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Analysis of maternal factors and food security with the incidence of stunting in children 0-59 months of age in Sungai Penuh City

Analisis faktor maternal dan ketahanan pangan dengan kejadian stunting pada balita usia 0-59 bulan di Kota Sungai Penuh

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Abstract

The high incidence of stunting is the leading cause of death in children under five years of age worldwide. Sungai Penuh City is one of the urban areas in Indonesia that has experienced an increase in the prevalence of stunting. Stunting is caused by long-term nutritional deficiency in the mother due to inadequate food supply due to low household food security. Stunting can also occur because of the reproductive condition of the mother, who is not ready to conceive. This cross-sectional study aimed to analyze maternal factors and food security that have the greatest influence on the incidence of stunting in toddlers aged 0-59 months in Sungai Penuh City using data from the 2022 Indonesian Nutrition Status Survey conducted in August-September 2022. The sample consisted of 308 toddlers living in urban areas. Data were analyzed using descriptive non-parametric statistical tests with the chi-square test and Logistic Regression test. The results of this study prove that short maternal stature has a significant relationship with the incidence of stunting in toddlers ($p<0,05$), whereas chronic energy deficiency mothers, maternal age, and food security did not have a significant relationship with the incidence of stunting in toddlers in urban areas ($p>0,05$). In conclusion, maternal short stature is an indicator of past chronic malnutrition and a major predictor of stunting in children under five.

Keywords: Food Security, maternal factors, stunting, toddlers

Abstrak

Tingginya angka stunting menjadi penyebab utama kematian pada balita di dunia. Salah satu daerah perkotaan di Indonesia yang mengalami peningkatan prevalensi stunting yaitu di Kota Sungai Penuh. Stunting disebabkan karena adanya keadaan kekurangan zat gizi dalam jangka waktu panjang pada ibu akibat tidak memadainya pasokan pangan karena rendahnya ketahanan pangan rumah tangga, selain dapat terjadi karena kondisi reproduksi ibu yang belum siap untuk mengandung. Penelitian *cross sectional study* ini bertujuan untuk menganalisis faktor maternal dan ketahanan pangan yang paling berpengaruh terhadap kejadian stunting pada balita usia 0-59 bulan di Kota Sungai Penuh dengan menggunakan data hasil Survei Status Gizi Indonesia tahun 2022 yang dilakukan pada bulan Agustus-September 2022. Sampel sejumlah 308 balita yang tinggal di wilayah perkotaan. Data dianalisis menggunakan uji statistik non-parametrik deskriptif dengan uji *Chi-square* dan uji *Logistic Regression*. Hasil penelitian ini membuktikan perawakan ibu pendek memiliki hubungan signifikan dengan kejadian stunting pada balita($p<0,05$), sedangkan ibu kekurangan energi kronis, usia ibu melahirkan, dan ketahanan pangan tidak memiliki hubungan yang signifikan dengan kejadian stunting pada balita di wilayah perkotaan ($p>0,05$). Kesimpulan, ibu dengan perawakan pendek merupakan indikator kekurangan gizi kronis dimasa lampau dan predictor utama terjadinya stunting pada balita.

Kata Kunci: Balita, faktor maternal, ketahanan pangan, stunting

Introduction

Chronic malnutrition is often the main cause of high mortality in children under five years of age globally, and one of the impacts of chronic malnutrition is a decrease in productivity in children under five years of age (Gebreayohanes & Dessie, 2022; Utami et al., 2019). One type of chronic malnutrition that often occurs in toddlers is stunting. Toddlers who have been diagnosed with stunting are susceptible to fat accumulation and have a higher risk of developing diabetes, hypertension, dyslipidemia, and obesity, which can increase the causes of mortality in toddlers (Soliman et al., 2021; Utami et al., 2019).

Globally, Joint Child Malnutrition (JCM) proves that in the last ten years, 148,1 million people, or 22,3% of children aged 0-59 months experienced stunting throughout the world. By 2022, 52% of the total number of children under five will be in Asia, and Indonesia is the country with the third highest prevalence of stunting in Southeast Asia (UNICEF et al., 2023). The stunting rate in Indonesia in 2021 was 24,4%, in the following year this figure fell by 2,8% in 2022 to 21,6% (Kementerian Kesehatan RI, 2021 & 2022) Meanwhile, the Indonesian government's target is 14% by 2024 (Kementerian Kesehatan RI, 2020a). However, there are still several regencies/cities in Indonesia that are experiencing an increase in the prevalence of stunting, one of which is Sungai Banyak. Sungai Penuh City is the second Municipal City in Jambi Province after Jambi City and is the only area experiencing an increase in the prevalence of stunting in Jambi Province in 2022(Dinas Kesehatan Kota Sungai Penuh, 2022; Kementerian Kesehatan RI, 2022). One of the Indonesian government's efforts to reduce the prevalence of stunting is by improving nutrition which focuses on mothers and toddlers (Peraturan Presiden Republik Indonesia Nomor 72 Tentang Percepatan Penurunan Stunting, 2021).

Improving maternal and child nutrition refers to the link between the first 1000 days of life and maternal history, which has been identified as a factor causing stunting (Miele et al., 2021). Long-term energy deficiency in mothers before pregnancy, during pregnancy and after pregnancy can linearly impact the growth and development of the baby and increase the risk of stunting by 10% in early life (Amaha & Woldeamanuel, 2021; Kpewou et al., 2020). The prevalence of chronic energy deficiency among mothers in Sungai Banyak City is relatively high, with 6,65% of mothers experiencing energy deficiency, while the threshold set by the WHO is 5% (Dinas Kesehatan Kota Sungai Penuh, 2022).

