Jurnal Aisyah : Jurnal Ilmu Kesehatan

Volume 6, Issue 1, March 2021, pp. 9–16
ISSN 2502-4825 (print), ISSN 2502-9495 (online)

Determinant Factor for Stunting in Toddler

Kurniasih Widayati[1*)]; I Kadek Agus Dwija[2]; Ni Luh Made Asri Dewi[3]

[1,2,3*)]Stikes Kesdam IX/Udayana

ARTICLE INFO

Article history:

Received November 12, 2020
Accepted December 12, 2020
Published April 25, 2021

Keyword:

Determinant
Stunting
Toddler

ABSTRACT

Stunting (failure to thrive) is a chronic nutritional problem in children under five which is characterized by a height that is shorter than its age. Stunting is a threat to the nation's competitiveness. The side effects are disruption of brain development, intelligence, physical growth disorders, and metabolic disorders in the child's body. The research objective was to determine the determinant factors causing stunting in Sukawati Gianyar District. The research design was a case control with a sample size of 47 cases and 144 controls, all of which were selected within a certain time period, namely 1-16 August 2020 in Sukawati Subdistrict, Gianyar Regency. Cases were respondents whose height was less suitable for age and controls were toddlers with height according to age. Data were collected using a questionnaire that asks about maternal factors, child factors, environmental factors and health service factors. Univariate analysis is used to determine the characteristics of respondents, bivariate to determine OR and, multivariate logistic regression method to determine Adjusted OR. The bivariate analysis showed that the factors that increased the risk of stunting were maternal height with OR = 3,260 (95% CI: 1,567-6,783), Gravida OR = 2,719 (95% CI: 1,256-5,889), Birth weight with OR = 0.217 (95% CI: 0.165-0.286), Multivariate analysis showed that the determinant variable which significantly increased the risk of stunting was maternal height with OR = 3.5 (95% CI: 1.6-7.9), Gravida with OR = 3.394. (95% CI: 1.368-8.416) and breastfeeding initiation counseling with OR = 0.392 (95% CI: 0.158 0.974). Mother's height and Gravida are risk factors for stunting in Sukawati District, Gianyar Regency, Bali.

Faktor Determinan Balita Stunting (Pendek)

Kata kunci:

Determinant
Stunting
Bayi

**) corresponding author*

Stikes Kesdam IX/Udayana

Email: kurnia070@gmail.com

DOI: https://doi.org/10.30604/jika.v6i1.381

ABSTRAK

Stunting (gagal tumbuh) merupakan masalah gizi kronis pada balita yang ditandai dengan tinggi badan yang lebih pendek dari usianya. Stunting merupakan ancaman bagi daya saing bangsa. Efek sampingnya adalah terganggunya perkembangan otak, kecerdasan, gangguan pertumbuhan fisik, dan gangguan metabolisme pada tubuh anak. Tujuan penelitian ini adalah untuk mengetahui faktor determinan penyebab stunting di Kecamatan Sukawati Gianyar. Rancangan penelitian adalah case control dengan ukuran sampel 47 kasus dan 144 kontrol yang semuanya dipilih dalam kurun waktu tertentu yaitu tanggal 1-16 Agustus 2020 di Kecamatan Sukawati Kabupaten Gianyar. Kasus adalah responden yang didapatkan tinggi badan kurang sesuai dengan umur dan kontrol adalah bayi dengan tinggi badan sesuai dengan umurnya. Data dikumpulkan menggunakan kuesioner yang menanyakan tentang faktor ibu, faktor anak, faktor lingkungan dan faktor pelayanan kesehatan. Analisis univariat digunakan untuk mengetahui karakteristik responden, bivariat untuk mengetahui OR dan, metode regresi logistik multivariat untuk menentukan Adjusted OR. Analisis bivariat menunjukkan bahwa faktor yang meningkatkan risiko stunting adalah tinggi badan ibu dengan OR = 3,260 (95% CI: 1,567-6,783), Gravida OR = 2,719 (95% CI: 1,256-5,889), Berat Badan Lahir dengan OR = 0,217 (95 % CI: 0,165-0,286), Analisis multivariat menunjukkan bahwa variabel determinant meningkatkan risiko stunting secara signifikan adalah

tinggi badan ibu dengan OR = 3,5 (95% CI: 1,6-7,9), Gravida dengan OR= 3,394 (95%CI: 1,368-8,416) dan penyuluhan Inisiasi Menyusui Dini dengan OR=0,392 (95%CI: 0,158 0,974). Tinggi badan Ibu dan Gravida merupakan faktor risiko stunting di Kecamatan Sukawati Kabupaten Gianyar Bali.

