FACTORS ASSOCIATED TO THE OCCURRENCE OF STUNTING AT THE PRIMARY HEALTH CENTER IN MADIUN CITY, INDONESIA

Arinaa Manasika Farida[1], Linda Dewanti[2], Ahmad Suryawan[3]

[1]Medical Student, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[2]Department of Public Health, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia
[3]Department of Pediatrics, Faculty of Medicine, Universitas Airlangga – Dr. Soetomo General Hospital, Surabaya, Indonesia

ABSTRACT

Stunting, a common nutritional problem characterized by a child's shorter stature due to growth failure, affects 11.5% of toddlers at Demangan Primary Health Center in Madiun, Indonesia. This research aimed to analyze factors linked to toddler stunting, using an observational analytical cross-sectional design. All toddlers visiting Demangan Primary Health Center's Integrated Health Post in Madiun were involved in the study sample. Maternal pre-pregnancy BMI, maternal upper arm circumference (LILA)*, maternal weight gain during pregnancy, inter-birth interval, low birth weight, per capita income, parental education, maternal knowledge on toddler's nutrition and parenting patterns of feeding were factors collected through questionnaires, Maternal and Child Health books, and primary health center records. Univariate and bivariate analysis results were tested using the Chi-Square or Fisher Exact test. In this study, 156 samples were obtained, consisting of 18 stunted toddlers (11.5%) and 138 normal toddlers (88.5%). Stunting associated with maternal pre-pregnancy BMI showed p=0.020, maternal upper arm circumference p=0.008, maternal weight gain during pregnancy p≤0.001, low birth weight p=0.001, per capita income p=0.007, and maternal knowledge on toddler's nutrition had p=0.011. In conclusion, pre-pregnancy conditions significantly influence stunting. So, enhancing interventions for maternal health during pre-pregnancy is crucial for maximizing impact.*

ARTICLE HISTORY

Received: December, 28, 2023
Revision: February, 12, 2024
Accepted: March, 23, 2024
Online: May, 29,2024

doi:
10.20473/jcmphr.v5i1.53250

KEYWORDS
Stunting, Growth, Toddlers, Demangan Primary Health Center, Madiun City

Corresponding author
Linda Dewanti
✉ linda-d@fk.unair.ac.id
Department of Public Health, Faculty of Medicine, Universitas Airlangga, Surabaya, Indonesia

How to cite:
Farida, A. M., Dewanti, L., Suryawan, A., 2024. Factors Associated to The Occurrence of Stunting at The Primary Health Center in Madiun City, Indonesia, Journal of Community Medicine and Public Health Research, 5(1): 79 - 89.

INTRODUCTION

One of the five stages in building a more productive and competitive Indonesia, with high flexibility to face changes in the world, is the development of human resources. Human resource development can begin by ensuring the health of pregnant women, infants, toddlers, and school-age children[1]. The primary focus during this phase is addressing malnutrition in the early stages of life, as it can significantly impact the

quality of human resources and hinder optimal growth attainment[2]. There is a term known as the First 1,000 Days of Life, considered crucial in determining a person's future quality of life[1]. Therefore, proper nutrition fulfillment during this period is essential to prevent the emergence of nutritional problems, especially in toddlers. Stunting is one of the numerous nutritional issues observed in Indonesia. It occurs when a child's posture is too short for their age due to growth failure. According to the child growth standards established by the World Health Organization (WHO), stunting is defined as a condition where a child's height is more than 2 standard deviations (SD) below WHO standards compared to the average growth of other children[3]. De Onis and Branca (2016) also emphasized that stunting is defined as a state of malnutrition characterized by a decrease in child nutrition up to -2SD from length/height according to age[4].

