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The Stunting Determinants in Toddlers from Landak Regency, West Kalimantan: A Cross-Sectional Study

Determinan Balita Stunting *di Kabupaten Landak, Kalimantan Barat: Studi Potong Lintang*

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ABSTRACT

Background: Stunting is a nutrition problem that can slow down the growth. With prevalence at 32.5%, Landak Regency in West Kalimantan has been designated as a stunting hotspot. The lack of a maximum penalty for the stunting case in Landak Regency is not based on factors causing the stunting itself, because there is no identifiable factor causing the stunting in certain area due to narrow roads and sharp curves.
Objectives: The objective of this study was to identify causes and distribution of the stunting case in Landak Regency.
Methods: A total of 330 households in Meranti, Sebangki, and Senakin were included in this cross-sectional study because they were at a risk of the stunting. Toddlers, mothers, health care, and environmental factors were among the found variables. The researchers employed a basic random sampling strategy for the sampling and used the secondary health center data to find out whether or not toddlers were stunted. Researchers in this study collected data on the independent variables by observing and interviewing participants. Using the chi-square test, the data was analyzed.
Results: The results showed that determinants of the stunting in Landak Regency were the history of early breastfeeding initiation (p-value=0.032), exclusive breastfeeding (p-value=0.042), frequency of exclusive breastfeeding (p-value=0.040), the continued breastfeeding (p-value=0.024), complementary feeding (p-value=0.042), immunization history (p-value=0.007), infectious disease history (p-value=0.000), maternal height (p-value=0.046), delivery assistance (p-value=0.000), access to health services (p-value=0.004), the role of health workers (p-value=0.002), and family latrine ownership (p-value=0.000).
Conclusions: Several factors were found to be associated with incidence of the stunting among toddlers in Landak Regency.

INTRODUCTION

Children suffer from a lower quality of life due to the stunting, a nutritional disorder that hinders them from reaching their full genetic potential in terms of growth and development. As a long-term symptom of malnutrition, the stunting can hinder development and growth in toddlers as a consequence of chronic malnutrition or previous growth failure[1]. The term stunting is described a state of chronic malnutrition starting from the womb phase. Children with the stunting experience a faltering growth due to the inhibited growth from womb until the first two years of their life. The stunting conditions only appear after the children are two years old. By comparing the child's age-appropriate body length (PB/U) or height (TB/U) to the standard set by the World Health Organization's Multicenter Growth Reference Study (MGRS), the researchers can identify indicators of the stunted and severely stunted toddlers. Children are considered to be severely stunted for having z-scores less than -3SD, according to the Indonesian Ministry of Health[2].

The stunting remains a national issue in Indonesia, negatively impacting children's physical and functional development as well as increasing their morbidity rates. World Health Organization emphasizes that addressing stunting is a global priority. According to WHO (2018), more than half of the stunted toddlers worldwide in 2017 were from Asia (55%), while over a third (39%) of them were from Africa[3]. WHO data on the stunting prevalence among children under five years shows that the number of the stunting cases in Indonesia was significant, with the third ranking in Southeast Asia. The average stunting prevalence in Indonesia during 2005-2017 period was 36.4%[2]. Basic Health Research

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data shows that the national stunting prevalence among children under five years was 36.8% in 2007, decreased to 35.6% in 2010, and increased to 37.2% in 2013. The 2018 data from Basic Health Research showed a decrease in the stunting prevalence to 30.8%. In West Kalimantan, the stunting prevalence among toddlers was 33.3%, but decreased to 27.8% in 2022. Although reduced, this figure was still far above the national target at 14%. A high stunting rate in West Kalimantan is a major concern, necessitating the immediate identification of its root causes for more effective prevention. In Landak Regency, the prevalence ranked fifth at 32.5%, while local government efforts focused on addressing the stunting case.

Many factors contribute to the stunting, which is a long-term nutritional issue. These include poverty, poor prenatal nutrition, baby health problems (infant morbidity), insufficient infant nutrition, and unsanitary living conditions[4]. Immediate action is necessary to ensure that the stunted children get the best opportunity of reaching their full cognitive and physical potential. Stunting in toddlers might be affected by one's level of knowledge. Parents, mothers in particular, need to understand the importance of antenatal care, proper food intake during pregnancy, appropriate nutrition for newborns, and other stunting prevention efforts which are crucial[5]. Mothers with a height of less than 145 cm bring a risk of the inhibited growth and development in their children. Babies born to women who are under 145 cm tall are more likely to be small-for-gestational-age (SGA), which puts them at a risk of developing into the stunted toddlers later in the next growth phase. Growth hormone insufficiency is a common medical condition among mothers who are under 145 cm tall[7]. Previous studies have identified maternal height as a risk factor for the stunting[8]. Factors existing throughout pregnancy are only one of many impacting a child's growth and development[8]. Regular Antenatal Care (ANC) checks, at least four times, are needed to monitor fetal development. Previous research has shown that ANC visits were a potential factor in the stunting incidence, along with maternal age and pregnancy interval[9].

