

Determinant Factors of Stunting Events of Toddler in Batu City Indonesia

Juin Hadisyuitno¹, Bastianus Dobby Riyadi², Suprajitno^{3*}

¹Dietician Department, Poltekkes Kemenkes Malang, e-mail: juinhadi@gmail.com

²Dietician Department, Poltekkes Kemenkes Malang, e-mail: b.doddyriyadi@gmail.com

³Nursing Department, Poltekkes Kemenkes Malang, e-mail: suprajitno_skp@poltekkes-malang.ac.id

Corresponding Author: Suprajitno

Email: suprajitno_skp@poltekkes-malang.ac.id

ABSTRACT

Background: Stunting on toddler shows the presence of chronic nutritional problems that are characterized by stunted growth. Stunting indicator is calculated using length-for-age Z-scores (LA Z-scores) less than -2SD. Stunting risk factors include length of birth, low birth weight, immunization, nutritional intake, infectious diseases, genetics, and family socioeconomic status.

Objective: This study aims to analyze the factors related to the stunting incidence in Batu City.

Method: The research design used case-control. Sample size of 90 toddlers were selected by simple random sampling. The sample was divided into two groups, namely case and control groups, each group of 45 people. Variables collected that are parental education, parental occupation, length of the child's body at birth, child's weight at birth, exclusive breastfeeding status, complementary feeding, history of illness, and immunization status. Data analysis used chi square.

Results: Child's body weight at birth, exclusive breastfeeding status, complementary feeding, immunization status, and history of illness were not associated with stunting ($p > 0.05$). Babies length at birth as a factor related to the incidence of stunting in Batu City, p value = 0.008 and OR = 0.216.

Conclusion: Child length at birth is a risk factor for stunting. So that nutritional needs during pregnancy need to be considered and fulfilled so that babies born have a normal of body length and birth weight.

Keywords: Stunting, toddler, baby's length at birth, nutrition, case control

Correspondence:

Suprajitno

Nursing Department, Poltekkes Kemenkes Malang

E-mail: suprajitno_skp@poltekkes-malang.ac.id

INTRODUCTION

Nutrition problems can inhibit development as a teenager that affects the next life. A study shows that very stunted and stunted in toddler age can reduce children's cognitive intelligence, so that they will grow into adults with low education, poor, less healthy, and susceptible to suffer from non-communicable diseases (1) Other studies states that very stunted and stunted children are estimated to have 20% lower than normal children (2) Very stunted and stunted children are predictors of poor quality human resources and reduce the productive ability of a nation in the future.

The 2013 UNICEF report on Improving Child Nutrition: The achievable imperative for global progress, globally more than a quarter (26%, around 165 million children) of children under five are very stunted and stunted lived (3). Indonesia is ranked 5 out of 14 countries with the highest prevalence of very stunted and stunted toddlers in the world. *Riset Kesehatan Dasar* (Basic Health Research) in 2013 stated that the prevalence of under-five children was very stunted and stunted as much as 37.2%, an increase compared to 2010 as much as 35.6% and in 2007 as much

as 36.8%. The prevalence of toddlers is very stunted and stunted as the highest when compared to the prevalence of underweight (19.6%) and thin (12.1%) (4). The prevalence of very stunted and stunted toddlers in East Java Province in 2007 - 2013 was 34.8 - 35.8% higher than the prevalence of underweight (19.1%) and thin (11.4%) (4,5).

METHODS

This study used a case-control design, conducted in Batu City, East Java Province in September - November 2017. The population of this study was all toddler children in Batu City area who had stunted and very stunted based on the results of the 2017 Nutrition Status Monitoring. Variables include immunization status, exclusive breastfeeding, supplementary feeding, history of illness, weight at birth, and length of birth. Data analysis used chi-square test.

RESULT

General characteristics of toddler children and risk factors for stunting are presented in Tables 1 and 2.

Table 1. General characteristic of toddler

No.	Characteristics	Case	Control
1	Sex: - Male - Female	25 (55.6%) 20 (44.4%)	26 (57.8%) 19 (42.2%)
2	Age (months): - Average	25.8	20.2
3	Weight at birth (kg): - Minimum	1.3	2.0

	- Average	2.96	3.08
4	Length at birth (cm):		
	- Minimum	45	44
	- Average	48.2	49.2
5	Current body length (cm):		
	- Minimum	62.5	65.6
	- Average	76.1	77.6

