

## Effect Size Estimation of Child Stunting Determinants in Surakarta, Central Java

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### ABSTRACT

**Background:** Child growth is one of the public health indicators in monitoring the nutritional and health status of a population. One of the nutritional problems that is of major concern is the prevalence of stunting in toddlers. Stunting is still a problem in the world. This study aims to analyze the reestimation of the magnitude of the determinant effect of stunting on children under five in the city of Surakarta, Central Java.

**Subjects and Method:** This was a cross-sectional study conducted in Pajang and Sibela community health centers (Puskesmas) in Surakarta, Central Java. Total sample of 200 children under five was selected using fixed disease sampling, consisted of 50 stunted children and 150 normal children. The dependent variable was stunting. The independent variables were exclusive breastfeeding, maternal height, maternal history of illness, maternal age at pregnancy, maternal height, and family income. The data were collected using questionnaire and analyzed using a multiple logistic regression.

**Results:** Maternal age  $\geq 20$  years (aOR= 0.19; 95% CI= 0.06 to 0.58;  $p=0.004$ ), maternal height  $\geq 160$  cm (aOR= 0.30; 95% CI= 0.12 to 0.74;  $p= 0.009$ ), and family income high (aOR= 0.29; 95% CI= 0.12 to 0.72;  $p=0.008$ ) reduces the risk of stunting. Children under five who were not exclusively breastfed (aOR= 27.06; 95% CI= 8.13 to 90.05;  $p <0.001$ ) and frequent illness in mothers (aOR= 12.69; 95% CI= 4.59 to 35.10;  $p <0.001$ ) increases the risk of stunting.

**Conclusion:** Maternal age  $\geq 20$  years, maternal height  $\geq 160$  cm, and family income high reduce the risk of stunting. Children under five who were not exclusively breastfed and frequent illness in mothers increase the risk of stunting.

**Keywords:** stunting, maternal age, maternal height, income, breastfed, illness, children

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### BACKGROUND

Child growth is one of the public health indicators in monitoring the nutritional and health status in a population (Atsu et al, 2017). One of the nutritional problems that

is of major concern is the prevalence of stunting in toddlers. Stunting is still a problem in the world, especially in Indonesia, which is proven by the height of Indonesian teenagers which is still below WHO stan-

dards (Ministry of Health of the Republic of Indonesia, 2018). According to WHO (2020) stunting is short or very short based on body length/height for age less than -2 standard deviation (SD) on the WHO growth curve which occurs due to irreversible conditions resulting from inadequate nutritional intake and recurrent/chronic infections that occur within 1,000 HPK.

The magnitude of the problem and determinants of stunting starting from pregnancy, toddlerhood, school age, working age, up to old age is a global concern for future generations (TNP2K, 2017). Stunting needs special attention and optimal prevention because it has a significant impact on the growth and development of children under five, and has long-term impacts on individual and social life, including lack of cognitive abilities and growth barriers, reduced productivity and poor health conditions, as well as increasing risk of degenerative disease.

Stunting that occurs under two years of age causes reduced cognitive abilities from childhood to adulthood and has an impact on educational and economic status at the individual, family, and community levels (WHO, 2014). Efforts to prevent stunting need to be made from an early age to minimize the negative impacts of stunting. The government has made efforts to prevent stunting starting from the health, education, sanitation, environmental, food nutrition, social, and other sectors, all of which are of course working hard to create programs and interventions for the community so that the target of reducing stunting rates in Indonesia is quickly achieved. (Syahida and Daliman, 2022).

In 2017, around 22.2% or 150.8 million toddlers suffered from stunting in the world (Ministry of Health of the Republic of Indonesia, 2018). The results of Basic Health Research (2018) in Indonesia

show that the prevalence of stunting is 24.4%, this means that around 5.33 million children are experiencing stunting in Indonesia, which is only down 6% from 2022, with the prevalence in 2022 being 30%. The prevalence of stunting in Central Java in 2021 is 1 in 5 toddlers in Central Java experiencing stunting or growth and development disorders.