Infants with low birth weight (LBW) may experience the inhibited growth and development, potentially turning into short children[10]. During early life stages, babies require more protein for their body cell development. Colostrum, rich in protein, is crucial for the baby's growth. If a baby does not sufficiently receive colostrum, the best nutrient for body cell growth is not perfectly obtained[11]. Children who receive exclusive breastfeeding have optimal growth, as colostrum helps form perfect body cells[12]. The correlation between toddler's stunting and non-exclusive breastfeeding has been previously demonstrated to be statistically significant (p-value=0.000)[13]. Research at the Kramatwatu Health Center also highlighted the importance of successful early initiation of breastfeeding (IMD) in preventing the stunting[14]. Immunization plays a role in actively improving health against antigens, while preventing diseases[15]. Previous research supported the role of immunization in preventing the stunting[16]. Proper nutrition significantly impacts toddlers' growth as well as their physical and mental development, so they require a diverse, sufficient, nutritious, and the balanced diet[17]. Protein intake is particularly important, as research has shown a relation between protein intake and the stunting incidence[18]. Sanitation improvement is another factor in preventing the stunting, with significant contribution from the environmental health, including an access to the clean drinking water, availability of latrines, and the hand-washing facilities[19].

Landak Regency is one of the districts contributing to the stunting prevalence in West Kalimantan. Despite significant local government support, the prevalence has not been significantly reduced. This research focused on the Meranti Health Center, Sebangki Health Center, and Senakin Health Center, in which their working areas were in Dayak, Malay, and Madurese communities. The study's advantage was in the stunting determinant investigation across three distinct regional characteristics within one district. The dominance of Dayak ethnic community and the presence of other ethnic groups make Landak Regency particularly noteworthy. Difficult road access and long distance from the district center have limited government intervention. This study uniquely identified toddler factors, maternal factors, health service factors, and environmental factors as the stunting determinants. Previous research in Landak Regency has primarily focused on urban areas, leaving the potential stunting causes in the unidentified rural areas. This research aimed to identify the stunting prevalence determinants in Landak Regency, representing three different regional characteristics, to develop strategic measures for addressing the stunting issue

METHODS

Landak Regency Health Office oversaw the execution of this study, which employed a cross-sectional analytical observational design at three health centers, namely Meranti, Sebangki, and Senakin. Secondary data suggested that the study areas were contributing to the stunting problem in Landak Regency where the research took place. Dayak Tribe is the dominant ethnic group, although there are also other significant population from Malay and Madurese.

The study subjects comprised 330 families at a risk of the stunting in each location, selected using a simple random sampling technique. Inclusion criteria included families of toddlers having Maternal and Child Health (MCH) books, registered as Integrated Service Post participants in each region, and willing to participate as respondents, as proven with the informed consent signed by the mothers of toddlers. Exclusion criteria were toddlers in ill condition. The nutritional status of toddlers for the stunting and non-stunting categories was determined through secondary data from health centers and cross-checked during the data collection using the standardized tools, such as stadiometers and scales. Ethical considerations in this study included confidentiality, free exploration, and the freedom to refuse or accept participation, as demonstrated through the informed consent. The researchers ensured the confidentiality of respondents by using the codes, instead of names, and guaranteed the confidentiality of all collected information. With the code 039/KEPK-

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FIKES/UM PONTIANAK/2021, this study was approved by the Health Research Ethics Commission of the Faculty of Health Sciences, Muhammadiyah University of Pontianak.

Toddler factors included several factors, namely vaccination history, infectious disease history, the length of time in breastfeeding, how often they get breastfed exclusively, how long they get breastfed for, how often they continued to get breastfed, and whether or not child's diet is supplemented with other foods. Maternal factors included some aspects, namely height, knowledge, gestational age, antenatal care, childcare practices, and access to the health services. Home environment factors included other matters, like family latrine ownership and water sanitation. Trained enumerators, as aided by Integrated Service Post cadres, were assigned to each household of toddlers chosen as respondents in order to ensure accuracy of the collected data. In order to evaluate the state of water sanitation and latrines, questionnaires and observation sheets were utilized in households who had children younger than five years.

Prior to the data entry, enumerators ensured that all collected data was complete. Data recapitulation was carried out in Microsoft Excel, and the data were imported to SPSS for numerical variable translation and coding. Afterwards, the data was ready for analysis. Univariate data analysis determined the frequency distribution of each variable, presenting the percentage data. Factors pertaining to the environment, health services, mothers, and toddlers were the independent variables that were analyzed in a bivariate data set, while the dependent variable was the stunting. In order to test for the bivariate relation, we utilized the chi-square test at the 95% confidence and 5% significant levels. It was determined that factors were the stunting determinants if the chi-square analysis revealed a p-value less than 0.05, considered to be significant.