INTRODUCTION

One of the national development priorities listed in the main targets of the 2015-2019 Mid-term Development Plan is an effort to improve the nutritional status of the community, including reducing the prevalence of stunting. (Indonesian Ministry of Health, 2016)

According to Anthropometric Standards for Assessing Children's Nutritional Status, the definition of short (stunting) and very short (severely stunted) is nutritional status based on the index of Body Length for Age (PB / U) or Height for Age (TB / U) and then compared with the standard the result, when compared with the WHO-MGRS standard (Mulicentre Geowth Reference Study) in 2005, is at a z_score value less than-2SD and is categorized as very short if the z-score is less than -3SD, (Rahmadi, 2016)

The results of Baseline health research 2013, the prevalence of stunting in Indonesia reached 37.2%. Based on Monitoring of Nutritional Status in 2016, it reached 27.5% while the limit from WHO was <20%. This means that about 8.9 million Indonesian children experience suboptimal growth, or 1 in 3 Indonesian children are stunted (Ministry of Villages, Development of Underdeveloped Areas, n.d.). Compared to several neighboring countries, the prevalence of stunting under five in Indonesia is also the highest compared to Myanmar (35%), Vietnam (23%), Malaysia (17%) (Indonesian Ministry of Health, 2016). Results of Baseline health research 2018 The proportion of short children under five in Indonesia reached 30.8%, while in baduta it was 28%.

Stunting has an impact on the level of intelligence, susceptibility to disease, reduces productivity and inhibits economic growth, increases poverty and inequality. (Bali Provincial Health Office, 2017). Nutritional Status Monitoring Data in 2017, cases of malnutrition in Bali reached 6.3% for underweight children and 19.1% for stunting. Based on data from the Bali Provincial Health Office on strategic issues, the current highest prevalence is in Buleleng and Gianyar Regencies, which are around 29-22.5%. The number of stunting in Gianyar district shows a significant increase in the number of stunted cases, namely 15.8% (2015), decreased in 2016, namely 13.6% and increased again, namely 22.5% (2017). So that Gianyar regency is categorized as acute and chronic in child nutrition problems.

The problem of short toddlers is influenced by several conditions, including mother, fetal period and infancy, comorbidities during toddlerhood (Nugroho, 2016). There are direct efforts to improve stunting, namely nutrition interventions specifically covering the first 1,000 days of life, namely pregnant women, breastfeeding and children 0-23 months and indirect efforts, namely involving various sectors such as food security, availability of clean water and sanitation, poverty alleviation , education and so on.

Based on the above problems, early detection is needed to determine the causes of the risk of stunting in children aged 0-60 months. Therefore, the purpose of this research was to determine the determinant factors of stunting in children under five in the area of Public Health Center of Sukawati, Gianyar regency, Bali.

METHOD

Research participants

This research is an observational analytic study with a case control design (case control) in Sukawati sub-district which oversees 2 health centers, namely public health center of Sukawati I and Sukawati II covering several villages. Given the conditions being hit by the Covid-19 pandemic, not all community health service activities are followed, it's just that in each village are represented by 1-2 health service activities. The target population is children under five with stunting in Sukawati sub-district, while the reachable population is children aged 0-60 months who are recorded at public health center Sukawati I and II in 2020.

Sampling used a purposive sampling technique, namely selecting all samples that took part in posyandu activities in the Sukawati 1 and 2 puskesmas within a certain time, namely 1-16 August 2020.

The estimation of the sample size is by calculating the role of thumb, namely the minimum sample size needed is between 5-50 times more than the number of independent variables (independent variables), namely 5 independent variables, and 10 times the number of independent variables, so that the required sample ranges between 50-250 samples (Dharma, 2013). The number of samples obtained were 191 respondents who met the inclusion and exclusion criteria, namely 0-60 months of age, did not have congenital disorders such as Down's syndrome.