WHO recommends a stunting prevalence target of 20% for a region[5]. However, Indonesia still has not reached this target. When observed over the past decade, the incidence of stunting remains high to date even at the national level reaching a percentage of 37%[6]. The incidence of stunting nationally has decreased, from 37.2% in 2013 to 30.8% in 2018[7]. Furthermore, based on Teja's study (2019), the national stunting prevalence rate in 2019 decreased again, which was 27.67%[5]. East Java, with a prevalence of 26.86% according to the Susenas Integration Implementation Report in March 2019 and the SSGBI 2019, remains above the WHO target, necessitating special attention for successful government programs in human resource development. The city of Madiun contributed to stunting cases in East Java with a prevalence of 17.44%[8]. Among its primary health centers, Demangan Primary Health Center has the highest prevalence at 11.4%. Although this is below the national figures and WHO targets, there is a concern as new cases are frequently reported, as discovered through interviews with health center staff. Further efforts are needed to address this issue and prevent the recurrence of new cases.

The high prevalence of stunting not only impacts the country's progress but also hinders the overall quality of individuals. Stunting can have detrimental effects on physical, mental, intellectual, and cognitive development in the long run[9]. These factors influence children's academic achievements, and later in life, impede daily productivity, making it challenging for individuals to develop into high-quality human beings. Moreover, stunting is linked to various diseases, increasing morbidity and mortality rates. According to the WHO conceptual framework, stunting is caused by household and family factors, including inadequate breastfeeding, insufficient food, the presence of infectious diseases, and home environment factors. Additionally, community and social factors such as social, economic, cultural, political, educational, health services, water sanitation, environment, food systems, and agriculture contribute to stunting[10]. This suggests that stunting is a multifactorial condition. This study focuses on identifying factors contributing to stunting in toddlers.

MATERIALS AND METHODS

The research employed an observational analytical approach with a cross-sectional design. The participants included all toddlers from three Integrated Health Post (*Posyandu*) with the highest

stunting prevalence, located at Demangan Primary Health Center in Madiun, Indonesia known for having the highest stunting prevalence. Sampling was carried out using a total sampling technique. It was conducted by considering the inclusion and exclusion criteria. Toddlers born at term, possessing a Maternal and Child Health book, and whose parents were willing to participate met all the inclusion criteria. Toddlers with a history of congenital diseases and/or severe infectious illnesses, as well as those with incomplete data, were excluded from the study. The study received approval from the Ethical Health Research Committee of Faculty Medicine Universitas Airlangga Surabaya, Indonesia, with ethics approval number 17/EC/KEPK/FKUA/2023 on 19 January 2023.

In this study, the variables used were stunting, maternal pre-pregnancy BMI, maternal upper arm circumference (*LILA*), maternal weight gain during pregnancy, inter-birth interval, low birth weight, per capita income, parental education, maternal knowledge on toddler's nutrition and parenting patterns of feeding. Data were collected through questionnaires as primary data and secondary data from Maternal and Child Health books and primary health care records. The data collected from this study were examined through either a Chi-Square or Fisher's Exact test.

RESULTS

In this research, 156 samples were acquired, comprising 18 cases of stunting (11.5%) and 138 normal toddlers (88.5%). These samples were gathered from three Integrated Health Posts in Demangan Primary Health Center, Madiun. The subsequent section presents the findings from the data analysis conducted in this study.

Table 1. Characteristics of Respondents

Characteristics	n	%
Gender of toddlers		
Boys	100	64.1
Girls	56	35.9
Toddlers' age (months)		
0 – 11	29	18.6
12 – 23	25	16.0
24 – 35	26	16.7
36 – 47	36	23.1
48 – 59	40	25.6
Mothers' age (years)		
21 – 30	51	32.7
31 – 40	89	57.1
41 – 50	16	10.3

Table 2. Variables' Frequency Distribution

Variables	n	%
Stunting		
Stunting	18	11.5
Normal	138	88.5
Pre-pregnancy BMI		
Underweight	12	7.7
Normal	96	61.5
Overweight	21	13.5
Obesity I	20	12.8
Obesity II	7	4.5
Maternal upper arm Circumference (centimeters)		
<23.5	30	19.2
≥23.5	126	80.8
Maternal weight gain during pregnancy*		
Normal	112	71.8
Abnormal	44	28.2
Inter-child interval (years)		
<3	19	12.2
≥3	137	87.8
Low birth weight		
Yes	8	5.1
No	148	94.9
Mother's education		
Uneducated	0	0
Elementary school	1	0.6
Junior high school	15	9.6
Senior high school	90	57.7
Bachelor	50	32.1
Father's education		
Uneducated	1	0.6
Elementary school	7	4.5
Junior high school	15	9.6
Senior high school	95	60.9
Bachelor	38	24.4
Maternal knowledge on toddler's nutrition		
Good	70	44.9
Sufficient	86	55.1
Insufficient	0	0.0