RESULTS AND DISCUSSIONS

The study was conducted on 330 families at a risk of the stunting (families of toddlers) in Landak Regency in working area of 3 health centers, namely Meranti Health Center, Sebangki Health Center and Senakin Health Center. Distribution and frequency of each research variable were determined by the univariate data analysis. The following is a compilation of univariate data pertaining to some factors affecting toddlers, mothers, health services, and the environment.

Table 1. Frequency Distribution of Toddler Factors as Potential Determinants of the Toddler Stunting in Landak Regency

Variable	n	%
Immunization History		
Incomplete	100	30.3
Complete	230	69.7
History of Infectious Disease		
Available	106	32.1
None	224	67.9
Exclusive Breastfeeding		
Not Exclusive Breastfeeding	184	55.8
Exclusive Breastfeeding	146	44.2
Breastfeeding Duration		
<30 Minutes	172	52.1
≥30 Minutes	158	47.9
Frequency of Exclusive Breastfeeding		
<12 Times per Day	245	74.2
≥12 Times per Day	85	25.8
Advanced Breastfeeding		
No	153	46.4
Yes	177	53.6
Complementary Feeding		
Not Appropriate	184	55.8
Compliant	146	44.2

Among the characteristics shown to be the stunting determinants in toddlers from Landak Regency, the most common cause was an absence of the exclusive breastfeeding (184 cases, or 55.8% of the total). Regarding the length of breastfeeding, a more dominant group at 172 (52.1%) had the breastfeeding sessions of less than 30 minutes. The frequency of exclusive breastfeeding was also higher among those who were breastfed less than 12 times per day, at 245 (74.2%). Additionally, inappropriate complementary feeding was more common, thus affecting 184 (55.8%) of the toddlers.

Table 2. Frequency Distribution of Maternal Factors as Potential Determinants of the Toddler Stunting in Landak Regency

Variable	n	%
Maternal Knowledge		
Not Good	154	46.7
Good	176	53.3
Maternal Height		

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Variable	n	%
Maternal Height at Risk	17	5.2
Maternal Height Not at Risk	313	94.8
Maternal Gestational Age		
At Risk	32	9.7
Not at Risk	298	90.3
ANC		
Not Conforming to Standard	199	60.3
Conforming to Standard	131	39.7
Delivery Assistance		
Non-Personnel	76	23.0
Health Workers	254	77.0
Parenting Pattern		
Not Good	138	41.8
Good	192	39.7

The frequency distribution of maternal factors, as the stunting determinants in toddlers from Landak Regency, showed that the ANC during pregnancy was more dominant, with 199 cases (60.3%), compared to ANC that met the standards, which accounted for 131 cases (39.7%).

Table 3. Frequency Distribution of Health Service Factors as Potential Determinants of the Toddler Stunting in Landak Regency

Variable	n	%
Access to Health Services		
Not Good	120	36.4
Good	210	63.6
Role of Health Workers		
Not Good	91	27.6
Good	239	72.4

The frequency distribution of health service factors as the stunting determinants in toddlers from Landak District showed that access to the health services was good, with a higher percentage of 210 cases (63.6%), and the role of health workers was also good, at 239 cases (72.4%). Nevertheless, 66 cases (55% of the total) of the stunted toddlers and 54 cases (45% of the total) of the non-stunted toddlers showed a correlation between the availability of health services and prevalence of the stunting in toddlers.

Table 4. Frequency Distribution of Environmental Factors as the Potential Determinants of the Toddler Stunting in Landak Regency

Variable	n	%
Latrine Ownership		
None	113	34.2
Available	217	65.8
Water Sanitation		
Not Eligible	180	54.5
Meeting Requirements	150	45.5

The frequency distribution of environmental factors as the stunning determinants in toddlers from Landak District shows that some families of toddlers still did not have private latrines, accounting for 113 cases (34.2%). Additionally, it is noted that a higher number of respondents, 180 cases (54.5%), did not meet the requirements for water sanitation.

Table 5. Results of Bivariate Analysis of Factors as the Potential Determinants of the Toddler Stunting in Landak Regency (Study at 3 Health Centers)

Variable	Child Nutritional Status		Chi-Squared Test
	Stunted	Not Stunted	
Early Breastfeeding Initiation (IMD)			
Not Performing IMD	88 (50.0%)	88 (50.0%)	0.032*
Performed IMD	58 (37.7%)	96 (62.3%)	
Exclusive Breastfeeding			
Not Exclusive Breastfeeding	91 (49.5%)	93 (50.5%)	0.042*
Exclusive Breastfeeding	55 (37.7%)	91 (62.3%)	
Frequency of Exclusive Breastfeeding			

