July – September, 2024
Original Article
DOI: http://dx.doi.org/10.30867/action.v9i3.1824

AcTion: Aceh Nutrition Journal
Pages: 538 – 547
p-issn 2527-3310; e-issn 2548-5741

Factors associated with stunting among children 0-23 months in Aceh: A cross-sectional study using SSGI 2021

Faktor-faktor yang berhubungan dengan stunting pada anak usia 0-23 bulan di Aceh: Studi potong lintang menggunakan SSGI 2021

Aripin Ahmad[1*], Abidah Nur [2], Teuku Muliadi[3], Nelly Marissa[4], Iflan Nauval[5], Marisa[6], Junaidi[7], Fitrah Reynaldi[8], Eva Fitriyaningsih[9], Husnah[10], Muhammad Rizal Martua Damanik[11], Ardi Adji[12], Syuja' Rafiqi Arifin[13], Devita Annisa[14]

[1] Department of Nutrition Health Polytechnic of Aceh, Aceh Besar, Indonesia. E-mail: aripinahmad@poltekkesaceh.ac.id
[2] Balai Laboratorium Kesehatan Masyarakat Banda Aceh, Aceh, Indonesia. E-mail: abidahnur2@gmail.com
[3] Faculty of Public Health, Teuku Umar University, Aceh, Indonesia. E-mail: teukumuliadi@utu.ac.id
[4] Balai Laboratorium Kesehatan Masyarakat Banda Aceh, Aceh, Indonesia. E-mail: nellymarissa@gmail.com
[5] Faculty of Medicine, Syiah Kuala University, Aceh, Indonesia. E-mail: iflandr@usk.ac.id
[6] Faculty of Medicine, Syiah Kuala University, Aceh, Indonesia. E-mail: marisa@usk.ac.id
[7] Department of Nutrition Health Polytechnic of Aceh, Aceh Besar, Indonesia. E-mail: junaidineidi@gmail.com
[8] Faculty of Public Health, Teuku Umar University, Aceh, Indonesia. E-mail: fitrahreynaldi@utu.ac.id
[9] Department of Nutrition Health Polytechnic of Aceh, Aceh Besar, Indonesia. E-mail: fitriyaningsiheva1@gmail.com
[10] Faculty of Medicine, Syiah Kuala University, Aceh, Indonesia. E-mail: dr_husnah@usk.ac.id
[11] Department of Community Nutrition, Faculty of Human Ecology, IPB University, Indonesia. E-mail: damanik@apps.ipc.ac.id
[12] Pokja Kebijakan Tim Nasional Percepatan Penanggulangan Kemiskinan (TNP2K) Kantor Sekretariat Wakil Presiden dan Peneliti di Badan Pusat Statistik (BPS), Jakarta, Indonesia. E-mail: ardi.adji@tnp2k.go.id
[13] Rifin Nutrition Indonesia, Aceh, Indonesia. E-mail: syujarafiqi@gmail.com
[14] Department of Nutrition Health Polytechnic of Aceh, Aceh Besar, Indonesia. E-mail: Devitaannisa18@gmail.com

***Correspondence Author:**
Department of Nutrition, Health Polytechnic of Aceh, Aceh Besar 23352, Indonesia.
E-mail: aripinahmad@poltekkesaceh.ac.id

Article History:
Received: April 07, 2024; Revised: June 15, 2024; Accepted: July 03, 2024; Published: September 05, 2024.