Variables	n	%
Parenting patterns of feeding		
Good	113	72.4
Sufficient	38	24.4
Insufficient	5	3.2
Per Capita Income (IDR)		
<500.000	85	54.5
500.000 – 1.500.000	63	40.4
1.500.000 – 2.500.000	8	5.1

*Based on pre-pregnancy BMI

According to Table 1, there are more boys (64.1%) than girls (35.9%) among the toddlers. Considering the age of the toddlers, the largest population falls within the 48 – 59 months age category, constituting 25.6%, while the smallest age category is the 12 – 23 months age group, accounting for 16.0%. Additionally, based on the age of mothers, the highest proportion is in the 31 – 40 years age category, which is 57.1%.

Table 2 summarizes data for 156 toddlers, with 18 stunted (11.5%) and 138 normal (88.5%). Maternal nutritional status, based on pre-pregnancy BMI, is mostly normal (61.5%), with the least in the obesity II category (4.5%). Upper arm circumference (*LILA*) data showed that most mothers fell into the ≥23.5 cm category (80.8%). The majority reported normal weight gain during pregnancy (71.8%). Concerning inter-birth interval, most had a birth interval of ≥3 years (12.2%). Birth weight data indicated that most babies were born without low birth weight (94.9%). Mother's education data showed the majority were high school graduates (57.7%). Similarly, the father's education data indicated the majority were high school graduates (60.9%). Most mothers had sufficient knowledge of toddler's nutrition (55.1%). In feeding parenting data, most mothers fell into the good category (72.4%). Based on per capita income, the majority had an income of <500,000 IDR (54.5%).

Table 3 presents a bivariate analysis, examining various variables using different tests such as the Chi-Square or Fisher's Exact test. Variables that exhibited a significant association with the incidence of stunting were maternal nutritional status based on pre-pregnancy BMI (p=0.020) and upper arm circumference (p=0.008), maternal weight gain during pregnancy (p=<0.001), low birth weight (p=0.001), maternal knowledge on toddler's nutrition (p=0.011) and per capita income (p=0.007).