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Variable	Child Nutritional Status		Chi-Squared Test
	Stunted	Not Stunted	
<12 Times per Day	117 (47.8%)	128 (52.2%)	0.040*
≥12 Times per Day	29 (34.1%)	56 (65.9%)	
Follow-Up Breastfeeding			
Not Provided	57 (37.7%)	96 (62.7%)	0.024*
Given	89 (50.3%)	88 (49.7%)	
Feeding Complementary Foods			
Not Appropriate	91 (49.5%)	93 (50.5%)	0.042*
Compliant	55 (37.7%)	91 (62.3%	
Immunization History			
Incomplete	56 (56.0%)	44 (44.0%)	0.007*
Complete	90 (39.1%)	140 (60.9%)	
History of Infectious Disease			
Available	66 (62.3%)	40 (37.7%)	0.000*
None	80 (35.7%)	144 (64.3)	
Maternal Height			
Maternal Height at Risk	12 (70.6%)	5 (29.4%)	0.046*
Maternal Height Not at Risk	134 (42.8%)	179 (57.2%)	
Delivery Assistance			
Non-Personnel	53 (69.7%)	23 (30.3%)	0.000*
Health Workers	93 (36.6%)	161 (63.4%)	
Access to Health Services			
Not Good	66 (55.0%)	54 (45.0%)	0.004*
Good	80 (38.1%)	130 (61.9%)	
Role of Health Workers			
Not Good	27 (29.7%)	64 (70.3%)	0.002*
Good	119 (49.8%)	120 (50.2%)	
Latrine Ownership			
None	69 (61.3%)	44 (38.9%)	0.000*
Available	77 (35.5%)	140 (64.5%)	

A significant association between the stunting and early initiation of breastfeeding was found in the bivariate analysis (p-value=0.032), as shown above. The newborn is put on the mother's chest and encouraged to independently locate the nipple as part of the Early Initiation of Breastfeeding protocol, which begins shortly after delivery. The first 24 hours after delivery are crucial time for the success of subsequent breastfeeding. During the first hours after delivery, the hormone oxytocin, which is responsible for the milk production, is released[22]. Early initiation of breastfeeding greatly assists in the continuation of exclusive breastfeeding and its duration. According to previous research, failure in the early initiation of breastfeeding missed out on the benefits of colostrum for the infants, which affects their growth. By 12-24 months, these infants are more likely to experience the stunting conditions, as indicated by height that is not in accordance with their age[20]. This aligns with another research conducted in Astra Ksetra Village in 2022, which also found a significant relation between IMD and nutritional status (stunting)[23].

With a p-value of 0.042, this study found a statistically significant association between the stunting and the exclusive breastfeeding. The stunting was found in 91 (or 49.5% of the total) of the 184 individuals whose mothers stopped breastfeeding exclusively before the age of 6 months. Ministry of Health of the Republic of Indonesia has established a target rate of 80% for the exclusive breastfeeding, although this indicates that the percentage is still significantly lower[24]. Interviews with mothers as respondents revealed that some did not provide exclusive breastfeeding due to the perceived decreases in breast milk production, leading them to give formula milk or water instead. These findings were in line with earlier studies carried out in the work area of Hinai Kiri Health Center in Langkat Regency, which also discovered a significant correlation between the stunting and exclusive breastfeeding (p-value=0.001, PR=0.51), suggesting that this practice prevents infants from the stunting[25].

The length of the exclusive breastfeeding frequency also had a significant relation with the stunting incidence in toddlers from Landak Regency (p-value=0.040). According to the Ministry of Health (2021), mothers should breastfeed their babies in the morning, afternoon, and evening with a frequency of 8-12 times per day[26]. The duration of breastfeeding impacts milk production; if the babies are breastfed for the appropriate duration, they will receive the full benefits of both foremilk and hind milk, promoting optimal growth and development. Previous research also explained that non-optimal breastfeeding practices were associated with the stunting[27].

Besides exclusive breastfeeding as well as its frequency and duration, the continued breastfeeding was another significant variable related to the toddler's stunting (p-value=0.024). The continued breastfeeding, ideally until the age of 2 years, was an important intervention for reducing neonatal and under-five mortality[28]. Research by Endah and Titin (2021) stated that breastfeeding until the age of 2 years is crucial for preventing low growth and development in toddlers,

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which can be a risk factor for the stunting[29]. Other studies highlighted that the continued exclusive breastfeeding positively impacts nutritional status due to the minerals and growth factors in breast milk, which affect the development of the gastrointestinal tract, vessels, nervous system, and endocrine system in toddlers[30].

