

Determinants of Stunting in Children Aged 12-59 Months

Erna Julianti¹, Elni¹

¹*Department of Child Nursing, Pangkalpinang Nursing Academy, Bangka Belitung, Indonesia*
Corresponding Author: Erna Julianti (adex_erna90@yahoo.com)

Received: 6 October 2019

Revised: 24 April 2020

Accepted: 27 April 2020

ABSTRACT

Background: Stunting is one of the priorities of nutritional issues in Indonesia. It is one of the chronic malnutrition effects in children, which will have a long-term impact on the growth and cross-generation of mothers through the cycle of stunting syndrome.

Purpose: This study aimed to identify the determinant factors of stunting in children aged 12-59 months.

Methods: Quantitative research with a cross-sectional approach was employed in this study, involving 205 respondents recruited using a consecutive sampling technique. Data were collected using the z scores and questionnaires for children aged 12-59 months, food trust questionnaire, feeding practice questionnaire, and child eating habits questionnaire. The Chi-Square test and multivariable logistic regression were performed for the data analysis.

Results: Children who were not exclusively breastfed and had major infectious disease had a higher risk of stunting for 53.8% and 40.9%, respectively. There was a significant relationship between the history of exclusive breastfeeding ($p=0.001$, $OR=2.28$), the history of infection ($p=0.013$, $OR= 2.27$), and eating habits ($p=0.04$, $OR=1.55$) with stunting in children.

Conclusion: There is a relationship between the history of exclusive breastfeeding, the history of infection, and the eating habits of children with stunting. The formation of a peer group community of children aged 12-59 months is expected to prevent and overcome stunting and improve nutritional status and optimal development of the children.

Keywords: Children aged 12-59 months, stunting, breastfeeding, infection, eating habit

How to cite: Julianti, E., & Elni. (2020). Determinants of stunting in children aged 12-5 months. *Nurse Media Journal of Nursing, 10(1)*, 36-45. doi:10.14710/nmjn.v10i1.25770

Permalink/DOI: <https://doi.org/10.14710/nmjn.v10i1.25770>

BACKGROUND

Nutritional status has a significant influence on a child's growth and development. The efforts to meet the good nutritional status are given to a mother since the pregnant period until the phase after the baby is born (United Nations Children's Fund [UNICEF], 2017). Complete and varied nutrition during the first 1000 days of life can help brain development, promote proportional growth, and reduce the risk of disease (Saavedra & Dattilo, 2016). The inability to fulfill nutrition for the children during this

period can cause growth failure or growth retardation (Williams & Suchdev, 2017). One of the growth disturbances is stunting, which can affect the development of cognitive and non-cognitive abilities that will be felt in the pre-school to adolescence (Himaz, 2018).

The prevalence of stunting in the world has decreased from 32.6% in 2000 to 22.2% in 2017. Likewise, the prevalence of stunting in Southeast Asia has decreased from 51.3% in 2000 to 35.8% in 2016 (UNICEF, WHO, World Bank Group, 2017). Indonesia is included in the third country with the highest prevalence in the Southeast Asian or South-East Asia Regional (SEAR) region. The prevalence of stunting children aged 12-59 months in Indonesia in 2013 was 37.2%, and in 2018 was 30.8% (Ministry of Health Republic of Indonesia [MoHRI], 2018). The prevalence of short children aged 12-59 months in Bangka Belitung Islands Province in 2016 was 21.9%, which increased by 27.3% in 2017. Similarly, in Pangkalpinang, a city in Bangka Belitung, the prevalence of short children aged 12-59 months in 2016 was 21.7% and increased to 26.7% in 2017 (Public Health Office of Bangka Belitung Islands Province, 2017).