The city of Surakarta is often referred to as a child-friendly city, however cases of stunting in children still occur frequently. Reporting from the Solopos newspaper on May 18, 2022, it was stated that 1.87% of babies or the equivalent of 494 babies in Surakarta City would suffer from stunting in 2022. The Head of the Surakarta Family Welfare Empowerment Team (TPPKK), explained that the stunting rate in Surakarta City was in the second highest position in Central Java after Tegal. The number of stunting sufferers in the city of Surakarta will be around 800 children under five in 2022. Various efforts have been made to tackle and overcome the incidence of stunting in the city of Surakarta, one of which is by distributing multivitamins and nutritious food to the community in the city of Surakarta. Joint efforts are needed to handle and prevent stunting (Suryani et al, 2022). Stunting is caused by multi-dimensional factors (TNP2K, 2017). Many factors influence the birth of a short child, and one factor that needs to be considered is the mother's age during pregnancy. Mothers aged <20 years or >35 years have a high risk of health threats and death to the mother or fetus in her womb, both during pregnancy, childbirth and postpartum (Lubis, 2013). Blood circulation to the cervix and uterus at <20 years of age is still not perfect so it can disrupt the process of distributing nutrients from the mother to the fetus in her womb (Manuaba, 2012). The optimal reproductive age for women is 20-35 years because at that

age women are of childbearing age so they have more energy (Monita et al, 2016). A mother who becomes pregnant at the age of <20 years does not have sufficient experience and knowledge to care for the pregnancy, and mothers who are too old (>35 years) when pregnant tend not to have the enthusiasm to care for their pregnancy (Chirande et al, 2015).

Stunting has an impact on children's health. Children who are often sick have a greater risk of stunting than normal children. Children who suffer from illness, especially infections, cause a decrease in appetite so their nutritional intake cannot meet the needs for tissue growth. This is reinforced by the results of research by Aramico (2016) which states that the frequency and duration of illness is a risk for stunting.

One of the risk factors for stunting recorded by WHO is the mother's height. The interaction between maternal height and child growth is likely caused by genetic and environmental factors monitored by the mother, such as cleanliness, adequate nutritional intake, and reproductive health. Mothers with short stature may also have inadequate anatomical and metabolic systems that can affect fetal health, such as lower glucose levels or decreased energy and protein. This condition can cause intra-uterine growth restriction which also plays a role in short stature in children (Manggala et al, 2018).

Family income also has a relationship with the incidence of stunting in accordance with UNICEF's statement (2013) that one of the root problems of baby growth and development is the economic crisis. The inability of the head of the family to meet the baby's nutritional needs in terms of quantity and quality has a negative impact on the baby's nutrition. Based on research results from Rahmad and Miko (2016), it is

explained that 41.7% of toddlers with stunting are in families with low incomes, while 81.2% of toddlers with normal nutritional conditions are in families with high incomes.

Mother's milk (ASI) is the best food that babies need (Andarwulan, 2019). The first breast milk given to babies is called colostrum which contains fat, protein and can maintain the immune system so that children have strong resistance to disease (Fitri and Ernita, 2019). Breastfeeding can be related to growth in body length in children (Lufianti et al, 2020). Exclusive breastfeeding is giving breast milk to babies from birth for six months, without adding or replacing it with food or formula milk or anything else except medicine, vitamins and minerals (Hidayatunnikmah et al, 2018). After giving exclusive breastfeeding to a baby, it does not mean that the mother stops giving breast milk, but the mother still has to breastfeed the baby for up to two years (Deviatin, 2021). Exclusive breastfeeding for babies can provide benefits for both mother and baby. Breast milk is the best food, practical, economical, and has an ideal nutritional composition that suits the needs and digestive abilities of babies and breast milk supports growth for babies, especially height because breast milk calcium is more easily absorbed than formula milk (Laila et al, 2020). This study aims to analyze the reestimation of the magnitude of the determinant effect of stunting on children under five in the city of Surakarta, Central Java.

## SUBJECTS AND METHOD

### 1. Study Design

This was a cross-sectional study carried out in Sibela and Pajang community health centers, in Surakarta, Central Java, from May to June 2023.

**2. Population and Sample**

Total sample of 200 children under five was selected using fixed disease sampling, consisting of 150 normal height children and 50 stunted children.

**3. Study Variables**

The dependent variable was stunting. The independent variables were exclusive breastfeeding, maternal age at pregnancy, maternal history of illness, maternal, and family income.