From the time of birth until the age of six months, breast milk should be the only food consumed. From the age of six months to twenty-four months, supplementary foods can be introduced, and breastfeeding should be continued until the kid reaches the age of twenty-four months or older. There is a correlation between the stunting occurrence and the supplemental feeding variable, as seen in the bivariate results above (p-value=0.042). The World Health Organization recommends starting complementary feeding at an age of about 6 months, when breast milk's nutritional value becomes inadequate and the infants requires supplementary food to meet their nutritional demands. Babies begin to be introduced to the finely pulverized complementary foods because they already have the chewing reflexes. Smooth solids include milk porridge, biscuits with milk added, banana and papaya crushed[31]. The accuracy of complementary food given to infants in accordance with their needs can reduce the stunting risk[32]. Research conducted in Majene District showed that early or late age of the first complementary food as well as the lack of consistency from complementary food administration are risk factors for the faltering growth and will affect the intelligence of toddlers in children at the age of 7-24 months[33]. This statement is also supported by another research conducted in Sumberjo Village, Kediri Regency, which reveals a significant relation between the age of first complementary feeding and the stunting incidence, with a ρ value of 0.000[34].

Infant immunization is an attempt to make babies more resistant to disease. Toddlers can develop inadequate immunity due to incomplete immunization, making them more susceptible to infections. The untreated infections in toddlers provide a risk of the stunting[35]. This study stated a significant relation between immunization history and the stunting incidence (p-value=0.007). This was in line with a research conducted by Devi and Sendy (2023) in the working area of Pusat Jaya Public Health Center of Surabaya, which states that the incomplete immunization can increase developmental disorders through the stunting[36]. Evidence from earlier studies suggested a correlation between basic immunization status and the stunting prevalence in toddlers from Hegarmanah Village, Jatinangor District. Specifically, compared to toddlers who received full vaccinations, those with incomplete immunizations had a 4.9-fold increased risk of stunting[37].

Incomplete immunization compromises immunity, leaving toddlers vulnerable to the infectious diseases. These infections can disrupt normal immune responses and drain the body's energy. Toddlers without adequate immunity quickly deplete their energy due to infections, leading to a reduced appetite and refusal to eat. This refusal lowers their intake of the necessary nutrients. Consequently, toddlers are at the stunting risk if they do not receive adequate nutrition and suffer from the recurrent infections[37]. A p-value of 0.000 indicates a statistically significant correlation between a family history of infectious illnesses and the stunting prevalence in toddlers. Yulnefia and Mega (2021) also found a strong correlation between a history of infections and stunting, so our findings were in line with theirs. A p-value of 0.001 and an OR value of 4.200 (1.760-10.020) were reported in their study, suggesting a 4.2-fold increased risk of the stunting in children at the age of 24-36 months who suffered from viral infections more frequently[38].

Maternal height in the above study results showed a significant association with a p-value of 0.046. Low maternal height was positively associated with short stature in children. Low maternal weight is also associated with the stunting risk in children. Underweight is associated with malnutrition as low nutrient intake increases the risk of small gestational size and thus shorter stature[39]. In previous studies, it was explained that mothers with short stature (<145 cm) had twice the risk of having the stunted children[8]. This can be understood by looking at the biomechanical process involving the mother's organs and the biological mechanisms involving her nutrition, as well as the intergenerational relationship between a short mother's stature and the fertilized egg growth in the uterus. A low birth weight (LBW) and the possibility of stunting in a child born to a mother who is small in stature is due to the narrower pelvis that these mothers have during pregnancy[40].

The aforementioned bivariate data also showed a correlation between the stunting prevalence in children younger than five years in Landak Regency and the availability of health services (p-value=0.004). This was due to the fact that accessing health services can be quite a challenge brought by several factors, such as long travel times and the challenging road conditions. A correlation between availability of health care and the stunting prevalence in toddlers (p-value=0.016) was found, in keeping with studies carried out in the Baitussalam Health Center's operational region[41]. The lack of utilization of access to health services results in low delivery assistance for pregnant women carried out by health workers. Pregnant women and childbirth are the most vulnerable groups that require maximum service from health workers. One form of services that must be provided to women giving birth is the delivery assistance by health workers. This delivery assistance is directly related to one of the health indicators, namely the Maternal Mortality Rate (MMR)[42]. Statistically, this study found a correlation between the stunting rates and the presence of unsupervised delivery help (p-value=0.000). Scientific studies carried out at the Martapura Health Center corroborate this, showing a correlation between the location of delivery and the use of the IMD nutritional status assessment in children (ρ value=0.002)[43]. This is related to the role of health workers who deal with the stunting incidence in toddlers with a statistical value obtained at p-value 0.002. The role of health workers can provide information and education and empower women, particularly mothers who play an important role in reducing the stunting[44].