Research procedure

The data collection stage in this research was that after obtaining permission from the relevant agency, the researcher followed the community health service schedule for a certain period of time, from August 1 up to 16, until they got the sample they needed. And obtained 191 toddlers, with 47 stunting (cases) and 144 not stunting (controls) with a ratio of 1: 3.

Instrument

Data were collected using an extraction form which includes: mother variables, child variables, health service variables and environmental variables. Independent variables in this study are maternal factors, infant factors, environmental factors and health services. While the dependent variable (dependent) is stunting. Maternal variables consist of: mother's education, mother's

occupation, mother's height, age of marriage, age of delivery, gravida/number of maternal pregnancies, and the circumference of the mother's arm. Children's variables consisted of: birth weight, birth height, being given exclusive breastfeeding for 6 months, giving complementary breastfeeding for babies more than 6 months old and comorbidities in infants, namely fever, cough / runny nose, diarrhea and intestinal worms. from: delivery assisted by health personnel, giving vitamin A tablets, completing pregnancy check-ups/Ante Natal Care to mothers, providing health education for Early Breastfeeding Initiation / IMD, exclusive breastfeeding counseling, family planning/family planning counseling and counseling on complementary breastfeeding. Environmental variables consist of: In environmental factors, namely clean water sources seen from PDAM or non-PDAM, having private latrines, the number of family members who live in one house is more than 5 people or less and family income as seen from the income of the father (head of household) namely permanent or non-permanent income.

In the analysis, variable categorization was carried out, namely: 1) Mother's education (basic_intermediate and university), Mother's occupation (permanent and non-permanent), mother's height (<150 cm and> 150 cm), age of married mothers (in accordance with the Marriage Law and not in accordance with the marriage law), Gravida (Primipara and multiparous), Mother's arm circumference (<23 cm (KEK) and >23 cm (not KEK).

The data collection tool is in the form of an extraction form, the data filled in are primary data (direct interviews) with data made by the researcher referring to the MCH handbook and secondary data by looking at the health of mother and Child's book. The questionnaire consists of the characteristics of the respondent, namely the baby's initials, age of birth, gender of the baby, and the mother's education.

Measurement of the toddler's height using a microtoise with a capacity of 200 cm and an accuracy level of 0.1 sm, then the z-score calculation of height according to age (TB / U) was carried out using the WHO Anthro 2005 standard. Data collection on the sample was assisted by freelancers with student criteria health.

Data analysis

Data were analyzed using SPSS version 23 year 2016. Bivariate analysis was performed to compare cases and controls and calculate the Crude OR of each risk factor. Multivariate analysis was performed using the logistic regression method to determine the risk factors that were independently associated with stunting by calculating the correlation between the independent variable and the dependent variable, the Chi-square test was used. To see the dominant variable that has an effect on stunting, the Logistic Regression test is used (Sastroasmoro S, 2010).

This research has passed the ethical test from the Research Ethics Commission of the Faculty of Medicine, Udayana University / Sanglah Central General Hospital Denpasar with number: 1739 / UN14.2.2VII.14 / L.T / 2020.

RESULTS AND DISCUSSION

Table 1
Characteristics of Research Respondents Based on mother and baby factors in Sukawati District, Gianyar Regency

Characteristics	Frequency (n=191)	Percentage(%)
Mother's Education		
Basic- Intermediate	131	68,6
high	60	31,4
Mother's Occupation		
House wife	67	35,1
Enterpreneur	38	19,9
Farmer	1	0,5
laborer	3	1,6
Private	80	41,9
PNS/TNI/POLRI	2	1,0
Mother's knowledge level		
Good	139	72,8
Less	52	27,2
Babies Gender		
Male	95	49,7
Female	96	50,3
Toddler Categories		
Stunting (Case)	47	24,6
Normal/Control	144	75,4