Referring to the high number of stunting and the impact it takes, a comprehensive effort is needed. One of the efforts that have been successfully carried out is to control the factors that cause stunting (Zanello, Srinivasan, & Shankar, 2016). Kismul, Acharya, Mapatano, & Hatløy (2017) grouped three factors related to stunting: distal factors, intermediate factors, and proximal factors. Distal factors cover mothers' education, ethnicity, economic status, location, and type of settlement. Intermediate factors include environmental factors and maternal factors. Proximal factors include the birth order of children, the child's health status, and early breastfeeding initiation. Moreover, eating habits can also affect stunting, one of which is due to the way parents give their children food that is not yet diverse and balanced (Ban, Guo, Scherpbier, Wang, Zhou, & Tata, 2017).

The cultures are also influencing factors of stunting. Such cultures may include belief against food, practices of child feeding according to mother's tradition, and children's eating habits. The culture that exists in society is also one of the factors that influence how parents feed their children (Batiro, Demissie, Halala, & Anjulo, 2017). There is a culture of prelacteal feeding of newborns and complementary feeding for children aged 12-59 months (Illahi & Muniroh, 2016). The culture that influences the feeding also indirectly influences the nutritional adequacy of children, which affects the emergence of stunting (Pokhrel, Nanishi, Poudel, Pokhrel, Tiwari, & Jimba, 2016).

Cultural and tradition factors have not been the focus of research in Indonesia, even though they are one of the main factors of stunting. Due to the diverse factors which cause stunting, the high incidence, and the impact of stunting, the researchers are interested in finding out the determinants of stunting in children aged 12-59 months.

PURPOSE

This study aimed to identify the determinant factors of stunting in children aged 12-56 months.

METHODS

Design and samples

This study used a cross-sectional research design and was conducted in Pangkalpinang, Bangka Belitung. The samples were 205 respondents of children aged 12-59 months selected from seven districts. Proportional sampling, which refers to the sampling process based on the area or unit by taking into account the proportion of the population, was used to recruit the samples. The number of samples in each district based on the calculation of proportion is listed as follows: Rangkui = 37, Bukit Intan = 40, Grimaya = 19, Pangkalbalam = 22, Taman Sari = 21, and Gerunggang = 38, and Selindung = 28. After the number of samples in each district was determined, the sampling in this study was carried out using a non-probability sampling method of consecutive sampling. The inclusion criteria were: children aged 12-59 months, mothers and children aged 12-59 months were residents living in Pangkalpinang, the mothers were able to read and write, and willing to be respondents after receiving the research explanation. The exclusion criteria were parents who were sick and unable to continue filling out the questionnaire, and the level of children's intelligence was <105 .

Ethical consideration

This study was approved by the health research ethics committee of Yogyakarta Aisyiyah University as an effort to protect the welfare of the respondents in the form of an ethical statement No. 393/KEP-UNISA/XII/2018.

Measurement

Data collection tools in this study were a height meter to measure a child's height and height chart according to the age by WHO 2006 to determine stunting in children aged 12-59 months by looking at the z score and questionnaire. Four questionnaires were used in the study. The questionnaires were derived from Birch, Fisher, Grimm-Thomas, Markey, Sawyer, & Johnson (2001), and tested for validity and reliability. The first questionnaire is the child characteristic questionnaire, which consisted of gender, age, history of exclusive breastfeeding, history of early breastfeeding initiation, history of immunization, and history of infectious diseases. The second questionnaire is the Belief or Tradition Questionnaire towards Food that is measured using a 1-10 Likert scale (1 = do not agree, and 10 = strongly agree), and the validity was 0.425-0.933. The third questionnaire is the Child Feeding Questionnaire to find out how parents feel in feeding their children in terms of responsibilities and monitoring measured by using a Likert scale of 1-5 (1 = never, 2 = rarely, 3 = several times, 4 = mostly, 5 = always) and the validity is 0.58-0.841. The fourth questionnaire is the Child Eating Habit Questionnaire to find out children's eating habits measured by using a Likert scale of 1-5 (1 = never, 2 = rarely, 3 = several times, 4 = mostly, 5 = always) and the validity is 0.439-0.929. The second, third, and fourth questionnaires have obtained the r results (corrected item-total correlation) more than the r table (0.361), so it can be concluded that the statements in the questionnaire are valid.