Stunting can arise not only from nutritional deficiencies, but also from poor environmental

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sanitation, such as the lack of toilet ownership. The study results show a significant relation between latrine ownership and the stunting among toddlers in Landak Regency, with a p-value of 0.000. Latrines are essential for preventing the spread of diseases caused by human feces. Improper feces disposal can contaminate water and soil or turn into a source of infection, thus posing significant health risks. Family latrines are crucial in reducing the disease risk. Each family should have its own toilet to avoid the indiscriminate feces disposal, as insects can transfer germs from the exposed feces to food, thus potentially causing diseases like diarrhea[19]. A similar study stated that household sanitation, namely defecation practices, was significantly associated with the stunting incident in children under the age of 25-59 months in Lumajang District with a ρ value of 0.043 with a strong association of 0.218[4]. The use of latrines can contribute to the disease transmission which is also associated with the stunting. In line with a research conducted by Rizki, et al (2023), there was a relation between latrine ownership and the stunting incidence in toddlers from the working area of Penengahan Health Center, South Lampung Regency with an OR value of 7.4, meaning toddlers who had improper latrines had a risk of 7.4 times to experience the stunting, compared to toddlers who have proper latrines[45].

CONCLUSIONS

Determinants of the stunning in toddlers from Landak Regency include early initiation of breastfeeding ,exclusive breastfeeding, frequency and duration of breastfeeding, the continued breastfeeding, complementary feeding, immunization history, infectious disease history, maternal height, delivery assistance, access to health services, the role of health workers, and the limited latrine ownership. The findings of this study can guide the Landak Regency government, particularly the Health Office and Health Centers, in formulating policies and intervention activities to address the stunting issue. One recommendation is the development of an education model for families and mothers of toddlers to prevent the stunting through the "*Rumah Cegah Stunting*" (House of the Stunting Prevention) program, for leveraging the empowerment of the Integrated Service Post cadres and youth organizations in each region.

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CONFLICT OF INTEREST AND FUNDING DISCLOSURE

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AUTHOR CONTRIBUTIONS

ET: conceptualization, methodology, supervision, writing – review and editing; OW: methodology, writing – original draft, writing – review and editing; ES: methodology, formal analysis, writing – original draft; DA: formal analysis, resources, administration.

REFERENCES

1. Ministry of Health of the Republic of Indonesia. The Results of Indonesian Nutrient Status Survey in 2022. *Ministry of Health* 1–150 (2022).
2. Ministry of Health of the Republic of Indonesia. 2018 Basic Health Research Report of the Ministry of Health of the Republic of Indonesia. National Report of Basic Health Research in *2018* vol. 53 154–165 (2018).
3. Firrahmawati, L., Khotimah, N. & Munawaroh, M. An Analysis of the Causative Factors Affecting the Stunting Incidence. *Journal of Midwifery* **12**, 28–38 (2023).
4. Amalina, A., Ratnawati, L. Y. & Bumi, C. Relation among Consumption Water Quality, Hygiene, Household Sanitation, and the Stunting Incidence (A Case Control Study in the Stunted Toddler in the Lumajang Regency). *Journal of Indonesian Environment Health.* **22**, 28–37 (2023).
5. Murti, L. M., Budiani, N. N. & Darmapatni, M. W. G. Relation of Mother's Knowledge on Nutrient with the Stunted Child at the Age of 36-59 Months in Singakerta Village of Gianyar. *Sci. J.* **8**, 63–69 (2020).
6. Andari, W., Siswati, T. & Paramashanti, B. A. Maternal Height as a Factor of the Stunting Risk in the Children at the Age of 24-59 Months in the Pleret and Pajangan Districts, Bantul Regency, Yogyakarta. *J. Nutr. Coll.* **9**, 235–240 (2020).
7. Zubaidi, H. A. K. Height and the Smoking Behavior in Parent Potentially Lead to the Stunting in the Toddlers. *J. Penelit. Perawat Prof.* **3**, 279–286 (2021).
8. Safinatunnaja, B. Relation between Maternal Height and the Stunting Incidence in the Children at the age of 6-23 Months. *Journal of Health and Pharmaceutical Sciences.* **7**, 33–35 (2019).
9. Istiningsih, T. & Riyanti, R. Maternal Risk Factors against the Stunted Toddlers at the Age of 12-24 Months in Public Health Center of Mantangai District, Kapuas Province, Kalimantan. *Malahayati Nurs. J.* **4**, 1828–1838 (2022).
10. Linda, N. H., Lestari, H. & Rabbani Karimuna, S. Relation among Exclusive Breastfeeding, History of Baby with Low Birth Weight, Protein Intake, and the Stunting Incidence in the Children at the Age of 12-36 Months in the Working Area of Public Health Center in Tumbu-Tumbu Jaya, East Kolono District, South Konawe Regency in in