Stunting can also occur because of genetic factors from parents. The mother's height may influence the newborn by inheriting genes that affect the child's bone growth during pregnancy (Sari and Sartika 2021). Based on the results of an audit of stunting cases in Sungai Banyak City, it shows that 24% of mothers under five have a height of <150 cm (Hasil Audit Kasus Stunting, 2023). Mothers who are short in height have an impact on the small size of their organs, causing decreased blood flow and suboptimal growth; thus, the baby is at risk of prematurity and LBW, which has a high potential for stunting (Khatun et al., 2019; Sinha et al., 2018; Sridevi, 2018).

In addition, the age at which the mother gives birth when she is too young (<20 years) or too old (>35 years) can affect fetal growth and development (Astuti et al., 2022). Family data collection in Sungai Banyak City shows that 32% of mothers under five give birth at a risky age (Pendataan Keluarga Tahun, 2021). Mothers who give birth at a risky age can disrupt placental nutrient absorption and lactation through physiological mechanisms involving the hormone cortisol (Shukri et al., 2019; Wells et al., 2022).

Apart from maternal history, stunting can also be influenced by other factors such as household food security. Food security has a direct impact on stunting because if there is food insecurity over a long period of time from the time a mother is pregnant until she gives birth, it causes the child's food intake to not be optimal (Kementerian Kesehatan RI, 2018; D. W. S. R. Wardani et al., 2020). The food security index in Sungai Banyak City in 2022 is expected to decrease by 14,53% compared to the previous year (Kementerian Pertanian, 2022). One of the factors that influence household food security is socioeconomic status. Food security is also influenced by the demographic location of households in accessing food (Laraia et al., 2022; Lukwa et al., 2020).

Different demographic conditions of residence will have different potentials, so the influence of residence needs to be taken into consideration when identifying the causes of

stunting in toddlers. Several previous studies have shown that toddlers who live in urban areas are often entrusted to other family members because the toddlers' mother chooses to work, which has an impact on inadequate nutritional intake for toddlers so that the toddlers' growth is less than optimal (Sserwanja et al., 2021; Zhu et al., 2021). Previous findings have also shown that urbanization tends to occur in urban areas. Urbanization should increase knowledge and practice of feeding; however, evidence proves that urban areas have poor care, thereby increasing the risk of stunting (Ameye & De Weerdt, 2020).

It is suspected that urban areas often have better nutritional status than rural areas. However, several findings prove otherwise; therefore, further investigation is needed. Thus, this research aims to analyze the relationship between maternal factors and food security with the incidence of stunting in urban areas so that it can be used as a recommendation for making policies to prevent stunting in the local context, especially in urban areas.

Methods

The aim of this quantitative research, which uses a cross-sectional study design approach, is to analyze the relationship between maternal factors and food security and the incidence of stunting among children under five in urban areas. The results of a national survey conducted in Indonesia from August to September 2022 were the basis for this research. However, this research only focused on one city in Indonesia that is experiencing an increase in the prevalence of stunting, namely Sungai Penuh City, Jambi Province.

This study analyzes secondary data from the results of national survey activities conducted by the Health Development Policy Agency (HDPA) in the 2022 Indonesian Nutrition Status Survey (INSS 2022). Survey data collection was carried out by trained enumerators by conducting interviews with respondents based on the INSS 2022 questionnaire that had been provided and declared valid and reliable by the INSS 2022 organizers. The INSS 2022 questionnaire was divided into three parts: the toddler household questionnaire, toddler questionnaire, and women's questionnaire. Researchers gain power by studying the 2022 INSS questionnaire and guidelines, creating a checklist of the required data, submitting an application, filling in the required data form, and sending a proposal that has been tested and approved by the examining board via the official HDPA website. After obtaining approval, the dataset was sent to the applicant.

Participants in this survey were 470 households with toddlers aged 0-59 months. The sample in this study used a census sampling technique, in which the entire population was the research sample. This research only focuses on toddlers who live in urban settlements based on the classification of residential areas according to the Central Statistics Agency, which has the characteristics of data availability according to research needs; therefore, the sample for this research is 308 toddlers.

Data that have been cleaned according to research needs will then be categorized first, such as the dependent variable, namely stunting, categorized according to the Z-score calculation of the height index (0=stunting, 1=not stunting) and the independent variable, namely chronic lack of energy (CED) mothers with the threshold Upper Arm Circumference (LiLA) < 23,5 cm (0=CED, 1=Not CED), short maternal stature with height <150 cm (0=short, 1=normal), maternal age at birth (0=at risk (too young < 20 years and too old > 35 years), 1=not at risk), and food security variables (1=Poor, 2=Bonderline, and 3=Acceptable). Univariate analysis was carried out to see the frequency distribution of the data descriptively, and then a bivariate test was carried out using the chi-square test with a significance level of 5%, which aimed to determine the relationship between the stunting variable and maternal factor variables and food security in Sungai Full City. The results were considered significant. if the p value was considered <0,05. Considering that variables have substances that are considered important, the researchers included variables in the multivariate analysis using the Logistic Regression test. The results were considered significant if the p value was <0,05, and the variable effect size was determined based on the Odds Ratio (OR) value. All data analyses were performed using the IBM SPSS statistics application software version 25.