Table 2. Risk factors of stunting prevalence

Variable	Case		Control		p	OR 95% CI
	f	%	f	%		
Weight at birth:						
- Low birth weight	5	11.1	3	6.7	0.714	1.750 (0.392 – 7.807)
- Normal	40	88.9	42	93.3		
Exclusive breast-feeding status:						
- Yes	31	68.9	30	66.7	0.822	1.107 (0.457 – 2.681)
- No	14	31.1	15	33.3		
Early breastfeeding initiation:						
- Yes	29	64.4	21	46.7	0.091	2.071 (0,889 – 4.827)
- No	16	35.6	24	53.3		
Complementary feeding:						
- Appropriate	31	68.9	30	66.7	0.822	1.107 (0.457 – 2.681)
- Not appropriate	14	31.1	15	33.3		
History of illness:						
- Ever	40	88.9	36	80.0	0.245	2.000 (0.613 – 6.524)
- Never	5	11.1	9	20.0		
Immunization status:						
- Complete	40	88.9	34	75.6	0.982	0.386 (0.122 – 1.232)
- Not complete	5	11.1	11	24.4		
Length of breastfeeding:						
- < 1 year	9	20.0	17	37.8	0.633	0.412 (0.160 – 1.061)
- > 1 year	36	80.0	28	62.2		
Length of birth:						
- Normal	31	68.9	41	91.1	0.008	0.216 (0.065 – 0.721)
- Abnormal	14	31.1	4	8.9		

DISCUSSION

Low Birth Weight (LBW)

WHO defines Low Birth Weight is babies born to have birth weight <2500 g. Factors that determine birth weight include two processes, namely the length of pregnancy and the rate of fetal growth? Birth weight can be used as an indicator of infant growth, response to stimulation / environment, and length of survival. Birth weight has a major impact on a child's growth and development including height as an adult. Babies with low birth weight are at high risk of morbidity, death, infectious diseases, underweight, and stunting at the beginning of the neonatal period until childhood (6). Toddlers who suffer from stunting because during the womb have experienced growth retardation. Growth retardation can be caused by poverty, disease, and nutrient deficiency. That is, pregnant women with malnutrition from the early trimester to the end of pregnancy will give birth to babies weighing less than 2,500 g, as a risk of stunting as a toddler.

The results of this study indicate that birth weight is not related to the incidence of stunting (p = 0.714), also in Surabaya that low birth weight is not a risk factor for stunting (7). It was illustrated that the majority of the case groups (88.9%) and the control group (93.3%) had normal birth weight. If, a child having an abnormal birth weight is at risk of experiencing stunting by 1.75 times compared to a baby who has a normal birth weight. This result is in line with research in Aceh Province that children who have a birth weight of less than 2,500 g have a risk of being

stunted by 3.26 times compared to children who have a normal birth weight. This is because birth weight affects the incidence of stunting that occurs at the age of the first 6 months after birth, then decreases to the age of 24 months. If, the first 6 months after birth can catch up with growth, then most likely toddler can grow normally (8). Birth weight in this study was not related to the incidence of stunting due to nutritional insufficiency and infection.

Exclusive breastfeeding

Exclusive breastfeeding is breastfeeding during the first 6 months from birth without additional food, except drugs. This exclusive breastfeeding results in optimal height (9). This study shows exclusive breastfeeding is not associated with the incidence of stunting. Research in West Kalimantan also shows that exclusive breastfeeding is not a risk of stunting. Whereas in Kendal Regency, the duration of exclusive breastfeeding is also not a risk factor for stunting for 12-month-old infants. Toddlers who did not receive exclusive breastfeeding in the case group were 31.3% and the control group were 33.3%. This condition illustrates the nutritional needs when the baby is not met, which can have an impact later on. Breastfeeding contains a small amount of protein but is of high quality as the main ingredient in the growth process. The specialty of breastfeeding protein is a balanced ratio between whey protein and casein (60: 40) compared to cow's milk (20: 80) (8). This condition is very beneficial for babies because whey protein is smoother, so it is easily digested (7). In addition, the main benefit of exclusive breastfeeding for 6

months is to reduce the risk of gastrointestinal infections (10). Infants who are exclusively breastfeeding for 6 months will grow well, because breastfeeding helps protect babies from infectious diseases and maintain optimal growth.

Complementary Feeding

This study shows that supplementary feeding is not related to the incidence of stunting ($p = 0.822$). Risk factors for toddlers who do not get complimentary feeding cause stunting by 1.1 times compared to toddlers who get appropriate complementary food. Research in Kab. Pati suggest that the accuracy of complementary feeding is not a risk factor for toddler stunting (11).

After the baby is more than 6 months old, breastfeeding alone cannot meet the nutritional needs of the baby so additional sources of nutrients are needed from complementary foods. Proper and good complementary feeding is food that can meet nutritional needs so that children grow and develop optimally (12). Complementary feeding is given in stages according to the age of the child, besides that breastfeeding continues as a source of nutrients and antibodies until the child is 2 years old. Complementary feeding can be given at the age of 6 months because the development of the baby is already supporting (13). Research in India reports that supplementing feeding at an early age (0-2 months) can increase the risk of stunting in children aged 24-48 months.