**4. Operational Definition of Variables**

**Maternal age pregnancy:** the mother's age at the time of pregnancy. A number that represents the length of a person's life.

**Maternal history of illness:** is an illness that has been or is currently suffering in the last 6 months, including diarrhea/ respiratory tract infections.

**Maternal height:** is a measurement index that is measured standing using anthropometry.

**Family income:** is the average monthly income to support family members/person per month for each individual calculated by averaging the income for the last 6 months.

**Exclusive breastfeeding:** children only receive breast milk in the first 6 months of life without additional food or other fluids (including water, honey, formula milk, and fruit) except medication.

**Stunting:** short stature that arises as a result of prolonged malnutrition, which is characterized by a short and very short body condition by measuring height according to age.

**5. Study Instruments**

Data were collected using a questionnaire.

**6. Data Analysis**

Stunting determinants were examined using a multiple logistic regression.

**7. Ethical Consideration**

**RESULTS**

**1. Univariate Analysis**

The subjects in this study were some toddlers in Surakarta City spread across 5 (five) sub-districts with the highest stunting cases, namely Laweyan District 4.29% and Jebres District 3.92%. The research subjects were 200 people consisting of 50 stunted toddlers as the case group and 150 non-stunted toddlers as the control group.

In Table 1 it can be proven that the variable maternal age (years) has a mean value of 26.42 with a standard deviation of 6.05 a minimum value of 18 and a maximum value of 39. The variable maternal height (cm) has a mean value of 161.14 with a standard deviation of 3.91 a minimum value of 154 and a maximum value of 167 and monthly family income (Rp) has a mean value of 3,669,000 with a standard deviation of 1,453,618 with a minimum value of 2,000,000 and a maximum value of 10,000,000, which means that the mean value is greater than the standard deviation, thus indicating that the results are quite good. This is because standard deviation reflects very high deviations so that the distribution of data shows normal results and does not cause bias.

**Table 1. Characteristics of continuous data of Toddler Samples in the Working Area of Sibela Community Health Center and Pajang Community Health Center, Surakarta City, Central Java (N=200)**

Variables	Mean	SD	Min.	Max.
Maternal Age (Age)	26.42	6.05	18	39
Height (cm)	161.14	3.91	154	167
Family income per month (Rp)	3,669,000	1,453,618	2,000,000	10,000,000

Table 2 shows that as many as 75% of toddlers are at risk of stunting, 62.50% of toddlers often get sick and 57.50% of

toddlers do not receive exclusive breast milk for the first 6 months out of a total of 200 toddlers.

**Table 2. Frequency distribution of sample characteristics**

Characteristics	Category	Frequency (N)	Percentages (%)
Stunting	Yes	50	25
	No	150	75
History of illness	Seldom	75	37.5
	Often	125	62.5
Exclusive breastfeeding	Yes	85	42.5
	No	115	57.5

**2. Multivariate Analysis**

Table 3 showed results of multiple logistic regression analysis of stunting determinants at the Sibela and Pajang community health centers.

Maternal aged  $\geq 20$  years increased the risk of stunting 0.19 times compared to those aged  $< 20$  years (aOR= 0.19; 95% CI= 0.06 to 0.58; p= 0.004).

Mothers with frequent history of illness increased the risk of stunting 12.69 times compared to those without history of illness (aOR= 12.69; 95% CI= 4.59 to 35.10; p<0.001).

Maternal height  $\geq 160$  cm have increased the risk of stunting 0.30 times compared to maternal height  $< 160$  cm (aOR= 0.30; 95% CI= 0.12 to 0.74; p = 0.009).

Children from families with high income had lower risk of stunting compared to those from low family income (aOR= 0.29; CI 95%= 0.12 to 0.72; p= 0.008).

Children under five who were not exclusively breastfed had a risk of stunting 27.06 times compared to those who were exclusively breastfed (aOR= 27.06; 95% CI= 8.13 to 90.05; p <0.001).