Before collecting data during the 2022 SSGI survey, respondents filled out the questionnaire and agreed to the informed consent provided by the enumerator. The data sent to researchers do not include the identity of the sample but only contain a serial number. This study complied with the principles of research ethics according to the Declaration of Helsinki and was approved by the Research Ethics Committee of Dr. Moewardi (letter number 463/II/HREC/2024).

Result and Discussion

The research results (Table 1) prove that the distribution of sample characteristics based on age group has almost the same proportions.

The majority of toddlers were male (53,2%), more than half of their mothers had a history of higher education (high school university) (87%), and the majority of toddlers came from families with a medium wealth index (60,1%) years. Viewed based on height, the z-score Height-for-Age (HAZ) for toddlers has a mean of -1,3162 SD, which shows a tendency towards the threshold value for children who can be said to be stunted, namely - 2 SD.

Stunting is often associated with a child's gender. Previous findings conducted in Southeast Aceh have shown that men have a greater risk of stunting than women. This research is supported by the results of a systematic review and meta-analysis that proved the same thing; however, other factors such as food intake, health history, parenting patterns, and sanitation also play a role in the incidence of stunting in toddlers (Eliati et al., 2021; Thurstans et al., 2020).

Most of the participants had mothers with high formal education (87,0%), and almost half of the mothers of toddlers chose to work (46,4%). Maternal education can influence children's health and parenting patterns. Maternal education can also influence the desire of mothers who tend to choose work because of the influence of negative social views if mothers are educated but do not work. Working mothers aim to overcome the family's economic problems to meet the family's needs. However, the negative impact of working mothers is that there is less than optimal time to care for children, because children will more often be entrusted to grandparents or nannies, so that care is less than optimal during this period.

Table 1. Characteristics of mothers and toddlers

Characteristics	n (%)
Age	
0-11 month	63 (20,5)
12-23 month	67 (21,8)
24-35 month	51 (16,6)
34-47 month	67 (21,8)
48-59 month	60 (19,5)
Gender	
Man	164 (53,2)
Woman	144 (46,5)
Mother's education	
Low	40 (13,0
High	268 (87,0)
Mother's job	
Doesn't work	165 (53,6)
Work	143 (46,4)
Mother's Age at First Pregnancy	
Too young	78 (25,3)
Ideal	228 (74,0)
Too old	2 (0,6)
Number's of member family	
3 people	93 (30,2)
4 people	124 (40,3)
5 people	68 (22,1)
>6 people	23 (7,5)
Wealth Index	
Lower middle	185 (60,1)
Upper middle	123 (39,9)
HAZ	
Mean + SD (Min-Max)	-1,3162 ± 1,3189 (-5,02 -4,98)

Judging from the results of the chi-square test (Table 2), it is evident that among the four independent variables, only one variable has a significant relationship, namely between short maternal stature and the incidence of stunting in toddlers in urban areas ($p < 0,05$). The existence of this significance value can be influenced by genetic factors passed on by the mother to the child. Mothers with short stature can also be influenced by factors in the mother's past, such as lack of maternal intake during the mother's growth period.

The results of this study based on bivariate analysis (Table 2) also showed that mothers experiencing chronic energy deficiency, maternal age at birth, and food security did not find strong evidence of an association with the

incidence of stunting in this population because most of the research samples came from mothers who did not experience CED.

Reviewed based on (Table 1) first-time mothers become pregnant at a non-risk age, so it is likely that the mother also gives birth at a non-risk age. This is influenced by the fact that most mothers have a high level of education; therefore, researchers consider mothers to have good knowledge. Mothers with higher education will pay more attention to toddlers' health and prioritize toddlers' nutritional intake so that toddlers' needs will be met (Harismayanti and Retni, 2019). Likewise, the food security of under-five households shows that the majority of under-five households have good food security and are able to meet family needs. This is influenced by the geographical location which is close to the city center, apart from that it is also influenced by the existence of traditional markets which are held every every week in several sub-districts. A geographical location with easy access to food can meet the nutritional needs of toddlers so that nutritional problems in toddlers can be resolved (Lye et al., 2023).

Table 2. Bivariate analysis of maternal and food security with the incident of stunting in toddlers

Variable	Stunting		Normal		p-value
	n	%	n	%	
Mother has chronic energy deficiency					
CED	7	7,4	19	8,9	0,651
No CED	88	92,6	194	91,1	
Mother's stature is short					
Short	31	32,6	43	20,2	0,018*
Normal	64	67,4	170	79,8	
The age at which the mother gave birth to the toddler					0,224
Risky	29	30,5	51	23,9	
Not risky	66	69,5	162	76,1	
Food security					
Poor	0	0	0	0	
Borderline	2	2,2	2	0,9	0,385
Acceptable	91	97,8	213	99,1	

* variable significant value with p-value<0,05

Although, based on the chi-square test, only the short maternal stature variable has a significant relationship with the incidence of stunting, the other variables are comprehensive with the incidence of stunting, so that this variable is a predictor factor for the occurrence of stunting in toddlers. Furthermore, to see that all variables studied simultaneously can influence stunting, a multivariate analysis was performed using a logistic regression test, showing the following results:

Table 3. Multivariate analysis of predictive factors for stunting incidents among toddlers

Variables	p	OR	95% CI	
			Lower	Upper
Mother has chronic energy deficiency	0,443	0,691	0,268	1,779
Mother's stature is short	0,012*	2,020	1,164	3,505
The age at which the mother gave birth to the toddler	0,904	1,038	0,568	1,895
Food security	0,421	2,331	0,297	18,313

* Significant value with p <0,05 in the multivariate Logistic Regression with Enter Method analysis.