History of illness

Toddlers who are often sick have a negative impact on nutritional intake because it reduces appetite, absorption of nutrients in the intestine, increased catabolism so that nutrient reserves are insufficient for tissue formation and growth (9). This study showed that the history of illness was not related to stunting ($p = 0.245$). History of illness of toddler has a risk of stunting 2 times compared to toddlers who rarely / never sick. Toddlers who have been ill in the last two months in the case group were 88.9% and the control group were 80%. Diseases suffered are cough, influenza, fever, and diarrhoea. This situation is in line with research in Kecamatan Penanggalan Subusalam, Aceh Province that children who suffer of upper respiratory tract infections have a risk of 5.71 times becoming stunted compared to children who have never in the last two months (14).

Children who suffer to infections can worsen stunting which is decreased appetite so that lack of nutrient intake. In fact, children who are sick need adequate nutrition to speed up the recovery process. If it lasts a long time, it can result in impaired child's height growth. How to achieve optimal toddler growth and development is a body free of infectious diseases. Infectious diseases adversely affect growth through various means, namely reducing appetite, decreasing nutrient absorption, increasing metabolic requirements, or directly causing nutrient loss.

Children who suffer to malnutrition cause lower resistance to disease and are susceptible to infection. Toddler as a vulnerable group, with a weak body condition will be susceptible to infection. Such circumstances, resulting in weak body condition and loss of appetite so that nutritional status deteriorates.

Immunization

Complete basic immunization for toddlers in Batu City was not related to stunting ($p = 0.98$). Immunization is a way to actively increase the body's immunity against certain diseases. Immunization is an effort to increase immunity against infectious diseases in infants, children and adults. Immunization provides an immune effect, especially at the

age of infants who are vulnerable to infection (15,16). The impact for infants and children who are often and easily attacked by diseases is suffering to malnutrition or poor nutrition (17).

This study shows that immunization carries a risk of 0.38 times the incidence of stunting in toddlers in Batu City. This situation is different from research in the Kabupaten Janeponto that babies who get incomplete basic immunization have a stunting risk of 1.6 greater than those that are complete (18). Likewise, in West Papua that infants who received incomplete basic immunization had a risk of stunting of 2.1 greater than those complete (10) and in Kupang that infants who received incomplete basic immunization had a risk of stunting of 1.98 greater than those complete (19).

Length at Birth

Fetus growth during the linear womb with the baby's length at birth. Research shows that the baby's length at birth is related to the incidence of stunting in Batu City ($p = 0.008$ and $OR = 0.216$). This situation shows that length at birth is a risk factor for stunting in toddlers in Batu City. Infants who have the length of birth of normal reduce the occurrence of stunting by 78.4%. In line with research in the working area of Kandai City Health Center in Kendari that the baby's length at birth was a risk factor for toddler stunting (11). According to Riskesdas in 2013, a baby's length is short if the body length that's less than 48 cm. The baby's length at birth if short indicates a state of malnutrition due to a lack of protein energy for a long time which is marked by slowing or retarding fetus growth (8). Inadequate nutritional intake during pregnancy causes impaired fetus growth which ultimately results in births is short.

Growth failure in the case and control groups occurs when the baby is ± 2 months old. Environmental conditions and parenting in the case and control groups are relatively similar, it can be assumed that the quality of food consumed is estimated to be the same. Thus, inadequate nutrient intake for babies born normally can cause babies to experience growth failure.

Infants who fail to grow at an early age show a risk of failure to grow in the next period (20). Risk of baby's length at birth to the incidence of stunting obtained $OR = 4.078$. This means that the baby's length at birth is short has a risk of stunting of 4.078 times greater than the baby's length at birth is normal. CI value (95%) of 1,599 - 10,400 illustrates that the risk is significant. This study shows that the proportion of toddler stunting is more common in toddlers whose baby's length is shorter than normal babies. Research in Yogyakarta in 2005 stated that the length of a baby's length at birth is related to the incidence of stunting in school children. And the OR value = 2.81, meaning that the baby's length at birth is short has a risk of stunting 2.8 times greater than babies born with normal length of birth (21).

CONCLUSION

Risk factors for stunting in Batu City are body length at birth, meaning that length at birth is normal as a factor that can reduce stunting.

RECOMMENDATION

The incidence of stunting can be prevented if pregnant women receive adequate nutrition during pregnancy, so that babies born have normal birth length.

ACKNOWLEDGEMENT

Thank you to the Director of the *Poltekkes Kemenkes Malang* who has funded research in 2017 and research subjects.