**Table 3. The results of multiple logistic regression analysis of stunting determinants at the Sibela and Pajang community health centers**

Variable	aOR	Confidence Interval 95%		p
		Lower Limit	Upper Limit	
Maternal age ( $\geq 20$ years)	0.19	0.06	0.58	0.004
History of illness (Frequent)	12.69	4.59	35.10	< 0.001
Maternal height ( $\geq 160$ cm)	0.30	0.12	0.74	0.009
Family income ( $\geq$ Rp 3.6 million)	0.29	0.12	0.72	0.008
Exclusive breastfeeding (No)	27.06	8.13	90.05	< 0.001
n Observations = 200				
Pseudo R <sup>2</sup> = 42.44%				
p < 0.001				

**DISCUSSION**

**1. Effect of maternal age at pregnancy on stunting**

The results of the analysis showed that there was an effect of maternal age during pregnancy on the incidence of stunting. The effect of maternal age during pregnancy on

the incidence of stunting can be seen from the results of the analysis which was stated to be significant (aOR= 0.19; 95% CI= 0.06 to 0.58; p= 0.004), meaning that children under five of mothers aged  $\geq 20$  years have a risk of developing children under five.



stunting 0.19 times compared to age <20 years.

Mothers under 20 years of age have reproductive functions that are not yet fully developed and cause low awareness of self-examination and pregnancy. Mothers aged between 15 and 19 years are more likely to experience anemia, and are at higher risk of having a fetus with stunted growth, premature birth and a higher infant mortality rate (Cunningham, 2005). Meanwhile, for women aged >35 years, a woman's reproductive function has decreased compared to normal reproductive function, resulting in the possibility of complications and a higher risk of experiencing obstetric diseases as well as suffering from chronic diseases or poor physical condition which shows a significant increase in the incidence of hypertension, diabetes mellitus, placental abruption, premature birth, stillbirth and placenta previa, therefore it is not recommended to undergo pregnancy and childbirth after the age of 35 years (Siswosudarmo, 2008).

Research by Sani et al. (2019) explained that many factors influence a child's growth and development, one of which is the mother's age during pregnancy. In pregnancies with the mother's age <20 years, there will be competition for nutrition between the mother and the developing fetus, which can inhibit fetal growth and result in the baby being born short.

## **2. Effect of maternal history of illness on stunting**

The results of the analysis showed that there was an effect of illness history on the incidence of stunting. The effect of a history of illness on the incidence of stunting can be seen from the results of the analysis which stated it was significant (OR= 12.69; CI 95%= 4.59 to 35.10;  $p < 0.001$ ), meaning that children under five with a history of illness (often) had a risk of stunting 12.69

times compared to children under five who have no history of illness (rarely/never).

In line with the results of research by Bening et al (2018), toddlers with a history of ARI have an increased risk of stunting by 2.4 times, this is because the infection causes a decrease in appetite and impaired nutrient absorption, resulting in an increase in metabolism accompanied by loss of nutrients. Namangboling et al (2017) added that a history of infectious diseases is the dominant factor determining nutritional status in children, because the presence of infectious diseases causes children's health conditions and nutritional status to decline. Akombi et al (2017) revealed that recurring fever and diarrhea resulted in nutrition that should be used for growth and development needs being affected, causing growth failure including the risk of stunting.

## **3. Effect of maternal height on stunting**

The results of the analysis showed that there was an effect of maternal height on the incidence of stunting. The effect of maternal height on the incidence of stunting can be seen from the results of the analysis, which was stated to be significant (OR= 0.30; 95% CI= 0.12 to 0.74;  $p = 0.009$ ), meaning that mothers with a height  $\geq 160$  cm have a risk of stunting for toddlers of 0.30. times compared to mothers who have a height <160 cm. The results of this research are supported by a study conducted by Kim et al (2017) that mothers with short height have a risk of stunting in children three times greater than mothers who are taller. In line with the study conducted by Rahman et al. (2017) that short mothers have a 1.81 greater chance of stunting in their children than mothers of normal height.

Based on the description above, it can be concluded that the mother's height increases the likelihood of the child being born. Genetic inheritance from the mother is

directly passed on to the child. This is significantly consistent, meaning that tall mothers are more likely to have tall children and conversely, short mothers are more likely to have short children. Children's growth is also influenced by external factors such as adequate nutritional intake (Desmon, 2017).

This research is further strengthened by research conducted by Amin and Hadi (2015) in research conducted on 252 research subjects using logistic regression statistical tests, the variable maternal height made a significant contribution to the incidence of stunting in toddlers aged 6-23 months. This research also shows that genetic factors, especially parental height, have an impact on the incidence of stunting, namely the mother's height alone, while the father's height does not have a significant impact.