The results of the study (Table 3) show that maternal factors and food security simultaneously have a relationship with the incidence of stunting among toddlers in Sungai

Banyak City, namely short maternal stature (p<0,05) with an OR of 2,020, meaning mothers with a height <150 cm are 2,020 times at risk of having a stunted child. This finding is supported by previous research conducted in Northwest Ethiopia, proving that mothers with a height <150 cm have a 4,25 times risk of having stunted children. (Gudeta et al., 2023). Other research has also proven that maternal height has a significant relationship with the incidence of stunting among toddlers in urban areas (Sari & Sartika, 2021). In contrast to this research, research in Pasuruan City, Indonesia, shows that there is no significant relationship between maternal height and the incidence of stunting, because mothers with a height <150 cm can reduce the cycle of malnutrition in the next generation by improving their diet. during pregnancy, eating practices during pregnancy, and childcare in the first 1000 days of life(Sugianti et al., 2023).

This is because there is a link between maternal height and delayed intrauterine growth; mothers with short bodies have limitations in uterine blood flow, uterine growth, placenta, and fetal development, so children are at risk of becoming stunted (Berhe et al., 2019). Genetic factors are very important in influencing stunting if they are not influenced by other factors, at least +5% which can be inherited from children (Jelenkovic et al., 2018). A 1 cm increase in maternal height can reduce the risk of stunting in toddlers by 1% (Amaha & Woldeamanuel, 2021). The results of longitudinal research have shown that there are approximately 610 priority genes that have the potential to influence height by identifying long bone growth (Cousminer & Freathy, 2020). However, genetic factors play an important role in the regulation of hormones, cells, and communication pathways between cells in the epiphyseal growth plate, which can influence the growth of a child (Taib & Ismail, 2021). The findings of this study prove that the majority of stunted toddlers have mothers with short stature (32,6%), which is due to genetic factors that are influenced by the mother, due to the mother's less than optimal growth in the past. Considering the large impact of health and environmental factors on the nutritional status of children under five years of age, researchers consider that genetic factors can prevent stunting if they have a good health history and a healthy environment. In addition, gene expression is influenced by the environment (Küpers et al., 2019), thus reinforcing the role of the environment in the incidence of stunting.

The results of the study (Table 3) also show that chronic maternal energy deficiency does not have a significant relationship with the incidence of stunting among toddlers in Sungai Banyak City (p>0,05) with an OR <1, meaning that even in this study population, no significant relationship was found, However, mothers with good nutritional status have a 1,44 times chance of preventing stunting in toddlers compared with mothers with chronic energy deficiency. This research is in line with previous findings that KEK mothers do not have a significant correlation with the level of toddler stunting in urban areas (Endah Tri Maulina et al., 2021; Sartika et al., 2021). In contrast to previous research, it has been proven that KEK mothers can influence the incidence of stunting in their children (Ruaida & Soumokil, 2018; Santosa et al., 2022; Sugianti et al., 2023). This is due to the low quality of feeding practices in the household, due to the tendency to eliminate hunger and not consider the nutritional needs of family members, as illustrated by mothers experiencing chronic energy shortages (Fitriani et al., 2020; Odei Obeng Amoako et al., 2021). Food access can also influence a mother's nutritional status during pregnancy, with easy access to food being able to bridge the mother's chronic energy deficiency.

The findings of this study prove that the majority of toddlers have mothers with normal nutritional status or without KEK (92,6%), which is influenced by mothers who live in urban areas, possibly having an easier time accessing health services so that exposure to government programs such as PMT for pregnant women is easier. accessible as well as easier access to food compared to those living in rural areas. Mothers with KEK nutritional status who live in urban areas are able to increase compliance with health services; thus, by having regular antenatal visits, they can detect early problems that occur during pregnancy (Mulaw et al., 2020; Piniliw et al., 2021).

The results of the study (Table 3) show that the age of mothers who are at risk of giving birth (<20 years and >35 years) did not have a significant relationship with the incidence of stunting in toddlers in Sungai Banyak City

(p>0,05), with an OR of 1,038, meaning that although in this study population no significant relationship was found, mothers who gave birth at a risky age (too old or too young) had a 1,038 risk of having a stunted child. This research is in line with previous research that showed that the mother's age at birth was not significantly related to the incidence of stunting in toddlers in urban areas (Fatemi et al., 2019; Lewa et al., 2020; Sugianti et al., 2023). This is supported by the fact that the majority of mothers of toddlers have higher education, which influences the understanding and principles of taking into account the ideal age for having children. In contrast to previous research, mothers who give birth at a risky age (too old or too young) have a 2.74 times risk of having stunted children (Wardani et al., 2020). This is because the small size of the pelvis and decreased reproductive function in women can disrupt the passage of nutrients to the placenta, resulting in fetal failure to grow (Wells et al., 2022). Several other factors that can influence the age at which a mother gives birth are knowledge and socioeconomic (Akpinar & Teneler, 2022). The findings of this research prove that the majority of mothers under five become pregnant at the ideal age, namely 21-35 years (69,5%), so that the condition of the reproductive organs is ready and not at risk. This is influenced by the level of education; mothers with low education tend to marry early because of the belief that marrying early can ease the burden on the family, even though marrying at an early age increases the child's risk of stunting (Khairani et al., 2023). Most of the subjects of this research had a high level of education, and a high level of maternal education influences the mother's desire to give birth at the ideal age because of easy access to health services so that exposure to information will be easier and the mother can know the risks that will occur. if you marry too young or too old.