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2023. *Journal of Nutrient and Health. Indones.* **4**, 137–141 (2023).
11. Karo, E. B., Putri, S. R. & Yolandia, R. A. Determinants of the Stunting Incidence in the Toddler at the age of 6-24 Months. *Indones. J. Midwifery Sci.* **1**, 111–118 (2022).
12. Marchatus Soleha, Vivi Dwi Putri & Vika Tri Zelharsandy. An Analysis of the Effect from the Time of Colostrum Release towards the Physiological Jaundice Incidence in the Newborn. *Lentera Perawat* **4**, 116–122 (2023).
13. Singarimbun, N. B. *et al.* Comparison between Baby Growth and Exclusive and Non-Exclusive Breastfeeding. *J. Pharm. Heal. Res.* **4**, 64–68 (2023).
14. LINTANG, S. S. & AZKIYA, F. Relation between Early Initiation of Breastfeeding and the Stunting Incidence in Baby at the Age of 0-24 Months in the Kramatwatu Public Health Center in 2021. *J. Midwifery* **10**, 155–160 (2022).
15. Pusung, B. L., Malonda, N. S. H. & Momongan, N. Relation among the History of Immunization, the Infectious Disease, and Nutrient Status in Toddler at the age of 24-59 Months in the Working Area of Touluaan Public Health Center, Southeast Minahasa Regency. *J. KESMAS* **7**, 1–7 (2018).
16. Jamil, S. N. & Subiyatin, A. Relation between the History of Immunization and the Nutrient Status of Toddler. *J. Smart Midwife* **2**, 132–138 (2020).
17. Safa Safira Ibta Putri, Sri Tirtayanti & Dewi Pujiana. Relation among the Exclusive Breastfeeding, Complementary Food for Breast Milk, and the Stunting Incidence. *Mot. Journal of Health Sciences.* **18**, 7–13 (2023).
18. Utami, R. D. P. Patterns of Feeding, Exclusive Breastfeeding, Protein and Energy Intake, as the Causes of Stunting in Grogol Village, Ponorogo. *Nursery Journal of Malang* **5**, 96–102 (2020).
19. Sengkey, A., Joseph, W. B. S. & Warouw, F. Relation among the Availability of Family Latrine , Household Waste Disposal, and Diarrheic Incidence in the Raanan Baru Village, West Motoling District, South Minahasa Regency. *Journal of Public Health* **9**, 182–188 (2020).
20. Mamuroh, L., Sukmawati, S. & Nurhakim, F. Implementation of the Early Initiation of Breastfeeding by the Delivery Assistant. *Journal of Health. Bakti Tunas Husada. Journal of Nursing Sciences, Health Analysis and Pharmacy.* **21**, 1 (2021).
21. Ibrahim, I. A. *et al.* Determinant Analysis of Growth Failure (Stunting) in Children aged 12-36 Months in the Mountains of the Village of Bontongan. *Al-Sihah Public Heal. Sci. Journal* **11**, 50–64 (2019).
22. Shaputri, W. E. & Dewanto, N. E. Relation between Mother's Education and the Nutrient Status of Children from the age of 1 year and 6 months to 2 years in Sumber Waras Hospital. *Hijp Heal. Inf. J. Penelit.* **27**, 58–66 (2023).
23. Kusumaningsih, N., Muharramah, A., Dian Khairani, M. & Abdullah. Relation between Early Initiation of Breastfeeding and the Stunting Incidence in Astra Village. *Univ. Aisyah Pringsewu* **6**, 2023 (2023).
24. Ritanti, R. & Permatasari, I. Determinants of the Exclusive Breastfeeding Practice. *Qual. J. Kesehat.* **15**, 77–83 (2021).
25. Pratama, M. R. & Irwandi, S.Relation between Exclusive Breastfeeding and the Stunting in Hinai Kiri Public Health Center, Secanggang District, Langkat Regency. *J. Kedokt. STM (Sains dan Teknol. Med.* **4**, 17–25 (2021).
26. Yanti, A. P., Usman, A. M. & Widowati, R. Effects of the Exclusive Breastfeeding on Growth and Development of Babies at the age of 6 Months. *Nurs. Insid. Community* **4**, 53–58 (2021).
27. Astuti, M. A. *et al.*The Effects of Exclusive Breastfeeding History on the Stunting Incidence in the Toddlers. **10**, 35–39 (2024).
28. Purnami, L. A. *et al.* The Perception of Mother regarding the Advanced Breastfeeding (0-2 Years): A Phenomenological Study. *NersMid* **3**, 1–6 (2020).
29. Kusumawati, E. & Sutriyani, T. Relation among Breastfeeding until the Age of 2 Years, Diet Pattern of Pregnant Mother, and the Growth of Child at the Age of 3 Years in Mojo Village, Kalitidu District, Bojonegoro Regency. *J. Tribhuwana Tunggadewi* University **5**, 55 (2021).
30. Ahonen, J., Rankinen, K., Holmberg, M., Syri, S. & Forsius, M. Application of the SMART2 Model to a Forested Catchment in Finland: Comparison to the SMART Model and Effects of Emission Reduction Scenarios. *Boreal Environ. Res.* **3**, 221–233 (1998).
31. Rohmani, A.Administration of the Complementary Food for Breast Milk on Children at the Age of 1-2 years in the Central Lamper Subdistrict, South Semarang District, Semarang City. *Pros. Semin. Nas. Unimus* **1**, 81–87 (2018).
32. Merben, O. & Abbas, N. Relation between the Complementary Food for Breast Milk and the Diarrheic Incidence in Babies at the Age of 0-6 Years in the Working Area of the Cigudeg Public Health Center in 2023. *J. Health Science. Bpi* **7**, 1–8 (2023).
33. Mayangsari, R., Sri, A., Kasma, R. & Yulia, A. Relation between the Age of Introduction to Complementary Food for Breast Milk on the Stunting Incidence in the Toddlers in Rangas Subdistrct, Banggae District, Majene Regency. *Nutr. Sci. Heal. Res.* **2**, 14–20 (2023).
34. Riska, S., Mika, M. & Ririn, I. Relation between the Early Administration of the Complementary Food for Breast Milk with the Stunting Incidence in Toddler at the Age of 1-5 Years in Sumberjo Village, Kandat District, Kediri Regency. 91–99 (2019).
35. Eldrian, F., Karinda, M., Setianto, R., Dewi, B. A. & Guzmira, Y. H. Relation between the History of Infectious Disease and the Stunting Incidence in the Toddlers of the Cipadung Public Health Center, Bandung City. *J. Health Management.* **9**, 80–89 (2023).
36. Aprilia, D. & Tono, S. F. N. The Status of Basic

