

Factors Affecting Stunting in Kediri City, East Java, Indonesia

Santy Irene Putri¹, Dian Jayantari Putri K. Hedo²

1. Midwifery Study Program, Tribhuwana Tunggal University, Malang, Indonesia

2. National Board of Population and Family Planning, Surabaya, Indonesia

Corresponding Author:
santyrene@gmail.com

Abstract:

Fulfilling nutritional needs, especially in first 1000 days of life in children is one of strategy to prevent stunting in toddlers. However, fulfilling nutritional needs alone is not enough to do prevention efforts related to stunting. Data shown that currently, prevalence of stunting in Indonesia is still high. This study aimed to determine factors' effects on stunting. This was analytical study with retrospective cohort study design conducted in Kediri City in 2021. The sample size was 10.213 mothers who had toddlers. The dependent variable was stunting. The independent variables were mothers' education, birth spacing, and number of children. Data was collected using secondary data and analysed using logistic regression. Mothers' education less than Junior High School (OR= 156.1, 95% CI= 49.45 – 492.97, $p < 0.001$), birth spacing less than 2 years (OR= 14.4, 95% CI= 2.52 – 3.07, $p < 0.001$), and number of children more than 3 (OR= 2.67, 95% CI= 10.75 – 19.38, $p < 0.001$) had significant influences on stunting. Mothers' education less than Junior High School, birth spacing less than 2 years, and number of children more than 3 were the factors for the incident of stunting in toddlers.

Keywords: Mothers' education, Birth spacing, Number of children, Stunting

Introduction

Problems related to stunting in Indonesia are serious issues that need to be solved effectively. This happens because stunting is related to the quality of communities' human resources (Dewanti, Ratnasari, & Rumiati, 2019). Indonesian Toddler Nutrition Status Survey in 2019 indicated that the prevalence of stunting in Indonesia was 27.7%. It meant that one in four children under five (which was more than eight million children) in Indonesia was stunted. This stunting prevalence was higher when compared to the WHO threshold prevalence, which is 20%. Stunting cases on toddlers are mostly found in rural areas with high poverty and low education levels (Indrastuty & Pujiyanto, 2019).

Various efforts to deal with stunting in Indonesia have been carried out by related stakeholders, including the Indonesian government. The National Board of Population and Family Planning (BKKBN) oversees implementing efforts to accelerate stunting reduction and carries out several stunting reduction related programs throughout Indonesia. BKKBN conducts the "Kapita Selekt" program as effort to prepare technical policy formulation in form of training tools by formulating curriculum, modules, and learning media to accelerate stunting reduction in Indonesia. BKKBN developed several strategies and action plans, starting with educating brides and grooms, pregnant and postpartum women, and children in their first 1000 days of life. BKKBN also formed several stunting management teams in form of Stunting Reduction Acceleration Team (TPPS), Stunting Reduction Acceleration Task Force, and Family Assistance Team (TPK). These teams have role in handling the

acceleration of stunting reduction in each region throughout Indonesia which also involving various sectors such as medical sector, local governments, formal and informal leaders, cadres, family welfare empowerment teams, and other elements of society. With these efforts, the government is targeting reduction in stunting prevalence in Indonesia, from 27.6% in 2019 to 14% in 2024, as stated in 2020-2024 National Medium-Term Development Plan (RPJMN) (Badan Kependudukan dan Keluarga Berencana Nasional, 2021). The implementation of efforts to accelerate stunting reduction is quite complex to be carried out in real terms at various levels of society because the stunting causes are complex and diverse. This condition is exacerbated by the existence of pandemic due to Covid-19 which causes many difficulties, changes, and turbulences in various sectors of people's lives.

The main factor for stunting is the lack of nutritional intake of children in the first 1000 days of life. Brain and body growth develop rapidly at 1000 first days of life, starting from the fetus until the child is two years old. Fulfillment of nutrition at this stage is very important so that children's growth and development can be optimal (Dayuningsih, Permatasari, & Supriyatna, 2021). However, access to nutritional fulfilment In Indonesia is not evenly distributed to all level of communities (Suryana, 2019). The current Covid-19 pandemic have major impact on increasing stunting in poor group because of the economic turbulence during the pandemic times. This difficulty in gaining nutritious fulfilment bring impact on decreasing communities' purchasing ability of nutritious food (Susanto, 2021).