The results of the reliability test showed that the Cronbach's alpha values of the second, third, and fourth questionnaires were 0.962, 0.938, and 0.976, respectively. Therefore, it could be concluded that the instruments were reliable since the value was more or equal to 0.8.

Data analysis

The data analysis in this study was performed using univariate and bivariate analyses. The univariate analysis described the characteristics of children and the culture of feeding children, which were expressed in frequency and percentage distribution since the data were categorical. The bivariate analysis described the relationship between the characteristics of children, feeding culture, and the incidence of stunting. The statistical test utilized the chi-square and multivariable logistic regression for the analysis process.

RESULTS

Demographic characteristics of respondents

The majority of children aged 12-59 months were males (51.2%). The children with a history of exclusive breastfeeding and a history of early breastfeeding initiation were 68.3% and 73.2%, respectively. Furthermore, those children with a history of complete immunization and a history of infection were 77.6%, and 56.1%, respectively (Table 1).

Table 1. The Characteristic of respondents

Characteristics of Respondents	<i>f</i>	%
Sex		
Male	105	51.2
Female	100	48.8
Exclusive breastfeeding history		
Exclusive breastfeeding	140	68.3
Non-exclusive breastfeeding	65	31.7
History of early breastfeeding initiation		
Early breastfeeding initiation	150	73.2
Non-early breastfeeding initiation	55	26.8
Immunization history		
Complete	159	77.6
Incomplete	46	22.4
Infection history		
Had an infection	115	56.1
Never had an infection	90	43.9

Relationship between gender, breastfeeding, immunization and infectious disease with stunting

The results indicated that there was no significant relationship between gender, history of early breastfeeding initiation, and history of immunization with stunting (p -value 0.62; 0.93; 0.66) (Table 2). However, the proportion of children aged 12-59 months who were not exclusively breastfed had a higher stunting risk of 53.8%. Based on the results of the analysis, it is reported that there was a significant relationship between exclusive breastfeeding and stunting with a p -value of 0.001 ($p < 0.005$). In addition, the OR (Odds Ratio) value is 2.28 (95% CI: 1.57-3.32), which shows that children aged 12-59 months who were not given exclusively breastfed have 2.28 times stunting chance compared to exclusive breastfeeding.

The proportion of the children aged 12-59 months with the majority of infectious disease had a higher stunting risk of 40.9%. The analysis found that there was a

significant relationship between infectious disease status and the incidence of stunting in Pangkalpinang with p -value = 0.013 ($p < 0.05$). It is also obtained an OR (Odds Ratio) value of 2.27 (95% CI:1.22-4.19), which shows that children aged 12-59 months suffering from infectious diseases have 2.27 times chance of stunting compared to those who did not (Table 2).

Table 2. Relationship between gender, history of exclusive breastfeeding, history of early breastfeeding initiation, history of basic immunization, history of infectious diseases, and stunting

Variable	Stunting classification				P value	OR (CI 95%)
	Stunting		Non-stunting			
	n	%	n	%		
Gender						
Male (ref)	37	35.2	68	64.8	0.620	0.83 (0.46-1.48)
Female	31	31	69	69		
Exclusive breastfeeding history						
Exclusive breastfeeding (ref)	33	23.6	107	76.4	0.001*	2.28 (1.57-3.32)
Non-exclusive breastfeeding	35	53.8	30	46.2		
History of early breastfeeding initiation						
Early breastfeeding initiation (ref)	49	32.7	101	67.3	0.930	0.92 (0.48-1.76)
Non-early breastfeeding initiation	19	34.5	36	65.5		
History of basic immunizations						
Complete, age-appropriate (ref)	51	32.1	108	67.9	0.660	0.82 (0.41-1.59)
Incomplete	17	37	29	63		
History of infectious diseases						
Positive	47	40.9	68	59.1	0.013*	2.27 (1.22-4.19)
Negative (ref)	21	23.3	69	78.7		