The research results (Table 3) also show that household food security does not have a significant relationship with the incidence of stunting among children under five years of age in urban areas (p>0,05), with an OR of 2,331. This means that, although there was no significant relationship found in this study population, inadequate household food security increased the risk of having stunted children 2,331 times. Several studies have shown that family food security is not related to the incidence of stunting (Asna et al., 2022; Priawantiputri et al., 2021). In contrast to previous research, it has been proven that food security can influence the incidence of stunting in toddlers (Patriota et al. 2024). This is because poor food security can affect the nutritional intake of toddlers, which is crucial for their growth period. This situation can occur because of economic disparities and demographic conditions (Lye et al., 2023; Patriota et al., 2024). One factor that can influence food security is household expenditures (Sihite & Tanziha, 2021). Household expenditure can describe socioeconomic conditions; households with low economic status find it more difficult to meet individual nutritional needs. Judging from the economic aspect, Sungai Banyak City is the city with the lowest poverty percentage in Jambi Province (Dinas Kesehatan Provinsi Jambi, 2022), so that it is very possible for the people of Sungai Penuh City to have good food security.

The findings of this study prove that the majority had acceptable food security (97.8%). This is influenced by geographical location, living in urban areas may find it easier to reach food because the distance is not too far (Mbogori & Muriuki, 2021), Apart from that, the Sungai Banyak City government has made a policy for food reserves as an effort to overcome food insecurity as an effort to improve nutrition (Peraturan Daerah Kota Sungai penuh Nomor 1 Tahun 2021 Tentang Penyelenggaraan Cadangan Pangan, 2021). The research location is a city that expanded from a previous district, causing cultural influences such as the provision of a traditional market every week on a certain day, which can be used by the community to meet food needs.

Stunting is complex; therefore, the causes of stunting need to be explored from various perspectives, although maternal factors and food security are direct factors that can cause stunting, and environmental and health factors also need to be considered. The living environment cannot be separated from the sanitation, culture, and customs that apply to society. The classification of urban areas does not guarantee a low prevalence of stunting due to the presence of slum urban environments or suboptimal health services as well as urbanization factors in urban areas, which can cause instability in the family's economic status.

Conclusion

Maternal nutritional status is the main predictor of stunting in toddlers aged 0-59 months in Sungai Banyak. Genetic factors are intergenerational in children. Short maternal stature is an indicator of chronic maternal malnutrition that can be inherited from the child, so that the child will be born with a short body length and be at risk of stunting, but this can be prevented by improving diet during pregnancy and eating practices during pregnancy and parenting. children in the first 1000 days of life, as well as the existence of good environmental conditions for their growth and development.

It is hoped that local governments can improve the cleanliness of environmental sanitation in urban areas that are still considered slums and optimize the nutritional status of adolescent girls, women of childbearing age, and pregnant women for early detection of future mothers-to-be. The nutritional status of mothers and children needs to be a top priority in improving human resources, so it is important to pay attention to other factors that were not examined in this research, such as maternal health during pregnancy, toddler health, socioeconomics, environmental sanitation, and other factors. Thus, cooperation intersectoral relations are very important in reducing the prevalence of stunting.

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References

Akpinar, C. V., & Teneler, A. A. (2022). Adolescent Motherhood and Negative Birth Outcomes, Stunting and Social Determinants: Secondary Analysis of Turkish National Data 2018. *Mediterranean Health Journal*, 1–13. https://doi.org/10.21203/rs.3.rs-1410546/v1

Amaha, N. D., & Woldeamanuel, B. T. (2021). Maternal factors associated with moderate and severe stunting in Ethiopian children: analysis of some environmental factors based on 2016 demographic health survey. *Nutrition Journal*, *20*(1), 1–9. https://doi.org/10.1186/s12937-021-00677-6

Ameye, H., & De Weerdt, J. (2020). Child health across the rural–urban spectrum. *World Development*, *130*, 104950. https://doi.org/10.1016/j.worlddev.2020.104950

Asna, A. F., Ramadhanty, P. D., & Fadhilah, T. M. (2022). *The Association between Household Food Security with Stunting Incidence in Children Aged 6-23 Months in Sukaluyu and Srikamulyan Village Karawang Regency*. *Icsdh 2021*, 43–47. https://doi.org/10.5220/0010758300003235

Astuti, F. D., Azka, A., & Rokhmayanti, R. (2022). Maternal age correlation of stunting in children: Systematics review. *Journal of Maternal and Child Health*, *7*(4 SE-Articles), 448–479. https://thejmch.com/index.php/thejmch/article/view/817

Berhe, K., Seid, O., Gebremariam, Y., Berhe, A., & Etsay, N. (2019). Risk factors of stunting (chronic undernutrition) of children aged 6 to 24 months in Mekelle City, Tigray Region, North Ethiopia: An unmatched case-control study. *PLoS ONE*, *14*(6), 1–11. https://doi.org/10.1371/journal.pone.0217736

Pendataan Keluarga Tahun 2021, (2021).

Hasil Audit Kasus Stunting, (2023).

Cousminer, D. L., & Freathy, R. M. (2020). Genetics of early growth traits. *Human Molecular Genetics*, *29*(R1), R66–R72. https://doi.org/10.1093/hmg/ddaa149

Dinas Kesehatan Kota Sungai Penuh. (2022). *Laporan Tahunan KESGA dan Gizi Kota Sungai Penuh 2022*.