In addition to the main factors as explained in previous discussion, there are several other factors that are also related to the occurrence of stunting in Indonesia. One of these factors is birth spacing. Birth spacing is time interval between one pregnancy to the next another pregnancy in a woman (Hutcheon et al., 2019). Birth spacing can be determined by knowing the difference between age and birth before or after. Children who have close birth distance with their sibling(s) in less than 2 years' time interval have stunting risk of 11.65 times higher than children who have birth distance with their sibling in more than 2 years' time interval (Dhingra & Pingali, 2021). Birth spacing of less than 2 years also cause poor fetal growth, prolonged labor and bleeding of delivery because uterus has not recovered properly. Too close time interval on pregnancy causes women to have quite short time to restore her uterus condition to the normal condition. Pregnant women who have close time interval on pregnancy are also at risk of developing anemia that can causes stunting to their offspring (Ahrens, Nelson, Stidd, Moskosky, & Hutcheon, 2019; Schummers et al., 2018).

Stunting are also caused by the number of children owned by parents. Parents who have too many children have higher risk of stunting in children than parents who have ideal number of children (Palino, Majid, & Ainurafiq, 2017). Number of children can cause stunting because it affects parents' parenting style and pattern to their children. In addition, parity is also related to the parents' ability to

fulfill nutrition to their children. This condition can be exacerbated by the existence of low economic status or the current pandemic situation. Children who have many siblings tend to have inability to achieve optimal growth and development because they compete with their other siblings in terms of meeting limited resource of nutrition (Sulistyoningsih, 2020).

The level of women's education is also related to stunting prevalence. Lack of education in women that results in lack of knowledge related to healthy pregnancy and stunting prevention, triggers the inability of women to meet nutritional needs during pregnancy and during they raise children in 1000 first days of life (Ariani, 2020). Stunting are also caused by women's limited knowledge and awareness regarding the importance of early initiation of breastfeeding for their newborn. Early initiation of breastfeeding prevents stunting prevalence by ensuring babies' nutrition fulfilment in their early life (Mediani, 2020). Limited knowledge due to low level of education also makes women less aware of effective childcare and parenting skill to ensure optimal physical and psychological growth and development in children (Zurhayati & Hidayah, 2022).

Stunting bring various bad impacts for children who experience it. The negative impacts of stunting are both short-term and long-term impacts. Stunting causes children have height below the average height of other children in their age, suboptimal physical growth, poor immunity, poor academic achievement, are more likely to drop out of school, and more likely to have lower income as an adult worker (Beckmann et al., 2021; Chakravarty, Tatwadi, & Ravi, 2019). Stunting also causes delays in brain development, low learning abilities, and increase children's future risk of developing chronic diseases such as diabetes, hypertension, and obesity in adult life (Barir, Murti, & Pamungkasari, 2019; Indriani, Dewi, Murti, & Qadrijati, 2018).

The causes of stunting that rooted from multi-sector and stunting's long-term and short-term adverse effects on children make stunting become an important issue to put attention on and to study further. Scientific research and studies on stunting, which in this study will focus on the stunting causes from sociodemographic aspect, can be the basis for related parties and stakeholders to formulate various convergence-based and to do effective stunting management efforts in order to reduce stunting prevalence in Indonesia.

Methods

This was an analytical study with retrospective cohort study design conducted in Kediri City in 2021. The sample size was 10.213 mothers who had toddlers. Sampling technique used in this study was saturation sampling. The dependent variable was stunting. The independent variables were mothers' education, birth spacing, and number of children. Data was collected by using secondary data. Univariate analysis was conducted to describe the frequency distribution and percentage of each

variable, while multivariate analysis was conducted using logistic regression to analyze the effects of independent variables on dependent variables of this study.