How to cite: *Trisnawati, E., Widyastutik, O., Suryadi, E., Alamsyah, D., Budiastutik, I., & Ruhama', U. (2024) The Stunting Determinants in Toddlers from Landak Regency, West Kalimantan: Determinan Balita Stunting di Kabupaten Landak, Kalimantan Barat: Studi Potong Lintang. Amerta Nutrition, 8(1SP), 61–69.*

Immunization towards the Stunting Incidence and Disturbance in the Todder's Growth. *J. Midwivery* **12**, 66–74 (2023).

37. Wanda, Y. D., Elba, F., Didah, D., Susanti, A. I. & Rinawan, F. History of the Basic Immunization Status Related to the Stunting Incidence in Toddlers. *J. Midwivery of Malahayati* **7**, 851–856 (2021).
38. Yulnefia & Sutia, M. Relation between the History of Infectious Disease and the Stunting Incidence in Toddlers at the Age of 24-36 Months in the Working Area of Tambang Public Health Center, Kampar Regency. *Jambi Med. J.* **10**, 154–163 (2022).
39. Dewi, Y. I., Agrina, A. & Erika, E. Description of Risk and the Stunting Prevention Efforts in the Pregnancy Period in the River Basin Area. *J. Ners Indones.* **13**, 115–127 (2023).
40. Waryana, Rosyida, I. S., Iskandar, S. & Y. Maternal Height and the Stunting Incidence in the Working Area of Srandakan Public Health Center, Yogyakarta. *Nutr. Diaita* **14**, 42–49 (2022).
41. Asarah, K., Ramadhaniah, Tahara, D. S. & M. Biomed. Relation among Health Service Access, Baby with Low Birth Weight, Exclusive Breast Milk, and the Protein Intake, and the Stunting Incidence in the Toddlers at the age of 6-59 Months in the Working Area of the Batussalam Public Health Center, Aceh Besar Regency in 2022. *J. Heal. Med. Sci.* **1**, 171–177 (2022).
42. Indah, I., Firdayanti, F. & Nadyah, N. Management of the Intranatal Nursery Assistance in Mrs. "N" at the Preterm Pregnancy Age in the Regional Public Hospital of Syekh Yusuf Gowa on the 1st of July, 2018. *J. Midwifery* **1**, 1–14 (2019).
43. Norhana, A., Arifin, S. & Yulidasari, F. Relation among the Birthing Place, Birthing Assistant, and the Implementation of Early Initiation of Breastfeeding in the Public Health Center of Martapura . *J. Publ. Kesehat. Masy. Indones.* **3**, 51–58 (2019).
44. Fifi, D. & Hendi, S.The Importance of Public Health, Education, and Women Empowerment to Reduce the Stunting in the Developed Nation. *J. Pros. Semin. Nas. Kesehat.* **2**, 16–25 (2020).
45. Pratama, R., Prasetyo, E. W. & Pramesona, B. A. The Latrine Ownership Relates to the Stunting Incidence in Toddlers. *J. Penelit. Perawat Prof.* **2**, 1333–1336 (2024).

How to cite: *Trisnawati, E., Widyastutik, O., Suryadi, E., Alamsyah, D., Budiastutik, I., & Ruhama', U. (2024) The Stunting Determinants in Toddlers from Landak Regency, West Kalimantan: Determinan Balita Stunting di Kabupaten Landak, Kalimantan Barat: Studi Potong Lintang. Amerta Nutrition, 8(1SP), 61–69.*