Table 3. Bivariate Analysis

Variable	Stunting		Total	p-*value*
	Yes	No		
	n (%)	n (%)		
Maternal Pre-pregnancy BMI				
Underweight	4 (33.3)	8 (66.7)	12 (100.0)	0.020[a]
Normal	7 (7.3)	89 (92.7)	96 (100.0)	
Overweight	5 (23.8)	16 (76.2)	21 (100.0)	
Obesity I	1 (5.0)	19 (95.0)	20 (100.0)	
Obesity II	1 (14.3)	6 (85.7)	7 (100.0)	
Maternal upper arm circumference (centimeters)				
< 23,5	8 (26.7)	22 (73.3)	30 (100.0)	0.008[a]
≥ 23,5	10 (7.9)	116 (92.1)	126 (100.0)	
Maternal weight gain during pregnancy				
Normal	0 (0.0)	112 (100.0)	112 (100.0)	<0.001[b]
Abnormal	18 (40.9)	26 (59.1)	44 (100.0)	
Inter-birth interval (years)				
< 3	3 (15.8)	16 (84.2)	19 (100.0)	0.463[a]
≥ 3	15 (10.9)	122 (89.1)	137 (100.0)	
Low birth weight				
Yes	5 (62.5)	3 (37.5)	8 (100.0)	0.001[a]
No	13	135	148	
Mother's education				
Uneducated	0 (0.0)	0 (0.0)	0 (0.0)	0.370[a]
Elementary school	0 (0.0)	1 (100.0)	1 (100.0)	
Junior high school	2 (13.3)	13 (86.7)	15 (100.0)	
Senior high school	13 (14.4)	77 (85.6)	90 (100.0)	
Bachelor	3 (6.0)	47 (94.0)	50 (100.0)	
Father's education				
Uneducated	0 (0.0)	1 (100.0)	1 (100.0)	0.431[a]
Elementary school	2 (28.6)	5 (71.4)	7 (100.0)	
Junior high school	2 (13.3)	13 (86.7)	15 (100.0)	
Senior high school	11 (11.6)	84 (88.4)	95 (100.0)	
Bachelor	3 (7.9)	35 (92.1)	38 (100.0)	
Maternal knowledge on toddler's nutrition				
Good	3 (4.3)	67 (95.7)	70 (100.0)	0.011[b]
Sufficient	15 (17.4)	71 (82.6)	86 (100.0)	
Insufficient	0 (0.0)	0 (0.0)	0 (0.0)	
Parenting patterns of feeding				
Good	12 (10.6)	101 (89.4)	113 (100.0)	0.170[a]
Sufficient	4 (10.5)	34 (89.5)	38 (100.0)	
Insufficient	2 (40.0)	3 (60.0)	5 (100.0)	
Per capita income (IDR)				
<500,000	13 (21.0)	49 (79.0)	62 (100.0)	0,007[b]
500,000-1,500,000	5 (7.0)	66 (93.0)	71 (100.0)	
1,500,000-2,500,000	0 (0.0)	23 (100.0)	23 (100.0)	

[a.]Fisher's Exact Test, [b.]Chi-Square Test

DISCUSSION

Stunting is a condition of nutritional deficiency in children based on height or length that can reflect social well-being and social inequality.[4] This research involved characteristics such as gender and age of toddlers. Most toddlers are boys (64.1%) with an age range of 48 – 59 months (25.6%). Hatijar (2023) indicated that boys tend to experience more stunting due to increased physical activity, leading to higher energy requirements without adequate nutritional intake[11]. The growth

process in toddlers is crucial, and a failure to achieve height growth within the first two years may result in stunted growth[12]. The most common age group for mothers in this study was 31 – 40 years (57.1%), considered a mature age that can influence child-rearing practices. The risk factors related to stunting in this study involved maternal nutritional status (pre-pregnancy BMI and upper arm circumference), maternal weight gain during pregnancy, inter-birth interval, low birth weight, per capita income, parental education, maternal knowledge of toddler's nutrition, and parenting patterns of feeding.

The results of this study found that the majority of toddlers in Demangan Primary Health Center were not stunted and had a normal birth weight. Most mothers of toddlers had an underweight pre-pregnancy BMI, normal upper arm circumference, normal weight gain during pregnancy, a normal inter-birth interval, and a high level of education (Senior High School), with spouses who were also highly educated (Senior High School). They possessed sufficient knowledge of toddler's nutrition and exhibited good feeding patterns. However, most families had low per capita income. The research finding also indicated that six variables were associated with the occurrence of stunting in Demangan Primary Health Center: pre-pregnancy BMI (p=0.020), maternal upper arm circumference (p=0.008), maternal weight gain during pregnancy (p=<0.001), low birth weight (p=0.001), maternal knowledge on toddler's nutrition (p=0.011) and per capita income (p=0.007).

The nutritional status of the mother, both before and during pregnancy, plays a crucial role in determining the health and well-being of the fetus until birth. Mothers with good nutritional status tend to give birth to infants with good nutritional status, and vice versa. The assessment of maternal nutritional status involved parameters such as pre-pregnancy BMI and maternal upper arm circumference. Pre-pregnancy BMI is closely related to the risk of low birth weight, which can also impact stunting (Fahmi, 2020). An upper arm circumference of <23.5 cm indicates Chronic Energy Deficiency (CED), which can lead to Intrauterine Growth Retardation (IUGR), and there is a risk of stunting[13]. This finding was consistent with the research of Pratiwi and Jumetan (2023) in the Village of Oben, Kupang, Indonesia, which showed an association between maternal BMI and the occurrence of stunting[14]. Similarly, the study by Dewi *et al* (2020) asserts that an upper arm circumference <23.5 cm increases the risk of stunting tenfold compared to a normal upper arm circumference[15].