Results

Table 1. Characteristics of respondents

Characteristic	Criteria	N	%
Age of women's first marriage	<20 years old	1689	16,5%
	>20 years old	8524	83,5%
Economic Status	Pre-prosperous	440	4,3%
	Prosperous	9773	99,6%
Working status	Working	10171	91,2%
	Not working	42	8,8%
Mothers' education	Lower than Junior High School	888	8,7%
	Higher than Junior High School	9325	91,3%
Mothers' age	15-19	22	0,2%
	20-24	550	5,4%
	25-29	1235	12,1%
	30-34	1818	17,8%
	35-39	2415	23,6%
	40-44	2251	22,0%
Total number of children	45-49	1922	18,8%
	1 child	3602	35,3%
	2 children	4337	42,5%
	>2 children	2274	22,3%
Sanitation Availability	Clean water	10122	99,0%
	Toilet	9706	94,9%
	Livable house	8269	80,8%
Mothers pregnancy	Pregnant	285	2,8%
	Not pregnant	9928	97,2%
Nutritional fulfilment	Fulfilled (twice per day)	10139	99,3%
	Not fulfilled (less twice per day)	74	0,7%
Mothers' pregnancy history	Early pregnancy (<20 years old)	22	0,2%
	Late pregnancy (>35 years old)	6195	60,7%
	Too often (< 2 years)	339	3,3%
	Too many (> 2 children)	2200	21,5%

Table 1 showed about the characteristics of research respondents. Table 1 indicated that most of respondents were mothers aged 35-39 years old, which was 23,6% and have two children, which was 42,45%. Most of respondents were women who are married over the aged of 20 years old, which was 83,5%, and had prosperous economic state, which was 99,6%. Most of respondents already had sanitation availability in their neighborhood environment, namely 99,0% of respondents had clean water availability, 94,9% of respondents had clean latrines, and 80,8% of respondents had livable houses.

From Table 1, it can be known that there were 2,8% of research respondents who were pregnant when this study was conducted. Most of the research respondents had education above the junior high school level, which was 91,3%, had a job, which was 91,2%, and were able to fulfil their daily nutritional needs, which was 99,3%. The table also showed information about respondents' pregnancy history,

namely 0.2% of respondents became pregnant at too young age, 60.7% of respondents became pregnant at too old age, 3.3% of respondents experienced pregnancy at too close time interval, and 21.5% of respondents had more than one pregnancy.

Table 2. Multivariate analysis

Independent Variable	OR	95 % CI		P
		Lower limit	Upper limit	
Mother's education < Junior High School	156.1	49.45	492.97	<0.001
Birth spacing < 2 years	14.4	2.52	3.07	<0.001
Number of children > 3	2.67	10.75	19.38	<0.001
n observation = 10213				
Nagelkerke R2 = 29%				
-2 Log likelihood = 9034				

In this study, multivariate analysis was carried out which is a method of processing a large number of variables, where the aim is to find the effect of these variables on an object simultaneously or simultaneously. Based on table 2, it is known about the results that children under five years old of mothers with education below junior high school had a 156.1 times chance of stunting compared to children of mothers with education above junior high school. Children under five years old of mothers who gave birth less than 2 years had a 14.4 times chance of stunting compared to children of mothers who gave birth more than 2 years apart. Children under five years old of mothers who had more than 3 children, had a 2.67 times chance of stunting compared to children of mothers who had less than 3 children.

Discussion

Birth spacing affects fetus and mothers' health (Molitoris, Barclay, & Kolk, 2019). The time interval between two pregnancies that are too close can cause serious complications in pregnancy and the birth process (Fotso, Cleland, Mberu, Mutua, & Elungata, 2013). World Health Organization (WHO) and National Board of Population and Family Planning (BKKBN) state that the interval between pregnancies should be 2 to 3 years. If the birth interval is less than two years, it can give bad impact on fetus and mothers' health. Birth spacing, which is the distance between pregnancy or also called the difference between age and birth before or after the birth of the subject, is one of some factors that caused stunting. Birth spacing can cause stunting because it affects parenting patterns for their children (Dhingra & Pingali, 2021). Birth spacing of less than 2 years can cause poor fetal growth, prolonged labor and bleeding at the time of delivery because the uterus has not recovered properly. Too close birth spacing causes mother having limited time to restore the condition of her uterus to its normal condition (Alreshidi & Haridi, 2021; Mremi, Rwenyagila, & Mlay, 2022).

The level of parental education, especially mothers' education level affects children's health status (Kriti Vikram, 2020; Mensch, Chuang, Melnikas, & Psaki, 2019). Mothers have role in forming children's eating habits, by arranging the menu, shopping, cooking, preparing, and distributing food. In

providing nutrition to children, mothers have role in determining food variations and identifying the nutritional needs for all family members (Ha, Bruce, Killian, Davis, & Lim, 2021; Wang, Naidoo, Ferzacca, Reddy, & Van Dam, 2014). Mothers who have knowledge about good nutrition are tend to be able to provide the right type and amount of food to ensure that their children can grow and develop optimally. Consumption of less nutritious food will cause imbalance of metabolic processes in children. As longterm effect, there will be growth and development disorders in children, on of which is stunting (Scheffler et al., 2021).