Publisher:
Politeknik Kesehatan Aceh
Kementerian Kesehatan RI

Abstract

Stunting is a chronic health problem that affects children and has long-term implications for their cognitive development. The multifactorial causes of stunting require identification of the most dominant factors to facilitate effective interventions. This study aimed to analyze the factors associated with stunting in children under two years old in Aceh. This was a cross-sectional study involving 2,395 subjects aged 0-23 months. Data were obtained from the 2021 SSGI National Survey, consisting of stunting prevalence, child and family characteristics, household sanitation, universal health insurance ownership, breastfeeding and complementary feeding practices, immunization status, parenting and pregnancy classes, supplementary feeding, and food security. Logistic regression analysis was performed using 95% confidence intervals. The results showed a significant association between stunting and child sex, sanitation conditions, parental education, exclusive breastfeeding, complementary feeding practices, immunization status, micronutrient supplementation, and breastfeeding duration ($p<0,05$). In conclusion, the factors associated with stunting in children aged 0-23 months in Aceh are sanitation, parental education, exclusive breastfeeding, complementary feeding practices, immunization, micronutrient supplementation, and breastfeeding duration. This study highlights the importance of improved nutrition education, family support, immunization coverage, and environmental sanitation to reduce the prevalence of stunting among young children in Aceh.

Keywords: Breastfeeding, complementary feeding, immunization, sanitation

Abstrak

Stunting merupakan masalah kesehatan kronis yang memengaruhi anak-anak, memiliki implikasi jangka panjang yang serius terhadap perkembangan kognitif. Penyebab stunting yang multifaktorial memerlukan identifikasi faktor yang paling dominan untuk memfasilitasi intervensi yang efektif. Penelitian bertujuan untuk menganalisis faktor-faktor yang berhubungan dengan stunting pada anak di bawah dua tahun di Aceh. Penelitian menggunakan studi potong lintang yang melibatkan 2.395 subjek berusia 0-23 bulan. Data berasal dari survei nasional SSGI tahun 2021, terdiri dari prevalensi stunting, karakteristik anak dan keluarga, sanitasi rumah tangga, kepemilikan asuransi kesehatan universal, praktik pemberian ASI dan makanan pendamping, status imunisasi, kelas parenting dan kehamilan, pemberian makanan tambahan, dan ketahanan pangan. Analisis menggunakan regresi logistik dengan interval kepercayaan 95%. Hasil, temuan menunjukkan adanya hubungan signifikan antara stunting dengan jenis kelamin anak, kondisi sanitasi, pendidikan orang tua, pemberian ASI eksklusif, praktik pemberian makanan pendamping, status imunisasi, pemberian suplemen

mikronutrien, dan durasi menyusui (p<0,05). Kesimpulan, faktor yang memiliki hubungan dengan stunting pada anak usia 0-23 bulan di Aceh adalah sanitasi, pendidikan orang tua, pemberian ASI eksklusif, praktik pemberian makanan pendamping, imunisasi, pemberian suplemen mikronutrien, dan durasi menyusui. Penelitian ini menekankan pentingnya peningkatan edukasi gizi, dukungan keluarga, peningkatan cakupan imunisasi, dan sanitasi lingkungan yang lebih baik untuk mengurangi prevalensi stunting di kalangan anak-anak muda di Aceh.

Kata Kunci: ASI ekslusif, imunisasi, sanitasi lingkungan, stunting

Introduction

Stunting is a chronic health issue with long-term implications for children's cognitive function, and arises due to prolonged malnutrition. Optimal child growth can be monitored using a health card booklet (Balitbangkes, 2013). Prioritizing the monitoring of a child's health condition from the prenatal period until the first 1000 days of life is crucial to prevent growth failure, which may ultimately result in stunting (Rahayu et al., 2018).

Currently, stunting programs in Indonesia remain a priority, as several studies have indicated high stunting rates in the country. According to the 2013 Indonesian Basic Health Research, the prevalence of stunting among children under five years of age in Indonesia was 18% for severely stunted and 19,2% for moderately stunted children (Balitbangkes 2013); in 2018, the percentages of severely stunted and stunted children in Indonesia were 11,5% and 19,3%, respectively (Kemenkes 2019). In 2019, the prevalence of stunting among children under five years of age in Indonesia, according to the Indonesian SSGI, reached 27,67% (Izwardy, 2020), The prediction for stunting in 2020 was 26,92%, and a nutritional status survey conducted in Indonesia in 2021 showed that the prevalence of stunting in Indonesia was 24,4%. Aceh had the fifth highest prevalence of stunting in children under five years of age in 2018 and the third highest in 2021 in Indonesia. The results of the 2019 Indonesia Nutritional Status Survey (Survei Status Gizi Indonesia, or SSGI) showed that stunting was 34,2% in Aceh Province and 33,2% in 2021 (Balitbangkes, 2021).