The process of weight gain during pregnancy varies for each pregnant woman and is influenced by factors such as height and weight before pregnancy, the size of the baby and placenta, as well as the quality of the diet before and during pregnancy. According to Fitri and Wiji (2018), the minimum weight gain should be equivalent to the weight of the conception product, including the fetus, placenta, and amniotic fluid[16]. Women with a weight appropriate for their height are advised to gain around 1 – 2 kg in the first trimester and an additional 0.4 kg per week. The results of this study were consistent with Dewi *et al* (2020), which indicated a relationship between the history of maternal weight gain during pregnancy and stunting. The study stated that mothers who do not experience weight gain during pregnancy have a seven times higher risk of having a child with a tendency for stunting compared to mothers

who experience weight gain[15]. The lack of weight gain can be caused by insufficient nutrient intake or the influence of placental conditions, amniotic fluid, blood volume, as well as suboptimal enlargement of the uterus and breasts[17].

Based on Table 3, this study indicated that the majority of stunted toddlers have a history of low birth weight (62.5%). Low birth weight is considered to have subsequent impacts, such as growth faltering, which can lead to difficulties in achieving maximum growth. Children with a history of low birth weight tend to experience stunting due to early growth retardation[18]. This condition implies that the baby has experienced Intrauterine Growth Restriction (IUGR), which can affect delayed growth and the possibility of failing to reach the expected level of growth at its age after birth[19]. To catch up with growth delays, a catch-up growth process is necessary to achieve height or weight that is appropriate for the child's age. Without adequate attention and nutritional intake, toddlers are prone to frequent infections and may experience growth delays[20]. The findings of this study are consistent with Sholihah's study (2023) stating a significant association between low birth weight and stunting in toddlers at the Dradah Primary Health Center, Lamongan, Indonesia[21]. However, this study contradicts Pacheco *et al* (2017), stating that there is no association between birth weight and stunting in Aileu Regency[20].

Stunting is closely related to the nutrient intake provided by mothers to toddlers. The quality of nutrient intake is influenced by a mother's knowledge of a toddler's nutrition. This knowledge encompasses aspects such as the definition of nutrition, factors influencing nutrition, nutritional content, and the impact of nutrition on a child's growth. Several factors influencing one's nutritional knowledge involve education levels, superstitions, cultural practices, and various media that influence knowledge, such as magazines, television, and other media[22]. Mothers with better nutritional knowledge have a greater chance of having children with good nutritional status. The findings of this study aligned with Amalia et al. (2021), who found an association between a mother's knowledge level about nutrition and stunting[23]. However, it differs from the study by Ni'mah and Muniroh (2015), which stated that there is no association between a mother's knowledge level and stunting[24]. These differences could be attributed to sample characteristics, classifications of knowledge levels, sample ages, and different research locations.

Per capita income is one of the factors related to the occurrence of stunting. The amount of per capita income can influence the well-being of family members and their ability to meet food needs, which, in turn, impacts the individual nutritional status within the family. To ensure the nutritional needs of children are met, efforts should be made to lead a healthy lifestyle by providing age-appropriate foods for toddlers and maintaining regular eating patterns. Families with low incomes may face difficulties in fulfilling the nutritional needs of children[25]. This study supports the findings of Rufaida *et al* (2020), stating that there is a correlation between family income and the occurrence of stunting. Families with low incomes have a risk 2.344 times higher of having stunted toddlers compared to families with high incomes[26]. Similar findings were also revealed by Pacheco *et al* (2017), who found that low income is associated with the incidence of stunting in toddlers in

Aileu, Timor Leste, especially since most of the population there works as farmers[20].

Several risk factors examined in this study showed no association with stunting in Demangan Primary Health Center in Madiun. These factors include the inter-birth interval, parental education, and parenting patterns of feeding.