Dinas Kesehatan Provinsi Jambi. (2022). *Profil Kesehatan Provinsi Jambi Tahun 2021*.

Eliati, Handayani, S., Heppy Nidia, W., Susanti, D., & Rahliadi, R. (2021). Faktor-Faktor yang

Berhubungan dengan Kejadian Stunting pada Balita Usia 3-5 Tahun di Kecamatan Badar Kabupaten Aceh Tenggara. *Nasuwakes: Jurnal Ilmiah Kesehatan*, *14*(2), 123–135.

Endah Tri Maulina, E., Radita Alma, L., & Nurrochmah, S. (2021). Relationship of Chronic Energy Deficiency, Birthweight and Exclusive Breastfeeding with Stunting in Kedungrejo Village, Pakis District, Malang. *KnE Life Sciences*, *2021*(ISMoPHS 2020), 102–114. https://doi.org/10.18502/kls.v0i0.8872

Fatemi, M. J., Fararouei, M., Moravej, H., & Dianatinasab, M. (2019). Stunting and its associated factors among 6-7-year-old children in southern Iran: A nested case-control study. *Public Health Nutrition*, *22*(1), 55–62. https://doi.org/10.1017/S136898001800263X

Fitriani, H., Achmad Setya, R., & Nurdiana, P. (2020). Risk Factors of Maternal Nutrition Status During Pregnancy to Stunting in Toddlers Aged 12-59 Months. *Jurnal Keperawatan Padjadjaran*, *8*(2), 174–182. https://doi.org/10.24198/jkp.v8i2.1305

Gebreayohanes, M., & Dessie, A. (2022). Prevalence of stunting and its associated factors among children 6–59 months of age in pastoralist community, Northeast Ethiopia: A community-based cross-sectional study. *PLOS ONE*, *17*(2), e0256722. https://doi.org/10.1371/journal.pone.0256722

Gudeta, H. T., Nagari, S. L., Dadi, D. G., Abdulahi, T., & Abose, S. (2023). Predictors of Stunting among 6-35 Months Old Children in Assosa Zone, Northwest Ethiopia: Unmatched Case-Control Study. *Advances in Public Health*, *2023*. https://doi.org/10.1155/2023/3491977

Harismayanti and Retni. (2019). Karakteristik Pekerjaan Responden Wiraswasta Petani Total Frekuensi Presentase. *Zaitun Universitas Muhammadiyah Gorontalo*, *7*(2), 1–8.

Jelenkovic, A., Yokoyama, Y., Sund, R., Hur, Y. M., Harris, J. R., Brandt, I., Nilsen, T. S., Ooki, S., Ullemar, V., Almqvist, C., Magnusson, P. K. E., Saudino, K. J., Stazi, M. A., Fagnani, C., Brescianini, S., Nelson, T. L., Whitfield, K. E., Knafo-Noam, A., Mankuta, D., … Silventoinen, K. (2018). Associations between birth size and later height from infancy through adulthood: An individual based pooled analysis of 28 twin cohorts participating in the CODATwins project. *Early Human Development*, *120*, 53–60. https://doi.org/10.1016/j.earlhumdev.2018.04.004

Kementerian Kesehatan RI. (2018). Lebih Dari 200 Penyakit Ditularkan Melalui Makanan. *Direktorat Jendral Kesehatan Masyarakat*. https://kesmas.kemkes.go.id/konten/133/0/092717-lebih-dari-200-penyakit-ditularkan-melalui- makanan

Kementerian Kesehatan RI. (2021). *Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota Tahun 2021*. *1*, 168. https://doi.org/10.36805/bi.v2i1.301

Kementerian Kesehatan RI. (2022). Hasil Studi Status Gizi Indonesia (SSGI) Tingkat Nasional, Provinsi, dan Kabupaten/Kota Tahun 2022. In *Kemenkes RI*. https://www.litbang.kemkes.go.id/buku-saku-hasil-studi-status-gizi-indonesia-ssgi-tahun-2021/

Kementerian Pertanian. (2022). Indeks Ketahanan Pangan 2022. *Badan Ketahanan Pangan*, *0*(0), 0.

Kementrian Kesehatan RI. (2020). Indikator Program Kesehatan Masyarakat Dalam RPJMN dan RENSTRA Kementrian Kesehatan 2020-2024. In *Kementerian Kesehatan Republik Indonesia*.

Khairani, M. D., Tjahjono, K., Rosidi, A., Margawati, A., & Noer, E. R. (2023). Faktor determinan riwayat kehamilan dan kelahiran sebagai penyebab stunting. *AcTion: Aceh Nutrition Journal*, *8*(1), 70. https://doi.org/10.30867/action.v8i1.793

Khatun, W., Rasheed, S., Alam, A., Huda, T. M., & Dibley, M. J. (2019). Assessing the intergenerational linkage between short maternal stature and under-five stunting and wasting in Bangladesh. *Nutrients*, *11*(8). https://doi.org/10.3390/nu11081818

Kpewou, D. E., Poirot, E., Berger, J., Som, S. V., Laillou, A., Belayneh, S. N., & Wieringa, F. T. (2020). Maternal mid-upper arm

circumference during pregnancy and linear growth among Cambodian infants during the first months of life. *Maternal and Child Nutrition*, *16*(S2), 1–11. https://doi.org/10.1111/mcn.12951