* p -value < 0.05

Relationship between mothers' belief, feeding practice, and eating habits, and stunting

The results of this study indicated that there was no relationship between mothers' belief in food and the feeding practice with the incidence of stunting. Children with low eating habits tended to experience more stunting, which was 39.6%. The results of the analysis found that there was a significant relationship between children's eating habits and stunting with p -value = 0.04 ($p < 0.05$). In addition, an OR (Odds Ratio) value was 1.55 (95% CI:1.03-2.35), which showed that the children aged 12-59 months with low eating habits hadve 1.55 times chance of stunting compared to those with high eating habits (Table 3).

Table 3. Relationship between mothers' belief against food, practices of child feeding according to mothers' tradition, the practice of child feeding, children's eating habits with stunting

Variable	Stunting Classification				p value	OR (CI 95%)
	Stunting		Non Stunting			
	n	%	n	%		
Mother's Belief in Feeding						
Low confidence	40	38.8	63	61.2	0.1	0.59 (0.33-1.07)
High confidence (ref)	28	27.5	74	72.5		
The Practice of Child Feeding						
Low control	35	32.4	73	67.6	0.92	1.07 (0.6-1.9)
High control (ref)	33	34	64	64		
Children's Eating Habits						
Low	44	39.6	67	60.4	0.04*	1.55 (1.03-2.35)
High (ref)	24	25.5	70	74.5		

* p-value <0.05

DISCUSSION

The characteristics of the children in this study included gender, age of the child, history of exclusive breastfeeding, history of early breastfeeding initiation, history of basic immunization, and history of infectious diseases. There is no relationship between the gender of the children aged 12-59 months in this study and stunting. Both males and females have a similar possibility to experience stunting. Other things that have a similar possibility are the history of early breastfeeding initiation and the history of basic immunizations. On the other hand, the history of non-exclusive breastfeeding and the history of infectious diseases experienced by children aged 12-59 months have a chance to cause stunting.

A study by Setiawan, Machmud, and Masrul (2019) showed that there were significant relationships between energy intake level, history of infectious disease duration with the incidence of stunting. Non-exclusive breastfeeding has an influence on the incidence of stunting in children aged 12-59 months. It is in line with the results of the previous study, which points out that exclusive breastfeeding is strongly associated with reducing the risk of stunting (Victora et al., 2008). The result of another research indicates the same result; one of the main factors causing stunting in the village of Petobo, Palu is that the mothers do not give exclusive breastfeeding (Rahman, Napirah, Nadila, & Bohari, 2017). This finding is also supported by the results of another research which states that exclusive breastfeeding during the first six months and appropriate complementary foods are the efforts to reduce short growth rates and improve the children's survival. The survey result from eight countries in Africa and Asia revealed that two countries (Ethiopia and Kenya) showed significant results in the relationship between stunting and exclusive breastfeeding (Bove, Miranda, Campoy, Uauy, & Napol, 2012). Breast milk contains nutrients and bioactive factors that can prevent infection and inflammation and support the body's immunity and organ maturity (Ballard & Morrow, 2013). It confirms that exclusive breastfeeding is very important in supporting optimal child growth. The benefits may be due to the nutritional content of

breastfeeding, like long-chain fatty acids such as docosahexaenoic acid (DHA) and arachidonic acid (AA) and their influence on brain development. Breastfeeding might exert an effect through the physical and emotional contact between mother and infant during breastfeeding (Pang et al., 2019).

Based on the results of this study, infectious disease is one of the contributors to the occurrence of stunting. Infectious diseases can be caused by several things, such as the environment and poor sanitation. More than one-fifth of the world's population lives in inadequate environments and lack of clean water which allow high rates of enteric infections like diarrhea. The enteric infection will disrupt the function of absorption of nutrients in the intestine, causing up to 43% of growth to be stunted, which affects one-fifth of children worldwide and one-third of children in developing countries (Guerrant, DeBoer, Moore, Scharf, & Lima, 2013). When during the first two years, a child has an infectious disease, he/she can experience an average growth reduction of 8 cm and IQ decrease of 10 points when they are 7-9 years old. It shows that infectious diseases in children can result in stunted growth (Guerrant et al., 2013).