REFERENCE

1. Victora CG, Adair L, Fall C, Hallal PC, Martorell R, Richter L, et al. Maternal and child undernutrition: consequences for adult health and human capital. *Lancet*. 2008 Jan 26;371(9609):340–57.
2. Grantham-McGregor S, Cheung YB, Cueto S, Glewwe P, Richter L, Strupp B. Developmental potential in the first 5 years for children in developing countries. *Lancet*. 2007 Jan 6;369(9555):60–70.
3. UNICEF. Improving child nutrition: The achievable imperative for global progress. Vol. 18, NCSL legisbrief. New York: UNICEF; 2013. 132 p.
4. Kemenkes RI. Riset Kesehatan Dasar (Riskesdas) 2013. Jakarta; 2013.
5. Depkes RI. Riset Kesehatan Dasar 2007. Jakarta; 2008.
6. Fernald LC, Neufeld LM. Overweight with concurrent stunting in very young children from rural Mexico: Prevalence and associated factors. *Eur J Clin Nutr*. 2007 May;61(5):623–32.
7. Kemenkes RI. Keputusan Menteri Kesehatan RI Nomor: 1995/Menkes/SK/XII/2010 tentang Standar Antropometri Penilaian Status Gizi Anak. Jakarta: <http://gizi.depkes.go.id/wp-content/uploads/2012/07/buku-sk-antropometri-2010.pdf>; 2010 p. 41.
8. Kartikawati PRF. Faktor Yang Mempengaruhi Kejadian Stunted Growth Pada Anak Balita di Wilayah Kerja Puskesmas Arjasa Kabupaten Jember. Universitas Jember; 2011.
9. Supariasa IDN, Bakri B, Fajar I. Penilaian Status Gizi. 5th ed. Jakarta: EGC; 2002.
10. Ni'mah K, Nadhiroh SR. Faktor Yang Berhubungan Dengan Kejadian Stunting Pada Balita. *Media Gizi Indones*. 2015 Dec 22;10(1):13–9.
11. Anugraheni HS, Kartasurya MI. Faktor Risiko Kejadian Stunting Pada Anak Usia 12-36 Bulan di Kecamatan Pati, Kabupaten Pati. *J Nutr Coll*. 2012;1(1):30–7.
12. Dinas Kesehatan Kota Batu. Laporan Program Gizi Masyarakat Tahun 2014. 2014.
13. Asosiasi Dietisien Indonesia (AsDI), Ikatan Dokter Anak Indonesia (IDAI). Penuntun Diet Anak. 3rd ed. Jakarta: Badan Penerbit Fakultas Kedokteran Universitas Indonesia; 2105. 228 p.
14. Lestari W, Margawati A, Rahfiludin MZ. Faktor risiko stunting pada anak umur 6-24 bulan di kecamatan Penanggalan kota Subulussalam provinsi Aceh. *J Gizi Indones Indones J Nutr*. 2014;3(1):37–45.
15. Najahah I, Adhi KT, Pinatih GI. Faktor risiko balita stunting usia 12-36 bulan di Puskesmas Dasan Agung, Mataram, Provinsi Nusa Tenggara Barat. *PUBLIC Heal Prev Med Arch*. 2013;1(2):134–41.
16. McDonald CM, Manji KP, Kupka R, Bellinger DC, Spiegelman D, Kisenge R, et al. Stunting and Wasting Are Associated with Poorer Psychomotor and Mental Development in HIV-Exposed Tanzanian Infants. *J Nutr*. 2013 Feb 1;143(2):204–14.
17. Millenium Challege Account (MCA) Indonesia. Gambaran Umum Proyek Kesehatan dan Gizi Berbasis Masyarakat (PKGBM) Untuk Mencegah Stunting. 2013.
18. Nasrul N, Hafid F, Thaha AR, Suriah S. Faktor Risiko Stunting Usia 6-23 Bulan di Kecamatan Bontoramba Kabupaten Jeneponto. *Media Kesehat Masy Indones*. 2015 Jun 22;11(3):139–46.
19. Picauly I, Toy SM. Analisis Determinan dan Pengaruh Stunting Terhadap Prestasi Belajar Anak Sekolah di Kupang dan Sumba Timur, NTT (The Determinant Analysis and the Impact of Stunting for School Children School Performance in Kupang and Sumba Timur, NTT). *J Gizi dan Pangan*. 2013;8(1):55–62.
20. Kusuma KE, Nuryanto. Faktor Risiko Kejadian Stunting Pada Anak Usia 2-3 Tahun (Studi di Kecamatan Semarang Timur). *J Nutr Coll*. 2013;2(4):523–30.
21. Swathma D, Lestari H, Ardiansyah R. Analisis Faktor Risiko BBLR, Panjang Badan Bayi Saat Lahir Dan Riwayat Imunisasi Dasar Terhadap Kejadian Stunting Pada Balita Usia 12-36 Bulan Di Wilayah Kerja Puskesmas Kandai Kota Kendari Tahun 2016. *J Ilm Mhs Kesehat Masy*. 2016;1(3):1–10.