Küpers, L. K., Monnereau, C., Sharp, G. C., Yousefi, P., Salas, L. A., Ghantous, A., Page, C. M., Reese, S. E., Wilcox, A. J., Czamara, D., Starling, A. P., Novoloaca, A., Lent, S., Roy, R., Hoyo, C., Breton, C. V., Allard, C., Just, A. C., Bakulski, K. M., … Felix, J. F. (2019). Meta-analysis of epigenome-wide association studies in neonates reveals widespread differential DNA methylation associated with birthweight. *Nature Communications*, *10*(1), 1–11. https://doi.org/10.1038/s41467-019-09671-3

Laraia, B. A., Gamba, R., Saraiva, C., Dove, M. S., Marchi, K., & Braveman, P. (2022). Severe maternal hardships are associated with food insecurity among low-income/lower-income women during pregnancy: results from the 2012–2014 California maternal infant health assessment. *BMC Pregnancy and Childbirth*, *22*(1), 1–10. https://doi.org/10.1186/s12884-022-04464-x

Lewa, A. F., Kusika, S. Y., Muliani, Rahmawati, & Jannah, I. (2020). Risk factors of stunting events in child 6–23 months old in Biromaru Public Health Center Sigi. *Enfermeria Clinica*, *30*, 131–135. https://doi.org/10.1016/j.enfcli.2019.10.056

Lukwa, A. T., Siya, A., Zablon, K. N., Azam, J., & Alaba, O. (2020). Prevalence and Socioeconomic inequalities trends in child health comparing within and between group inequalities: Food insecurity and malnutrition in Zimbabwe. *BMC Public Health*, 1–11. https://doi.org/10.1186/s12889-020-09295-z

Lye, C. W., Sivasampu, S., Mahmudiono, T., & Majid, H. A. (2023). A systematic review of the relationship between household food insecurity and childhood undernutrition. *Journal of Public Health*, *45*(4), e677–e691. https://doi.org/10.1093/pubmed/fdad070

Mbogori, T., & Muriuki, J. (2021). Demographic and Social-Economic Determinants of Malnutrition among Children (0-23 Months Old) in Kenya. *International Journal of Child Health and Nutrition*, *10*(3), 80–87. https://doi.org/10.6000/1929-4247.2021.10.03.1

Miele, M. J., Souza, R. T., Calderon, I. M., Feitosa, F. E., Leite, D. F., Rocha Filho, E. A., Vettorazzi, J., Mayrink, J., Fernandes, K. G., Vieira, M. C., Pacagnella, R. C., & Cecatti, J. G. (2021). Maternal nutrition status associated with pregnancy-related adverse outcomes. *Nutrients*, *13*(7), 1–14. https://doi.org/10.3390/nu13072398

Mohd Shukri, N. H., Wells, J., Eaton, S., Mukhtar, F., Petelin, A., Jenko-Pražnikar, Z., & Fewtrell, M. (2019). Randomized controlled trial investigating the effects of a breastfeeding relaxation intervention on maternal psychological state, breast milk outcomes, and infant behavior and growth. *American Journal of Clinical Nutrition*, *110*(1), 121–130. https://doi.org/10.1093/ajcn/nqz033

Mulaw, G. F., Adem, O. S., & Belachew, A. B. (2020). Determinants of Stunting among Children Aged 6-23 Months of Age in Pastoral Community, Afar Region, Ethiopia: Unmatched Case-Control Study. *International Journal of Child Health and Nutrition*, *9*(4), 191–201. https://doi.org/10.6000/1929-4247.2020.09.04.6

Odei Obeng Amoako, G. A., Karamagi, C. A. S., Nangendo, J., Okiring, J., Kiirya, Y., Aryeetey, R., Mupere, E., Myatt, M., Briend, A., Kalyango, J. N., & Wamani, H. (2021). Factors associated with concurrent wasting and stunting among children 6–59 months in Karamoja, Uganda. *Maternal and Child Nutrition*, *17*(1), 1–15. https://doi.org/10.1111/mcn.13074

Patriota, É. S. O., Abrantes, L. C. S., Figueiredo, A. C. M. G., Pizato, N., Buccini, G., & Gonçalves, V. S. S. (2024). Association between household food insecurity and stunting in children aged 0–59 months: Systematic review and meta-analysis of cohort studies. *Maternal and Child Nutrition*, *20*(2), 1–15. https://doi.org/10.1111/mcn.13609

Peraturan Presiden Republik Indonesia Nomor 72 Tentang Percepatan Penurunan Stunting, Peraturan Presiden Republik Indonesia 23 (2021).

Piniliw, M. B., Africa, L. S., & Agne, J. P. (2021). Factors Associated with Stunting among 24–35-Month-Old Kalinga Indigenous Children in Pinukpuk, Kalinga, Philippines: A Case-Control Study. *Jurnal Gizi Dan Pangan*, *16*(2), 81–90. https://doi.org/10.25182/jgp.2021.16.2.81-90

Priawantiputri, W., Fahmida, U., & Utami (2021). Household Food Security and Nutritional Status Among Children Under Two Years Old in East Kolaka District, South East *Empowerment*, *December*, 14–16. http://conference.juriskes.com/index.php/IC/article/view/163

Ruaida, N., & Soumokil, O. (2018). Hubungan Status Kek Ibu Hamil Dan Bblr Dengan Kejadian Stunting Pada Balita Di Puskesmas Tawiri Kota Ambon. *Jurnal Kesehatan Terpadu (Integrated Health Journal)*, *9*(2), 1–7. https://doi.org/10.32695/jkt.v2i9.12

Santosa, A., Kep, S., Kep, M., Arif, E. N., Kep, S., Ghoni, D. A., & Kep, S. (2022). Effect of maternal and child factors on stunting: partial least squares structural equation modeling. Clinical and experimental pediatrics, 65(2), 90. *Clin Exp Pediatr*, *65*(2), 90–97.