Culture in child feeding covers the mothers' belief in feeding, child feeding practices, and child's eating habits. The mothers' belief in feeding will affect child feeding practices. It is related to the habits that the mother believes regarding the prohibition or abstinence of nutritious food in her family. Most mothers have beliefs in particular food and the application of feeding practices is done according to low maternal confidence (Ma, 2015). It means that few people believe in culture and rarely apply the belief according to it. Koini, Ochola, and Ogada (2019) stated that socio-cultural practices and beliefs had been shown to influence the feeding of children, thus determining their nutritional status. Socio-cultural beliefs and practices which are basically contrary to the principle of fulfilling nutrition are the existence of dietary restrictions on pregnant women and children, mistakes in providing complimentary food to children, as well as the existence of negative views that prohibit immunization and exclusive breastfeeding.

The variable of child feeding illustrates how parents provide supervision, pressure, and restrictions on feeding their children. Ek et al., (2016) elaborate that the variable of child feeding is the way parents control and regulate the child's feeding. The variable also aims to see the beliefs, attitudes, and application of feeding by parents to children (Birch et al., 2001). Feeding a child is one of the factors that will affect a child's nutrition. This is partly because the child's food intake at pre-school age depends on the feeding. It is in line with the research of Birch et al., (2001) that parents who have babies and preschool children play an important role in deciding food for their children, responding to children's desire to eat, and deciding on adequate food limits for their children. In this study, child feeding is largely low, which shows that the efforts to control and regulate food intake for children are also low. Birch et al., (2001) explained that if the feeding given by parents is low, the food intake received by children is also low. Therefore, it can be concluded that low feeding contributes to the adequacy of nutrition received by children.

The variable of children's eating habits consists of two domains: the rejection of food and acceptance of food. In this study, most of the eating habits in children are low.

Children eating habits can affect food intake, which can affect the nutrition of children, one of which is stunting (Biondi, 2007). Birch et al. (2001) affirm that children have begun the ability to choose which foods they like or dislike. It confirms that the children's desire to choose allows them to form the eating habits which are possibly not appropriate with the efforts to fulfill optimal nutrition. On the other hand, parents must have a good ability to control food consumption. It is in line with research conducted by Birch et al. (2001), which explains that feeding the children has a close relationship with eating habits. Another research finding states that the initiation of inappropriate complementary feeding is directly related to stunting (Abeway, Gebremichael, Murugan, Assefa, & Adinew, 2018). The variables explained in some of the results of these studies are the factors that have a relationship in assessing the nutritional status of children related to their physical growth.

One of the factors that can influence stunting is eating habits, one of which is due to the way parents give their children food that is not yet diverse and balanced (Ban, Guo, Scherpbier, Wang, Zhou, & Tata, 2017). The culture that exists in the community is one of the factors that influence how parents feed their children (Batiro et al., 2017). The existence of a culture that is contrary to the principle of fulfilling nutrition in children is one of the predisposing factors for the occurrence of stunting (Nurbaiti, Adi, Devi, & Harthana, 2014).

CONCLUSION

This study showed that there was a significant relationship between the history of exclusive breastfeeding, the history of infection, eating habits, and stunting in children aged 12-59 months. The findings are expected to help the formation of peer groups in the children aged 12-59 months' family community to prevent and overcome stunting and to improve nutritional status and optimal children aged 12-59 months' development.