The inter-birth interval can influence the incidence of stunting and the health of the mother. A too-close inter-birth interval can impact the health of the baby and the recovery of the mother after childbirth[27]. Toddlers with mothers who have too-close birth intervals may experience nutritional disturbances because the mother faces difficulties in taking care of her children[26]. However, this study found that there was no association between inter-birth interval and the incidence of stunting, a result consistent with Rufaida *et al* (2020)[26]. This differed from the findings of Ernawati (2021), stating that there is an association between inter-birth interval and stunting[27]. This difference may be due to variations in inter-birth interval categories, toddler's age, and different research locations. Although inter-birth interval was not a determinant factor for stunting at the Demangan Primary Health Center in Madiun, paying attention to inter-birth interval remains crucial for the mother's health and preparation for the next pregnancy, as well as maintaining good parenting practices.

The parent's education level has an indirect influence on child growth. The higher level of education, the more knowledge is acquired, especially related to nutrition and health[24]. A mother with a higher level of education is more likely to easily access health information to improve her family's well-being. Fathers with higher education are also more likely to secure jobs with better income, supporting good parenting practices for their children[26]. However, this study did not find an association between parental education and the incidence of stunting at the Demangan Primary Health Center. This finding aligned with Salsabila et al.'s study (2022), which stated that there was no association between maternal education and stunting[28]. Similarly, the study by Rufaida et al. (2020) also supports that parental education is not related to stunting[26]. It can be concluded that the parent's education level does not entirely influence the occurrence of stunting. According to Notoadmojo (2005), other factors such as socio-economic conditions, socio-cultural aspects, and the environment also play a role in determining the nutritional status of children[24].

Parenting patterns, especially in feeding, play a crucial role in a child's growth. Mothers with good parenting practices tend to have children with better nutritional status[24]. In this study, the majority of mothers fell into the insufficient category of feeding patterns (40.0%). Feeding practices in developing countries, including Indonesia, often fail to meet daily micro-nutritional needs[29]. Nevertheless, this research indicated that there is no association between parent patterns of feeding and stunting at Demangan Primary Health Center. This finding aligned with the study by Khadijah and Palifiana (2022), that there was no association between parental patterns of feeding and the nutritional status of toddlers[30]. Therefore, it can be assumed that the incidence of stunting at Demangan Primary Health Center was influenced by other factors.

To address the high prevalence of stunting in Indonesia, the government has taken several steps in the health sector,

including establishing the framework for Specific Nutrition Interventions. These are measures implemented during the first 1000 days of a child's life. Specific Nutrition Interventions target pregnant women, breastfeeding mothers with infants aged 0 – 6 months, and breastfeeding mothers with children aged 7 – 23 months[31]. The Provision of Supplementary Foods (*Pemberian Makan Tamabahan /PMT*) for malnourished toddlers is also a program frequently carried out by the Ministry of Health through Primary Health Centers[32]. In addition to the government, active community participation is crucial in efforts to reduce the stunting rate, evident in their involvement in every program organized by the government.

CONCLUSION

The study at Demangan Primary Health Center in Madiun City found 18 stunted toddlers (11.5%) out of 156 in the sample. Stunting in toddlers at this center is associated with factors such as maternal nutritional status (pre-pregnancy BMI and upper arm circumference), maternal weight gain during pregnancy, low birth weight, per capita income, and maternal knowledge of toddler's nutrition. Most influential factors are pre-pregnancy-related. So, interventions focusing on maternal conditions before pregnancy are crucial to reducing stunting, especially in Madiun, Indonesia.

ACKNOWLEDGMENT

The author expresses gratitude to all individuals and entities involved, with special appreciation extended to the Demangan Health Center in Madiun for their support in facilitating this research.

CONFLICT OF INTEREST

The authors affirm the absence of any conflicts of interest.

ETHICS CONSIDERATION

The study was approved by the Ethical Health Research Committee of Universitas Airlangga School of Medicine Surabaya, Indonesia with permit preference number 17/EC/KEPK/FKUA/2023 on 19 January 2023.

FUNDING

None.