#### **4. Effect of family income on stunting**

The results of the analysis showed that there was an effect of family income on the incidence of stunting. The effect of family income on the incidence of stunting can be seen from the results of the analysis which was stated to be significant (OR= 0.29; 95% CI= 0.12 to 0.72;  $p = 0.008$ ), meaning that children under five from families with an income of  $\geq$ Rp. 3.6 million have a risk of developing children under five. stunting 0.29 times compared to children under five from families with income < IDR 3.6 million.

The results of this research are supported by the results of research from Nasikhah (2012) which shows that the level of per capita income shown in spending on shopping is a risk factor for stunting among toddlers in East Semarang with an OR of 7.21. Similar research also states that families with low food expenditure have a 6.35 times greater risk of experiencing stunting than families with high expenditure

(Annisa, 2012). According to Arifin (2004), the greater the food expenditure in a household, the lower the household's food security. This is associated with the ability to access food. According to Berg (2010), increasing expenditure on consumption is not always followed by improvements in food consumption patterns. A person tends to spend most of his income on consumption which does not necessarily reflect that what he eats is of good nutritional quality. A family's ability to buy food is not only influenced by the amount of income but the price of food ingredients. Some expensive food ingredients tend not to be chosen and purchased, so in families these types of food are rarely served so that they still lack nutritional needs

#### **5. Effect of exclusive breastfeeding on stunting**

The results of the analysis showed that there was an effect of exclusive breastfeeding on the incidence of stunting. Children under five who are not given exclusive breast milk have a risk of stunting 27.06 times compared to children under five who are given exclusive breast milk. (OR= 27.06; 95% CI= 8.13 to 90.05;  $p < 0.001$ ).

This is in line with Susin et al (2005), who revealed that the lack of public understanding about the benefits of breast milk causes low exclusive breastfeeding coverage and low family support, especially from grandmothers. Grandmothers are often seen as people who are experienced and hold authority in the family and even play an active role in making decisions about breastfeeding and preserving the culture of introducing additional foods early. WHO recommends breastfeeding babies exclusively for up to the first 6 months and continuing with the addition of appropriate complementary foods. However, globally only 40% of babies aged less than 6 months receive exclusive breast milk. This research

reveals that exclusive breastfeeding is influenced by family support and maternal education. Mensah et al (2017) added that there are other factors that influence exclusive breastfeeding, namely the mother's job and beliefs.

This research is further strengthened by research conducted by Zomratun et al. (2018) where one of the benefits of exclusive breastfeeding is that it can support baby growth, especially height because breast milk calcium is absorbed more efficiently than breast milk substitutes. Giving breast milk and formula milk at the same time can make babies more susceptible to disease because formula milk does not contain antibodies as good as the antibodies in breast milk.

#### **AUTHOR CONTRIBUTION**

Jemmi Sastrawijayah as a researcher who chose topics, searched for and collected research data. Bhisma Murti and Burhannudin Ichsan analyzed data and reviewed research documents.

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#### **CONFLICT OF INTEREST**

There is no conflict of interest in this study.

#### **REFERENCE**

Akombi BJ, Agho KE, Hall JJ, Wali N, Renzaho AM, Merom D (2017). Stunting wasting and underweight in sub-Saharan Africa: a systematic review.

Int J Environ Res Public Health. 14(8): 863.

Amin NA, Hadi M (2016). Faktor sosio-demografi dan tinggi badan orang tua serta hubungannya dengan kejadian stunting pada balita usia 6-23 bulan. *J. Gizi Dietetik Indones.* 2(3): 170-177.

Annisa FO, Rohmawati N, Ririanty M (2012). Faktor-faktor yang mempengaruhi kejadian stunting pada anak balita di wilayah pedesaan dan perkotaan. *e-Jurnal Pustaka Kesehatan.*

Andarwulan S, Hubaedah A, Waroh YK (2019). Factor analysis of working mothers and housewives of preschool children 36-72 month in kindergarten against stunting in the Kalisari district, Mulyorejo district, Surabaya. *Proceeding of international conference on science, health, and technology:* 33-36.