Sari, K., & Sartika, R. A. D. (2021). The effect of the physical factors of parents and children on stunting at birth among newborns in indonesia. *Journal of Preventive Medicine and Public Health*, *54*(5), 309–316. https://doi.org/10.3961/jpmph.21.120

Sartika, A. N., Khoirunnisa, M., Meiyetriani, E., Ermayani, E., Pramesthi, I. L., & Nur Ananda, A. J. (2021). Prenatal and postnatal determinants of stunting at age 0–11 months: A cross-sectional study in Indonesia. *PLoS ONE*, *16*(7 July), 1–14. https://doi.org/10.1371/journal.pone.0254662

Sihite, N. W., & Tanziha, I. (2021). Faktor-faktor yang mempengaruhi ketahanan pangan rumah tangga di Kota Medan. *AcTion: Aceh Nutrition Journal*, *6*(1), 15. https://doi.org/10.30867/action.v6i1.395

Sinha, B., Taneja, S., Chowdhury, R., Mazumder, S., Rongsen-Chandola, T., Upadhyay, R. P., Martines, J., Bhandari, N., & Bhan, M. K. (2018). Low-birthweight infants born to short-stature mothers are at additional risk of stunting and poor growth velocity: Evidence from secondary data analyses. *Maternal & Child Nutrition*, *14*(1). https://doi.org/10.1111/mcn.12504

Soliman, A., De Sanctis, V., Alaaraj, N., Ahmed, S., Alyafei, F., Hamed, N., & Soliman, N. (2021). Early and long-term consequences of nutritional stunting: From childhood to adulthood. *Acta Biomedica*, *92*(1), 1–12. https://doi.org/10.23750/abm.v92i1.11346

Sridevi, M. (2018). Influence of Maternal Short Stature on the Stunting Levels of Infants and Toddlers: A Case Study of Urban Slums in Chennai. *Review of Development and Change*, *23*(1), 151–180. https://doi.org/10.1177/0972266120180107

Sserwanja, Q., Kamara, K., Mutisya, L. M., Musaba, M. W., & Ziaei, S. (2021). Rural and Urban Correlates of Stunting Among Under-Five Children in Sierra Leone: A 2019 Nationwide Cross-Sectional Survey. *Nutrition and Metabolic Insights*, *14*. https://doi.org/10.1177/11786388211047056

Sugianti, E., Buanasita, A., Hidayanti, H., & Putri, B. D. (2023). Analisis faktor ibu terhadap kejadian stunting pada balita usia 24-59 bulan di perkotaan. *AcTion: Aceh Nutrition Journal*, *8*(1), 30. https://doi.org/10.30867/action.v8i1.616

Taib, W. R. W., & Ismail, I. (2021). Evidence of stunting genes in Asian countries: A review. *Meta Gene*, *30*(June), 100970. https://doi.org/10.1016/j.mgene.2021.100970

Thurstans, S., Opondo, C., Seal, A., Wells, J., Khara, T., Dolan, C., Briend, A., Myatt, M., Garenne, M., Sear, R., & Kerac, M. (2020). Boys are more likely to be undernourished than girls: A systematic review and meta-analysis of sex differences in undernutrition. *BMJ Global Health*, *5*(12), 1–17. https://doi.org/10.1136/bmjgh-2020-004030

UNICEF et al. (2023). Levels and trends in child malnutrition in Bangladesh. *Asia-Pacific Population Journal*, *24*(2), 51–78. https://doi.org/10.18356/6ef1e09a-en

Utami, R. A., Setiawan, A., & Fitriyani, P. (2019). Identifying causal risk factors for stunting in children under five years of age in South Jakarta, Indonesia. *Enfermeria Clinica*, *29*(xx), 606–611. https://doi.org/10.1016/j.enfcli.2019.04.093

Peraturan Daerah Kota Sungai penuh Nomor 1 Tahun 2021 Tentang Penyelenggaraan Cadangan Pangan, (2021).

Wardani, D. W. S. R., Wulandari, M., & Suharmanto, S. (2020). Hubungan Faktor Sosial Ekonomi dan Ketahanan Pangan terhadap Kejadian Stunting pada Balita. *Jurnal Kesehatan*, *11*(2), 287. https://doi.org/10.26630/jk.v11i2.2230

Wardani, E. K., Widiyastuti, N. E., Rofika, L. D., & Wirawati, W. A. (2020). *Factors Affecting Stunting among Children Under Five Years of Age in Banyuwangi, East Java*. 117–125. https://doi.org/10.26911/the7thicph.03.80

Wells, J. C. K., Marphatia, A. A., Cortina-Borja, M., Manandhar, D. S., Reid, A. M., & Saville, N. M. (2022). Associations of maternal age at marriage and pregnancy with infant undernutrition: Evidence from first-time mothers in rural lowland Nepal. *American Journal of Biological Anthropology*, *178*(4), 557–573. https://doi.org/10.1002/ajpa.24560

Zhu, W., Zhu, S., Sunguya, B. F., & Huang, J. (2021). Urban–rural disparities in the magnitude and determinants of stunting among children under five in tanzania: Based on tanzania demographic and health surveys 1991–2016. *International Journal of Environmental Research and Public Health*, *18*(10). https://doi.org/10.3390/ijerph18105184