AUTHOR CONTRIBUTION

Designed the study and drafted the manuscript: AMF, LD, and AS. Collected data and performed background literature review: AMF. Performed statistical analysis: AMF. Supervised results and discussion: LD and AS. All authors have examined and approved the final version of the manuscript.

REFERENCES

1. BPS. Profil Statistik Kesehatan 2019. Profil Stat Kesehat [Internet]. 2019;1–431. Available from: www.bps.go.id
2. Amaliah N, Sari K, Suryaputri IY. Short Birth Length as One of The Determinant Factors of Child Growth and Development Delays on Children Aged 6-23 Months in Jaticempaka , Pondok Gede. J Ekol Kesehat. 2016;15(1):43–55.
3. WHO. Global nutrition targets 2025. Stunting policy brief (WHO/NMH/NHD/14.3). Geneva: World Health Organization. 2014
4. de Onis M, Branca F. Childhood

stunting: A global perspective. Matern Child Nutr. 2016;12:12–26.
5. Teja M. Stunting Balita Indonesia Dan Penanggulangannya. Pus Penelit Badan Keahlian DPR RI. 2019;XI(22):13–8.
6. Beal T, Tumilowicz A, Sutrisna A, Izwardy D, Neufeld LM. A review of child stunting determinants in Indonesia. Matern Child Nutr [Internet]. 2018;14(4):1–10. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6175423/pdf/MCN-14-e12617.pdf
7. Kemenkes RI. Laporan Akhir Penelitian Studi Status Gizi Balita Di Indonesia Tahun 2019. Badan Penelit dan Pengemb Kesehat Kementeri Kesehat RI [Internet]. 2019;1–150. Available from: https://cegahstunting.id/unduhan/publikasi-data/
8. Kemenkes RI, BPS. Laporan Pelaksanaan Integrasi Susenas Maret 2019 dan SSGBI Tahun 2019. 2019;69.
9. Sutio D. Analisis Faktor-Faktor Risiko terhadap Kejadian Stunting pada Balita. J Dep Gizi Fak Kesehat Masarakat [Internet]. 2017;Vol. 28 No:247–56. Available from: https://ejournal2.litbang.kemkes.go.id/index.php/mpk/article/download/472/537/
10. Fajri FF. Faktor Maternal Pada Kejadian Stunting. J Med Hutama. 2021;02(04).
11. Hatijar H. Angka Kejadian Stunting Pada Bayi dan Balita. J Ilm Kesehat Sandi Husada. 2023;12(1).
12. Elisia L, Etika R, Aprilawati D, Mahiroh H. The Relationship Between Exclusive Breastfeeding History to Stunting Incidence in Children Aged 6-24 Months in The Working Area of The Gunung Anyar Community Health Center, Surabaya, Indonesia. J Community Med Public Heal Res. 2023;4(3):123–9
13. Sukmawati, Hendrayati, Chaerunnimah, Nurhumaira. Status Gizi Ibu Saat Hamil, Berat Badan Lahir Bayi Dengan Stunting Pada Balita. Media Gizi Pangan. 2018;25(1):18–24.
14. Pratiwi ED, Jumetan MA. Hubungan Indeks Masa Tubuh Ibu Hamil Dengan Kejadian Stunting di Desa Oben Kecamatan Nekamese Kabupaten Kupang. Mahesa Malahayati Heal Student J. 2023;3(5):1449–57.
15. Dewi R, Evrianasari N, Yuviska IA. Kadar Hb,Lila Dan Berat Badan Ibu Saat Hamil Berisiko Terhadap Kejadian Stunting Pada Anak Usia 1-3 Tahun. J Kebidanan Malahayati. 2020;6(1):57–64.
16. Fitri I, Wiji RN. Asupan zat gizi makro dan kenaikan berat badan selama hamil terhadap luaran kehamilan. J Gizi Klin Indones. 2018;15(2):66–74.
17. Ni Putu A, Nurul H. Pengaruh Peningkatan Berat Badan Terhadap Berat Badan Bayi Baru Lahir Di Puskesmas Kediri Tahun 2016. Bunda Edu-Midwifery J [Internet]. 2016; Available from: https://bemj.e-journal.id/BEMJ/article/view/4
18. Rahayu A, Yulidasari F, Putri AO, Anggraini L. Study Guide - Stunting dan Upaya Pencegahannya. Buku stunting dan upaya pencegahannya. 2018. 88 p.
19. Kamilia A. Berat Badan Lahir Rendah dengan Kejadian Stunting