Number of children is also the risk factors of stunting (Danaei et al., 2016; Tafesse, Yoseph, Mayiso, & Gari, 2021). Availability of food for children is influenced by the number of children in the family. The chances of children experiencing malnutrition tend to be greater in family with low economic status with many children. Impaired growth and development tend to be experienced by children who are born later, because the burden that is borne by parents is getting bigger with the increasing number of children in family. This condition is exacerbated by working mothers who work for ensuring family finances and caused the nutrition fulfillment of children under-five is neglected. Children in that age still need attention and nutritious food, but the condition of low-income family with large number of children, will face difficulty in meeting the needs. Insufficient food intake due to the large number of family members will lead to nutritional problem as one of the stunting factors in children (Lee & Park, 2015) (Galgamuwa, Iddawela, Dharmaratne, & Galgamuwa, 2017).

Conclusion

Most of the respondents in this research, who were mothers of toddlers that potentially had risk of stunting, already had sanitation availability in their neighborhood environment. They were well-educated and had a proper job and economic welfare. They also had ability to fulfill their daily nutritional needs. From results of the study, it was known that mother's education, birth spacing less than 2 years, and number of children more than 3, had significant effects on occurrence of stunting in toddlers. Suggestions that can be submitted based on the results of this study were the need for further research on stunting in toddlers with different contexts and approaches. Based on the results of study, it was practically necessary to educate and raised awareness for the community about stunting and its prevention, especially those related to sociodemographic factors that became focus of this study. Thus, it was hoped that stunting prevalence in Kediri City can be suppressed or reduced through these prevention efforts.

References

1. Ahrens, K. A., Nelson, H., Stidd, R. L., Moskosky, S., & Hutcheon, J. A. (2019). Short interpregnancy intervals and adverse perinatal outcomes in high-resource settings: An updated systematic review. *Paediatric and Perinatal Epidemiology*, 33(1), 25-O47.

<https://doi.org/10.1111/ppe.12503>

2. Alreshidi, M. A., & Haridi, H. K. (2021). Prevalence of anemia and associated risk factors among pregnant women in an urban community at the North of Saudi Arabia. *Journal of Preventive Medicine and Hygiene*, 62(3), E653–E663. <https://doi.org/10.15167/2421-4248/jpmh2021.62.3.1880>
3. Ariani, M. (2020). Determinan Penyebab Kejadian Stunting Pada Balita: Tinjauan Literatur. *Dinamika Kesehatan: Jurnal Kebidanan Dan Keperawatan*, 11(1), 172–186. <https://doi.org/10.33859/dksm.v11i1.559>
4. Badan Kependudukan dan Keluarga Berencana Nasional. (2021). Bkkbn Mencari Strategi Percepatan Pencegahan Stunting. Retrieved from Badan Kependudukan dan Keluarga Berencana Nasional website: <https://www.bkkbn.go.id/detailpost/bkkbn-mencari-strategi-percepatan-pencegahan-stunting>
5. Barir, B., Murti, B., & Pamungkasari, E. P. (2019). The Associations between Exclusive Breastfeeding, Complementary Feeding, and the Risk of Stunting in Children Under Five Years of Age: A Path Analysis Evidence from Jombang East Java. *Journal of Maternal and Child Health*, 4(6), 486–498. <https://doi.org/10.26911/thejmch.2019.04.06.09>
6. Beckmann, J., Lang, C., du Randt, R., Gresse, A., Long, K. Z., Ludyga, S., ... Gerber, M. (2021). Prevalence of stunting and relationship between stunting and associated risk factors with academic achievement and cognitive function: A cross-sectional study with South African primary school children. *International Journal of Environmental Research and Public Health*, 18(8), 1–17. <https://doi.org/10.3390/ijerph18084218>
7. Chakravarty, N., Tatwadi, K., & Ravi, K. (2019). Intergenerational Effects of Stunting on Human Capital: Where Does the Compass Point? *International Journal of Medicine and Public Health*, 9(4), 105–111. <https://doi.org/10.5530/ijmedph.2019.4.24>
8. Danaei, G., Andrews, K. G., Sudfeld, C. R., Fink, G., McCoy, D. C., Peet, E., ... Fawzi, W. W. (2016). Risk Factors for Childhood Stunting in 137 Developing Countries: A Comparative Risk Assessment Analysis at Global, Regional, and Country Levels. *PLoS Medicine*, 13(11), 1–18. <https://doi.org/10.1371/journal.pmed.1002164>
9. Dayuningsih, Permatasari, tria A. E., & Supriyatna, N. (2021). Pengaruh Pola Asuh Pemberian Makan terhadap Kejadian Stunting Pada Balita. *Jurnal Kesehatan Masyarakat Andalas*, 14(2), 3. <https://doi.org/10.24893/jkma.v14i2.527>
10. Dewanti, C., Ratnasari, V., & Rumiati, T. (2019). Pemodelan Faktor-faktor yang Memengaruhi Status Balita Stunting di Provinsi Jawa Timur Menggunakan Regresi Probit Biner. *Jurnal Sains Dan Seni Its*, 8(2), 129–136. Retrieved from https://ejournal.its.ac.id/index.php/sains_seni/article/view/48519/5885
11. Dhingra, S., & Pingali, P. L. (2021). Effects of short birth spacing on birth-order differences in child stunting: Evidence from India. *Proceedings of the National Academy of Sciences of the United States of America*, 118(8), 1–8. Washington DC: PNAS News Office.