Aramico B, Sudargo T, Susilo J (2016). Hubungan sosial ekonomi, pola asuh, pola makan dengan stunting pada siswa sekolah dasar di Kecamatan Lut Tawar, Kabupaten Aceh Tengah. *J Gizi Dietetik Indones.* 1(3): 121-130

Arifin FO, Ririanty M (2004). Faktor-faktor yang mempengaruhi kejadian stunting pada anak balita di wilayah pedesaan dan perkotaan. *e-Jurnal Pustaka Kesehatan.*

Atsu BK, Guure C, Laar AK (2017). Determinants of overweight with concurrent stunting among Ghanaian children. *BMC pediatr.* 17: 1-12.

Bening S, Margawati A, Rosidi A (2018). Asupan zink riwayat ispa dan pengeluaran pangan sebagai faktor resiko stunting pada anak usia 2-5 tahun di kota Semarang. *J Gizi.* 7(1).

Berg LM, Azpeitia G, Suárez D, Rodríguez A, Ferrer JF, Majem L (2010). Factors associated with stunting among children aged 0 to 59 months from the



- central region of Mozambique. *Nutrients*. 9(5): 491.
- Chirande L, Charwe D, Mbwana H, Victor R, Kimboka S, Issaka AI, Agho KE (2015). Determinants of stunting and severe stunting among under-fives in Tanzania: evidence from the 2010 cross-sectional household survey. *BMC pediatr*. 15: 1-13
- Cunningham WA, Raye CL, Johnson MK (2005). Neural correlates of evaluation associated with promotion and prevention regulatory focus. *Cogn. Affect. Behav. Neurosci*. 5: 202-211.
- Desmon C, Christijani R, Nurhidayati N (2022). Hubungan risiko status kesehatan dengan kejadian stunting pada anak 24-36 bulan. *Food Nutr Res*. 45(2): 83-90
- Deviatin NS (2021). Factors that associated with the practice of exclusive breastfeeding. *JIPJISK*. 11(1): 217-226.
- Fitri L, Ernita (2019). Hubungan pemberian asi eksklusif dan mpasi dini dengan kejadian stunting pada balita. *J Ilmu Kebidanan*. 8(1): 19-24.
- Hidayatunnikmah N, Irawan R, Prasety, B (2018). The influence of maternal nutrition consumption level during breastfeeding on breast milk macronutrient component and infants weight 121. *HNST*. 2(1): 121-127.
- Kemendes RI (2018). Situasi balita pendek (stunting) di Indonesia. *Kementerian Kesehatan RI*. 301(5): 1163-1178.
- Kim AHA, Miko A, Hadi A (2017). Kajian stunting pada anak balita ditinjau dari pemberian ASI eksklusif, MP-ASI, status imunisasi dan karakteristik keluarga di Kota Banda Aceh. *J Kesehatan Ilmiah Nasuwakes*. 6(2): 169-184.
- Laila MN, Yuniarti Y, Noviardhi A, Muningggar DLP, Jaelani M (2020). Edukasi gizi berbasis aplikasi android meningkatkan pengetahuan empat pilar penatalaksanaan diabetes melitus pada peserta prolanis. *J Riset Gizi*. 8(1): 18-24.
- Lubis NL (2013). Wanita dan perkembangan reproduksinya ditinjau dari aspek fisik dan psikologinya. Jakarta: Kencana Prenada Media Group
- Lufianti A, Rahmawati, Sari EM (2020). Hubungan riwayat pemberian asi dan pemberian MP-ASI dengan kejadian stunting di wilayah kerja Puskesmas Tawangharjo. *The Shine Cahaya Dunia Ners*. 5(2).
- Manggala AK, Kenwa WM, Kenwa MML, Sakti AAGDPJ, Sawitri AAS (2018). Risk factors of stunting in children aged 24-59 months. *Paediatr. Indones*. 58(5): 205-212. Doi: 10.14238/pi58.5-2018.205-12.
- Manuaba I (2012). Ilmu kebidanan, penyakit kandungan dan keluarga berencana. Jakarta: EGC.
- Mensah GA, Wei GS, Sorlie PD, Fine LJ, Rosenberg Y, Kaufmann PG, Gordon D (2017). Decline in cardiovascular mortality: possible causes and implications. *Circ Res*. 120(2): 366-380.
- Monita F, Suhaimi D, Ernalia Y (2016). Hubungan usia, jarak kelahiran dan kadar hemoglobin Ibu hamil dengan kejadian berat bayi lahir rendah di RSUD Arifin Achmad Provinsi Riau. *Jom FK*. 3(1).
- Murti B (2010). Desain dan ukuran sampel untuk penelitian kesehatan 1 ed. Yogyakarta: Gadjah mada university press.
- Namangboling AD, Murti B, Sulaeman ES (2017). Hubungan riwayat penyakit infeksi dan pemberian ASI eksklusif dengan status gizi anak usia 7-12 bulan di Kecamatan Kelapa Lima Kota Kupang. *Sari Pediatri*. 19(2): 91-6.
- Nasikhah L, Setiawati S, Subroto T (2012). Hubungan riwayat penyakit infeksi