In Table 1, it is found that the distribution of maternal education levels is mostly at the primary-secondary education level (SD, SMP, SMA), namely 131 respondents (68.6%) and higher education 60 respondents or 31.4%. Type of work for mothers is mostly private, namely 80 people or 41.9%, then housewives 35.1% (67 people). The level of knowledge of mothers about stunting was mostly good, namely 139 (72.8%) and less as much as 52 (27.2%). The sex of the baby was 96 girls (50.3%) and 95 boys (49.7%). Toddlers who were stunted (short) 47 babies (24.6%) and control (normal) 144 (75.4%). In Tables 2, 3, 4 and 5, it can be seen that the case and control groups in all are similar (p> 0.05) except for the variable number of maternal pregnancies (gravida), maternal height, and baby birth weight (p <0, 05). Significantly, the risk factors that increase the incidence of stunting are gravida with crude OR = 2,719 (95% CI: 1,256-5,889), maternal height with crude OR = 3,260 (95% CI: 1,567-6,783), Birth weight with crude OR = 0.217 (95% CI: 0.165-0.286)

Table 2
Crude Odd Ratio of Maternal Factors to Risk of Stunting

Mother's Factor	Group		*Crude*	95%CI	*p value*
	Control	Cases	*OR*		
Marriage mother age					
Based on marriage law in	138 (75,0%)	46 (25,0%)	Ref 0,500	0,059-4,263	1,000
Not based on marriage law in	6 (85,7%)	1 (14,3%)			
Childbirth's Age					
Ideal age	125 (73,5%)	45 (26,5%)	Ref 0,292	0,065-1,306	0,152
Not Ideal Age	19 (90,5%)	2 (9,5%)			
Mother's Education					
Basic - Intermediate	96 (73,3%)	35 (26,7%)	Ref 0,686	0,327-1,439	0,412
High Education	48 (80,0%)	12 (20,0%)			
Mother's Occupation					
Settle	62 (75,6%)	20 (24,4%)	Ref 1,021	0,525-1,986	1,000
Unsettle	82 (75,2%)	27 (24,8%)			
Gravida					
Primigravida	61 (42,4%)	10 (21,3%)	Ref 2,719	1,256-5,889	0,009 *
Multigravida	83 (57,6%)	37 (78,7%)			
Mother's arm circumference					
Normal	126 (76,8%)	38 (23,2%)	Ref 1,658	0,689-3,991	0,371
< 23 cm	18 (66,7%)	9 (33,3%)			
Mother's Height					
Normal	76 (66,3%)	12 (13,6%)	Ref 3,260	1,567-6,783	0,001*
Short	68 (66,0%)	35 (34,0%)			

Table 3
Crude Odd Ratio of Child Factors to the Risk of Stunting

Child's Factor	Groups		*Crude*	95%CI	*p value*
	Control	Cases	*OR*		
Baby birth weight					
normal	144 (100%)	40 (85,1%)	Ref 0,217	0,165-0,286	0,000 *
law	0 (0,0%)	7 (14,9%)			
Baby birth height					
Normal	101 (75,4%)	33 (24,6%)	Ref 0,995	0,475-2,083	1,000
short	40 (75,5%)	13 (24,5%)			
Giving breast-milk 6 months					
Yes	118 (77,1%)	35 (22,9%)	Ref 1,556	0,712-3,398	0,366
No	26 (68,4%)	12 (31,6%)			
Giving complementary breastfeeding >6 month					
Yes	123 (76,4%)	38 (23,6%)	Ref 1,387	0,586-3,283	0,606
No	21 (70,0%)	9 (30,0%)			
History of the comorbidities					
Fever					
Yes	107 (75,9%)	34 (24,1%)	Ref 1,106	0,527-2,318	0,940
No	37 (74,0%)	13(26,0%)			
Flu/Cough					
Yes	106 (75,7%)	35 (24,3%)	Ref 1,067	0,509-2,233	1,000
No	38 (74,5%)	13 (25,5%)			
Diarrhea					
Yes	27 (84,4%)	5 (15,6%)	Ref 1,938	0,701-5,361	0,285
No	117 (73,4%)	47 (24,6%)			
Wormy					
Yes	1 (100,0%)	0 (0,0%)	Ref 1,329	1,225-1,442	1,000
No	143 (75,4%)	47 (24,6%)			