ACKNOWLEDGEMENT

The researchers would like to thank Yayasan Pendidikan Pangkalpinang (YPK) and Akper Pangkalpinang for funding support to this study. We also thank the parents and children aged 12-59 months in the city of Pangkalpinang who participated in this study.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

REFERENCES

- Abeway, S., Gebremichael, B., Murugan, R., Assefa, M., & Adinew, Y. M. (2018). Stunting and its determinants among children aged 6-59 months in Northern Ethiopia: A cross-sectional study. *Journal of Nutrition and Metabolism*, 2018, 1078480. doi:10.1155/2018/1078480
- Ballard, O., & Morrow, A. L. (2013). Human milk composition: Nutrients and bioactive factors. *Pediatric Obesity*, 60(1), 49-74. doi:10.1016/j.pcl.2012.10.002
- Ban, L., Guo, S., Scherpbier, R. W., Wang, X., Zhou, H., & Tata, L. J. (2017). Child feeding and stunting prevalence in left-behind children: a descriptive analysis of data from a central and western Chinese population. *International Journal of Public Health*, 62(1), 143-151. doi:10.1007/s00038-016-0844-6

- Batiro, B., Demissie, T., Halala, Y., & Anjulo, A. A. (2017). Determinants of stunting among children aged 6-59 months at Kindo Didaye woreda, Wolaita Zone, Southern Ethiopia: Unmatched case control study. *PLoS One*, *12*(12), e0189106. doi:10.1371/journal.pone.0189106
- Biondi, D. J. (2007). *Nutrient intake adequacy and child stunting status in Kabarole district, Western Uganda*. *Nursing & Allied Health Database*. (ProQuest Dissertations & Theses Global). Retrieved from <https://remote-lib.ui.ac.id:2063/docview/304790933?accountid=17242>
- Birch, L. L., Fisher, J. O., Grimm-Thomas, K., Markey, C. N., Sawyer, R., & Johnson, S. L. (2001). Confirmatory factor analysis of the Child Feeding Questionnaire: A measure of parental attitudes, beliefs and practices about child feeding and obesity proneness. *Appetite*, *201*-210. doi:10.1006/appe.2001.0398
- Bove, I., Miranda, T., Campoy, C., Uauy, R., & Napol, M. (2012). Stunting, overweight and child development impairment go hand in hand as key problems of early infancy: Uruguayan case. *Early Human Development*, *88*(9), 747-751. doi:10.1016/j.earlhumdev.2012.04.002
- Ek, A., Sorjonen, K., Eli, K., Lindberg, L., Nyman, J., Marcus, C., & Nowicka, P. (2016). Associations between parental concerns about preschoolers' weight and eating and parental feeding practices: Results from analyses of the child eating habit questionnaire, the child feeding questionnaire, and the lifestyle behavior checklist. *PLoS One*, *11*(1), 1-20. doi:10.1371/journal.pone.0147257
- Guerrant, R. L., DeBoer, M. D., Moore, S. R., Scharf, R. J., & Lima, A. A. (2013). The impoverished gut--a triple burden of diarrhoea, stunting and chronic disease. *Nature reviews. Gastroenterology & Hepatology*, *10*(4), 220-229. doi:10.1038/nrgastro.2012.239
- Himaz, R. (2018). Stunting later in childhood and outcomes as a young adult: Evidence from India. *World Development*, *104*, 344-357. doi:10.1016/j.worlddev.2017.12.019
- Illahi, R. K., & Muniroh, L. (2016). Gambaran sosio budaya gizi etnik Madura [An illustration of the socio-cultural nutritional culture of Madura]. *Media Gizi Indonesia*, *11*(2), 135-143.
- Kismul, H., Acharya, P., Mapatano, M. A., & Hatløy, A. (2017). Determinants of childhood stunting in the Democratic Republic of Congo: Further analysis of Demographic and Health Survey 2013-14. *BMC Public Health*, *18*(1), 1-15. doi:10.1186/s12889-017-4621-0
- Koini, S. M., Ochola, S., & Oggada, I. A. (2019). Social-cultural factors and complementary feeding of children 6-23 months among the Maasai in Narok South Kenya. *Journal of Health*, *62*, 170-177. doi:10.7176/JHMN
- Ma, G. (2015). Food, eating behavior, and culture in Chinese society. *Journal of Ethnic Foods*, *2*(4), 195-199. doi:10.1016/j.jef.2015.11.004.
- Ministry of Health Republic of Indonesia [MoHRI]. (2018). Pusat data dan informasi: Situasi balita pendek (*Stunting*) di Indonesia [Data and information center: Short toddler situation (*Stunting*) in Indonesia]. *Buletin Jendela Data dan Informasi*. Jakarta: Kementerian Kesehatan RI.