<https://doi.org/10.1073/pnas.2017834118>

12. Fotso, J. C., Cleland, J., Mberu, B., Mutua, M., & Elungata, P. (2013). Birth spacing and child mortality: An analysis of prospective data from the Nairobi urban health and demographic surveillance system. *Journal of Biosocial Science*, 45(6), 779–798. <https://doi.org/10.1017/S0021932012000570>
13. Galgamuwa, L. S., Iddawela, D., Dharmaratne, S. D., & Galgamuwa, G. L. S. (2017). Nutritional status and correlated socio-economic factors among preschool and school children in plantation communities, Sri Lanka. *BMC Public Health*, 17(1), 1–11. <https://doi.org/10.1186/s12889-017-4311-y>
14. Ha, O. R., Bruce, A. S., Killian, H. J., Davis, A. M., & Lim, S. L. (2021). Shared Dynamics of Food Decision-Making in Mother-Child Dyads. *Frontiers in Psychology*, 12(August), 1–11. <https://doi.org/10.3389/fpsyg.2021.695388>
15. Hutcheon, J. A., Moskosky, S., Ananth, C. V., Basso, O., Briss, P. A., Ferré, C. D., ... Ahrens, K. A. (2019). Good practices for the design, analysis, and interpretation of observational studies on birth spacing and perinatal health outcomes. *Paediatric and Perinatal Epidemiology*, 33(1), O15–O24. <https://doi.org/10.1111/ppe.12512>
16. Indrastuty, D., & Pujiyanto, P. (2019). Determinan Sosial Ekonomi Rumah Tangga dari Balita Stunting di Indonesia: Analisis Data Indonesia Family Life Survey (IFLS) 2014. *Jurnal Ekonomi Kesehatan Indonesia*, 3(2), 68–75. <https://doi.org/10.7454/eki.v3i2.3004>
17. Indriani, D., Dewi, Y. L. R., Murti, B., & Qadrijati, I. (2018). Prenatal Factors Associated with the Risk of Stunting: A Multilevel Analysis Evidence from Nganjuk, East Java. *Journal of Maternal and Child Health*, 3(4), 294–300. <https://doi.org/https://doi.org/10.26911/thejmch.2018.03.04.07>
18. Kriti Vikram, R. V. (2020). Maternal Education and the Multidimensionality of Child Health Outcomes in India. *J Biosoc Sci*, 52(1), 57–77. <https://doi.org/10.1017/S0021932019000245>
19. Lee, H. A., & Park, H. (2015). Correlations between poor micronutrition in family members and potential risk factors for poor diet in children and adolescents using Korean National Health and Nutrition Examination Survey data. *Nutrients*, 7(8), 6346–6361. <https://doi.org/10.3390/nu7085286>
20. Mediani, H. S. (2020). Predictors of Stunting Among Children Under Five Year of Age in Indonesia: A Scoping Review. *Global Journal of Health Science*, 12(8), 83. <https://doi.org/10.5539/gjhs.v12n8p83>
21. Mensch, B. S., Chuang, E. K., Melnikas, A. J., & Psaki, S. R. (2019). Evidence for causal links between education and maternal and child health: systematic review. *Tropical Medicine and International Health*, 24(5), 504–522. <https://doi.org/10.1111/tmi.13218>
22. Molitoris, J., Barclay, K., & Kolk, M. (2019). When and Where Birth Spacing Matters for Child Survival: An International Comparison Using the DHS. *Demography*, 56(4), 1349–1370. <https://doi.org/10.1007/s13524-019-00798-y>
23. Mremi, A., Rwenyagila, D., & Mlay, J. (2022). Prevalence of post-partum anemia and associated factors among women attending public primary health care facilities: An institutional based cross-sectional study. *PLoS ONE*, 17(2 February), 1–12. <https://doi.org/10.1371/journal.pone.0263501>