Table 4
Crude Odd Ratio of Health Service Factors Against Stunting Risk

Health Services Factor	Groups		*Crude*	95%CI	*p value*
	Control	Cases	*Or*		
Early breastfeeding Initiation Counseling					
Ever	97(71,9%)	38 (28,1%)	Ref 0,489	0,218-1,094	0,114
never	47 (83,9%)	9 (16,1%)			
Counseling of exclusive breastfeeding					
Ever	101(73,7%)	36 (26,3%)	Ref 0,718	0,334-1,540	0,505
Never	43 (79,6%)	11 (20,4%)			

Counseling of family planning					
Ever	103 (73,6%)	37 (26,4%)	Ref 0,679	0,309-1,491	0,436
Never	41 (80,4%)	10 (19,6%)			
Counseling of giving supplementary breastfeeding					
Ever	102 (73,9%)	36 (26,1%)	Ref 0,742	0,345-1,595	0,563
Never	42 (79,2%)	11 (20,8%)			
Pregnancies Check-up / ANC					
Complete	114 (79,2%)	41 (87,2%)	Ref 0,556	0,216-1,433	0,285
Incomplete	30 (20,8%)	6 (12,8%)			
Delivery assisted by health personnel					
Yes	143 (75,7%)	46(24,3%)	Ref 3,109	0,191-50,696	0,433
No	1(50,0%)	1 (50,0%)			
Giving Vit A tablet					
Yes	130 (75,1%)	43 (24,9%)	Ref 0,864	0,270-2,765	1,000
No	14 (77,8%)	4 (22,2%)			

Table 5
Crude Odd Ratio of Environmental / Demographic Factors to the Risk of Stunting

Environmental Factors	Group		*Crude*	95%CI	*p value*
	Control	Cases	*OR*		
Water resources					
PDAM	68(76,4%)	21(23,6%)	Ref 0,903	0,466-1,749	0,893
Non PDAM	76 (74,5%)	26(25,5%)			
Has its own toilet					
Yes	142 (75,1%)	47 (24,9%)	Ref 0,751	0,692-0,816	1,000
No	2 (100,0%)	0 (0,0%)			
Total family members					
< 5	63 (76,8%)	19 (23,2%)	Reff 1,146	0,587-2,238	0,818
> 5	81(74,3%)	29(25,7%)			
Father's Income					
Settle	100 (75,8%)	32 (24,2%)	Ref 1,065	0,525-2,163	1,000
Unsettle	44 (74,6%)	15 (25,4%)			

In the multivariate analysis, the variables included in the model were those that showed significant differences in both maternal factors, infant factors, health service factors and environmental factors which had a p value> 0.25. This is to determine the factors that most influence stunting. Based on the analysis, it was found that five variables were appropriate for criteria and could be included in the multivariate analysis, namely maternal height, maternal age, gravida, BMI counseling and birth weight. These variables were then analyzed using the enter method logistic regression, which was to put all the variables together into the model.

Table 6
Adjusted OR Stunting Risk Factors

Variables	*Adjusted*	95% CI		*p*
	OR	Lower	Upper	
Mother's height	3,343	1,484	7,530	0,004*
Childbirth's Age	0,311	0,066	1,476	0,142
Total pregnancy (gravida)	3,394	1,368	8,416	0,008*
Early breastfeeding Initiation Counseling	0,392	0,158	0,974	0,044*
Bbay birth weight	4,499	0,000		0,999

Table 7 shows the results of multivariate analysis and it is found that the variables that significantly increase the risk of stunting are maternal height, gravida and IMD counseling with adjusted OR = 3.343 and 95% CI: 1.484-7.530 and Gravida with adjusted OR = 3.394 and 95% CI : 1,368-8,416 whereas IMD counseling was preventive to increase the risk of stunting with adjusted OR = 0.392 and 95% CI: 0.158-0.974, and other variables did not increase the risk of stunting.

DISCUSSION

Risk factors for mothers with height <150 cm and child stunting in this study were risk factors for stunting with an OR of 3.343 95% CI: 1.484-7.530 fetus and risk of stunting. Then a pregnancy that is too close, a mother who is still a teenager, and insufficient nutritional intake during pregnancy can also affect fetal development.