pada Anak. J Ilm Kesehat Sandi Husada. 2019;10(2).
20. Pacheco C do R, Picauly I, Sinaga M. Health, Food Consumption, Social Economy, and Stunting Incidence in Timor Leste. J Kesehat Masy. 2017;13(2).
21. Sholihah SC. Kejadian Stunting di Wilayah Kerja Puskesmas Dradah. J Kesehat Masy. 2023;7(April 2023):135–40.
22. Zilawati N, Wahyuningsih. Gambaran Pengetahuan Ibu Balita Tentang Gizi Pada Balita Usia 1-5 Tahun Di Puskesmas Wonogiri I. J Kebidanan. 2019;11(02):170.
23. Amalia ID, Lubis DPU, Khoeriyah SM. Hubungan Pengetahuan Ibu Tentang Gizi Dengan Kejadian Stunting Pada Balita. J Kesehat Samodra Ilmu. 2021;12(2):146–54.
24. Ni'mah C, Muniroh L. Hubungan tingkat pendidikan, tingkat pengetahuan dan pola asuh ibu dengan Wasting dan Stunting Pada Balita Keluarga Miskin. Media Gizi Indones. 2015;10(1):84–90.
25. Sari RM, Oktarina M, Seftriani J. Hubungan Pendapatan Keluarga dengan Kejadian Stunting pada Balita di Wilayah Puskesmas Seginim Kabupaten Bengkulu Selatan. CHMK Midwifery Sci J. 2020;3(2).
26. Rufaida FD, Raharjo AM, Handoko A. Hubungan Faktor Keluarga dan Rumah Tangga dengan Kejadian Stunting pada Balita di Tiga Desa Wilayah Kerja Puskesmas Sumberbaru Jember. J Agromedicine Med Sci. 2020;6(1).
27. Ernawati R. Hubungan Jarak Kehamilan Dan Kehamilan Remaja Dengan Kejadian Stunting Di Puskesmas Harapan Baru Samarinda. Midwifery Reprod. 2021;4(2):56–63.
28. Salsabila S, Dewi Noviyanti R, Pertiwi D. Hubungan Tingkat Pendidikan Ibu dan Pola Asuh Orang Tua dengan Kejadian Stunting pada Balita Usia 12-36 Bulan di Wilayah Puskesmas Sangkrah. PROFESI (Profesional Islam Media Publ Penelit. 2022;19(2):143–51.
29. Kartini A, Suhartono, Subagio HW, Budiyono, Emman IM. Kejadian Stunting dan Kematangan Usia Tulang pada Anak Usia Sekolah Dasar di Daerah Pertanian Kabupaten Brebes. J Kesehat Masy [Internet]. 2016;11(2). Available from: http://journal.unnes.ac.id/nju/index.php/kemas%0AEfforts%0Ahttp://digilib2.unisayogya.ac.id/bitstream/handle/123456789/1341/UUT MARLINA NURSANTI 1710104095_NASKAH PUBLIKASI.pdf?sequence=1&isAllowed=y
30. Khadijah S, Palifiana DA. Hubungan Pola Asuh Orang Tua dengan Status Gizi Balita di Wilayah Kerja Puskesmas Mantrijeron Yogyakarta. J Kebidanan Indones. 2022;13(2):61–8.
31. TNP2K. 100 Kabupaten/Kota Prioritas untuk Intervensi Anak Kerdil (Stunting). 2017. 5 p.
32. Saputri RA. Upaya Pemerintah Daeah dalam Penanggulangan Stunting di Provinsi Kepulauan Bangka Belitung. Jdp (Jurnal Din Pemerintahan). 2019;2(2):152–68.