24. Palino, I. L., Majid, R., & Ainurafiq. (2017). Determinan Kejadian Stunting pada Balita Usia 12-24 Bulan di Wilayah Kerja Puskesmas Puuwatu Kota Kendari Tahun 2016. *Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat*, 2(6), 1–12. Retrieved from <http://ojs.uho.ac.id/index.php/JIMKESMAS/article/view/2870/2141>
25. Scheffler, C., Hermanussen, M., Soegianto, S. D. P., Homalessy, A. V., Touw, S. Y., Angi, S. I., ... Pulungan, A. B. (2021). Stunting as a Synonym of Social Disadvantage and Poor Parental Education. *International Journal of Environmental Research and Public Health*, 18(3), 1–13. <https://doi.org/10.3390/ijerph18031350>
26. Schummers, L., Hutcheon, J. A., Hernandez-Diaz, S., Williams, P. L., Hacker, M. R., Vanderweele, T. J., & Norman, W. V. (2018). Association of Short Interpregnancy Interval with Pregnancy Outcomes According to Maternal Age. *JAMA Internal Medicine*, 178(12), 1661–1670. <https://doi.org/10.1001/jamainternmed.2018.4696>
27. Sulistyoningih, H. (2020). Hubungan Paritas dan Pemberian Asi Eksklusif Dengan Stunting Pada Balita (Literature Review). *Prosiding Seminar Nasional Kesehatan “Peran Tenaga Kesehatan Dalam Menurunkan Kejadian Stunting,”* (July), 1–23. Tasikmalaya: Stikes Respati. Retrieved from <http://ejurnal.stikesrespati-tsm.ac.id/index.php/semnas/issue/view/33>
28. Suryana, A. (2019). *Ketahanan Pangan dan Gizi Nasional Berkelanjutan: Kebijakan dan Capaian* (I. W. Rusastra, Ed.). PT Penerbit IPB Press.
29. Susanto, P. N. (2021). Dinamika Pemenuhan Gizi Masyarakat Miskin di tengah Pandemi Covid-19. *Jurnal Ilmiah Permas*, 11(4), 757–770. Retrieved from <http://www.journal.stikeskendal.ac.id/index.php/PSKM/article/view/1447/1008>
30. Tafesse, T., Yoseph, A., Mayiso, K., & Gari, T. (2021). Factors associated with stunting among children aged 6–59 months in Bensa District, Sidama Region, South Ethiopia: unmatched case-control study. *BMC Pediatrics*, 21(1), 1–11. <https://doi.org/10.1186/s12887-021-03029-9>
31. Wang, M. C., Naidoo, N., Ferzacca, S., Reddy, G., & Van Dam, R. M. (2014). The Role of Women in Food Provision and Food Choice Decision-Making in Singapore: A Case Study. *Ecology of Food and Nutrition*, 53(6), 658–677. <https://doi.org/10.1080/03670244.2014.911178>
32. Zurhayati, & Hidayah, N. (2022). Faktor yang Berhubungan dengan Kejadian Stunting pada Balita. *Journal of Midwifery Science*, 6(1), 1–10. Retrieved from <http://jurnal.univrab.ac.id/index.php/jomis/article/view/1730/1130>