This is consistent with research in the city of Mekelle, northern Ethiopia. Get a mother who is less than 150 cm / short in height. Maternal short stature creates future

generations and is supported by maternal malnutrition thereby increasing the risk of intrauterine growth retardation, then short maternal height restricts uterine, placental and fetal blood flow leading to growth retardation and child stunting, (Berhe, Seid, Gebremariam, Berhe, & Etsay, 2019). This is also in line with the low maternal height in Rwanda (OR 3.27; 95% CI 1.89-5.64) (Uwiringiyimana, Ocké, Amer, & Veldkamp, 2018). However, this study is not in line with Nugroho's research conducted in Tanjungkarang Barat, Bandung, which states that the mother's body has no effect on the incidence of stunting if the results of statistical tests show that there is no significant correlation between height and the incidence of stunting (p-value 0.152), (Nugroho, 2016)

Gravida is pregnancy in women, primigravida is the first pregnancy, while multigravida is the second pregnancy. Usually in the first pregnancy, the mothers will pay attention to their pregnancy so that the fulfillment of nutrition is fulfilled, while in the second and even third pregnancies, mothers feel experienced so they tend to perceive the development of the prospective baby born compared to the first child. So it is at risk for the mother to be malnourished and result in growth retardation during the fetal period, so that it is associated with low maternal weight gain during pregnancy which results in insufficient distribution of nutrients to the placebo. Most of the intra-uterine growth retardation (IUGR) babies cannot catch up with the growth period to grow normally like other children (Hafid & Nasrul, 2016). Likewise, it is related to too many children, besides being bothered it will be difficult to take care of them. The research shows that mothers with multiple pregnancies (multigravida as many as 37 (78.7%) in the case group, while in the control group 57.6%, mothers who have many children tend to experience children with stunting, especially if the economy is lacking so they cannot provide nutritional intake. children aged 0-2 years need nutritional intake because they are in their infancy, growth and development disorders tend to be experienced by children who are born later, because the burden on parents is getting bigger and the number of children is growing. (Jihad, Ahmad, & ainurrafiq, 2016) However, this is not in line with research conducted wulan where if there are 2 or more toddlers at home, there is no risk of stunting, this is supported by the result of AOR = 0.72 (95 % CI: 0.45-1.15) (Hanifah, Wulansari, Meiandayati, & Achadi, 2018).

In connection with the provision of counseling on Early Breastfeeding Initiation / IMD, the results of this research significantly increase stunting. IMD is the process of a baby breastfeeding immediately after birth, the baby is allowed to find the mother's nipple on her own and not thrust directly into the nipple. This is important because it is very helpful in the continuity of exclusive breastfeeding, where as is known, exclusive breastfeeding will be very beneficial and help the baby's growth. The low level of exclusive breastfeeding is one of the triggers for the risk of stunting due to past events and an impact on the future of children under five (Aridiyah, Rohmawati, & Ririanty, 2015). This result is in line with Rahman's research, if the mother has never been exposed to knowledge or information, be it print media, mass media or counseling about the importance of exclusive nutrition / breastfeeding, it shows that her children will have a higher risk of becoming malnourished (Rahman, 2015).).

CONCLUSIONS AND SUGGESTIONS

The risk factors for stunting in this research were maternal height, the number of pregnancies and knowledge of early breastfeeding initiation. It is expected that early on from toddlers to be prepared for future mothers who will give birth in order to pay attention to the nutritional factors of toddlers, so that future generations do not produce genetically short children. Because nutritional problems are problems in the life cycle, starting from pregnancy, babies, toddlers, adolescents, to the elderly. Nutritional problems can occur in all age groups, even nutritional problems in a certain age group will affect nutritional status in the next period of the life cycle, so interventions are needed to improve the nutrition of pregnant and lactating mothers so that they can prevent low birth weight babies, reduce poverty, increase educating girls and intervening early in case of malnutrition.

Acknowledgment

Our research received a grant from DRPM of ministry research on technology and higher education 2020, Thanks to the head of the public health center of Sukawati I and II as well as the nutrition program holders at the public health center, community health services cadres and all respondents who were willing to be interviewed.

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