- Nurbaiti, L., Adi, A. C., Devi, S. R., & Harthana, T. (2014). Kebiasaan makan balita stunting pada masyarakat Suku Sasak: Tinjauan 1000 hari pertama kehidupan (HPK) [Stunting toddler eating habits in the Sasak tribe: Overview of the first 1000 days of life]. *Masyarakat, Kebudayaan dan Politik*, 27(2), 109-117.
- Pang, W. W., Tan, P. T., Cai, S., Fok, D., Chua, M. C., Lim, S. B., ... & Gluckman, P. D. (2019). Nutrients or nursing? Understanding how breast milk feeding affects child cognition. *European Journal of Nutrition*, 59(2), 609-619. doi:10.1007/s00394-019-01929-2.
- Pokhrel, K., Nanishi, K., Poudel, K. C., Pokhrel, K. G., Tiwari, K., & Jimba, M. (2016). Undernutrition among children aged 12-59 months and children in Nepal: maternal health services and their roles to prevent it. *Maternal and Child Health Journal*, 20(10), 2037-2049. doi:10.1007/s10995-016-2023-z
- Public Health Office of Bangka Belitung Islands Province (2017). *Profil kesehatan Provinsi Kepulauan Bangka Belitung [Health profile of the Bangka Belitung Islands Province]*. Pangkalpinang: Dinas Kesehatan Provinsi Kepulauan Bangka Belitung.
- Rahman, N., Napirah, M. R., Nadila, D., & Bohari. (2017). Determinants of stunting among children in urban families in Palu, Indonesia. *Pakistan Journal of Nutrition*, 16(10), 750-756. doi:10.3923/pjn.2017.750.756
- Saavedra, J. M., & Dattilo, A. M. (2016). *Nutrition in the first 1000 days of life: Society's greatest opportunity. Early nutrition and long-term health: Mechanisms, consequences, and opportunities*. Oxford: Elsevier.
- Setiawan, E., Machmud, R., & Masrul, M. (2018). Faktor-faktor yang berhubungan dengan kejadian stunting pada anak usia 24-59 bulan di wilayah Kerja Puskesmas Andalas Kecamatan Padang Timur Kota Padang tahun 2018 [Factors related to the incidence of stunting in children aged 24-59 months in the working area of Andalas Public Health Center, Padang Timur District, Padang City in 2018]. *Jurnal Kesehatan Andalas*, 7(2), 275-284.
- United Nations Children's Fund, the World Health Organization and World Bank Group (2017). *Level and Trends in Child Malnutrition: UNICEF/WHO/World Bank Group Joint Child Malnutrition Estimates*. Washington DC: United Nations Children's Fund, the World Health Organization and World Bank Group.
- United Nations Children's Fund. (2017). *First 1000 days: The critical window to ensure that children survive and thrive*. South Africa: United Nations Children's Fund.
- Victora, C. G., Adair, L., Fall, C., Hallal, P. C., Martorell, R., Richter, L., ..., & Scadev, H. S. (2008). Maternal and child undernutrition: Consequences for adult health and human capital. *The Lancet*, 371(9609), 340-357. doi:10.1016/S0140-6736(07)61692-4
- Williams, A. M., & Suchdev, P. S. (2017). Assessing and improving childhood nutrition and growth globally. *Pediatric Clinics of North America*, 64(4), 755-768. doi:10.1016/j.pcl.2017.03.001
- Zanello, G., Srinivasan, C. S., & Shankar, B. (2016). What explains Cambodia's success in reducing child stunting-2000-2014? *PLoS One*, 11(9), 1-22. doi:10.1371/journal.pone.0162668