- dengan kejadian stunting pada anak usia 12-59 bulan. *J Kebidanan Malahayati*. 7(2): 200-206.
- Picauly I (2023). Relationships between exclusive breastfeeding, and history of illness, and stunting in children under five. *J Matern Child Health*. 8(1).
- Rahmad AHA, Miko A (2016). Kajian stunting pada anak balita berdasarkan pola asuh dan pendapatan keluarga di Kota Banda Aceh. *J Kesehatan Masyarakat Nasional*. 8(2): 63-79.
- Rahman BA, Nicko C (2017). Hubungan berat dan tinggi badan orang tua dengan status gizi balita di Kabupaten Aceh Besar. *Gizi Indonesia*. 40(1): 21-34.
- Rakhmahayu A, Dewi YLR, Murti B (2019). Logistic regression analysis on the determinants of stunting among children aged 6-24 months in Purworejo Regency, Central Java. *J Matern Child Health*. 4(3). 158-169.
- Riskesdas (2018). Hasil utama riskesdas 2018. Kementerian kesehatan badan penelitian dan pengembangan kesehatan: 8-12.
- Sajalia H, Dewi YLR, Murti B (2018). Life course epidemiology on the determinants of stunting in children under five in East Lombok, West Nusa Tenggara. *J Matern Child Health*. 3(4).
- Sani E, Rahardjo S, Sari HP (2015). Model pengendalian faktor risiko stunting pada anak bawah tiga tahun. *Kesmas: J Kesehatan Masyarakat Nasional*. 9(3): 249-256
- Sekretariat Wakil Presiden Republik Indonesia (2017). 100 kabupaten/kota prioritas untuk intervensi anak kerdil (stunting). Jakarta: Sekretariat Wakil Presiden Republik Indonesia.
- Siswosudarmo R, Emilia O (2008). *Obstetri fisiologi*. Yogyakarta: Pustaka Cendekia.
- Suryani AAF, Fauzi H, Mufidah AI, Sofiana A, Dhamayanti E, Astria KA, Wijayanti KD (2022). Sosialisasi berantas stunting “BENING” dan praktik pengelolaan sampah masakan sebagai upaya pencegahan stunting. *J. Pengabdian Masyarakat*. 1(5): 301-306.
- Susin T, Rozikhan R (2005). Usia Ibu saat hamil dan kejadian stunting pada anak usia 1-3 tahun. *Midwifery Care J*. 1(5): 122-126.
- Syahida AA, Daliman D (2022). Literature review: telaah pendekatan teori kognitif sosial Albert Bandura terhadap stunting. *Proceeding Seminar Nasional Psikologi UAD*.
- TNP2K (2017). 1000 Kabupaten/Kota prioritas untuk intervensi anak kerdil (stunting). Tim Nasional Percepatan Penanggulangan Kemiskinan
- UNICEF (2013). Improving child nutrition. the United Nations International Children's Emergency Fund. doi:978-92-806-4686-3.
- WHO (2014). Reducing stunting in children: equity considerations for achieving the global nutrition targets 2025. World Health Organization
- WHO (2020). World health statistics and visualization dashboard: child stunting. World Health Organization
- Zomratun AB, Sarwanda BA (2018). Hubungan pemberian ASI eksklusif dengan status gizi anak usia 7-12 bulan di Kota Surabaya. 19(2): 74-6.