The causes of stunting are multifactorial, both direct and indirect. Direct factors can be influenced by the mother's condition, intake, and infections, whereas indirect factors are influenced by the social, economic, and cultural environment of the local community (Rahayu et al., 2018). Maternal nutrition during the preconception, pregnancy, and breastfeeding periods greatly affects the growth and development of children. Maternal intake and health conditions affect the intrauterine environment and fetal growth (Beal et al., 2018). A decrease in maternal health during pregnancy can result in inappropriate fetal growth for gestational age, low birth weight, and premature birth (Prendergast & Humphrey, 2014).

The family's economic situation, in terms of meeting the nutritional needs of children in terms of quantity and variety, greatly affects the occurrence of stunting (Utami et al., 2019). Access to health facilities to monitor the growth and development of children, as well as policies and programs in the health sector, greatly supports the improvement and prevention of stunting. The provision of clean water, sanitation, and the environment also contribute to efforts to improve nutritional status and prevent stunting (Beal et al., 2018).

Several studies have also suggested that other factors, such as a child's sex, parental education, breastfeeding, and immunization status, may play a significant role in determining stunting. However, few studies have explored the specific impact of these factors on the prevalence of stunting in Aceh's youngest population (Islam et al., 2018).

Understanding the determinants of stunting is critical for the development of effective interventions to reduce its prevalence. In Aceh, efforts have been made to address the problem of stunting through various programs including the provision of nutritional supplements, maternal education, and improvements in sanitation (Ahmad et al., 2018). However, a deeper understanding of the specific factors contributing to stunting is necessary to develop more targeted and effective interventions. Therefore, this study aimed to examine the factors associated with stunting in Children 0-23 months olds in Aceh.

Methods

A cross-sectional study design was used to analyze the factors associated with stunting among children 0-23 months old in the Aceh Province. This study used secondary data from the Indonesian Nutritional Status Survey from 2021, and the sample that met the inclusion criteria (age 0-23 months) consists of 2.455 children aged 0-23 months.

The dependent variable analyzed was stunting using anthropometric data, and the child's body length/height was analyzed using the WHO-Anthrop index height for age z-score (HAZ). The independent variables analyzed were sex, family size, drinking water source, sanitation, ownership of National Health Insurance, access to health services, mother's education and occupation, father's education and occupation, early initiation of breastfeeding (IMD), exclusive breastfeeding, complementary feeding (CF), immunization, iron supplements, maternal and child health classes, use of contraceptives, provision of complementary feeding, birth spacing, ownership of maternal and child health handbooks, food insecurity, infectious diseases, and breastfeeding duration.

A Cross-sectional study design was used to analyze the factors associated with stunting among children 0-23 months old in the Aceh Province. This approach was chosen to effectively identify and understand the various factors that contribute to the prevalence of stunting in this population. This study used secondary data from the Indonesian Nutritional Status Survey from 2021, and the sample that met the inclusion criteria (age 0-23 months) consisted of 2455 children aged 0-23 months. The validity and reliability of the data collection instruments were not assessed, as the data utilized were validated through the SSGI. Our approach focused solely on verifying missing data and performing data cleaning to align the variables intended for the analysis.

The dependent variable analyzed was stunting using anthropometric data, and the child's body length/height was analyzed using the WHO-Anthrop index height for age z-score (HAZ). The independent variables analyzed were sex, family size, drinking water source, sanitation, ownership of National Health Insurance, access to health services, mother's education and occupation, father's education and occupation, early initiation of breastfeeding (EIB), exclusive breastfeeding, complementary feeding (CF), immunization, iron supplements, maternal and child health classes, use of contraceptives, provision of complementary feeding, birth spacing, ownership of maternal and child health handbooks, food insecurity, infectious diseases, and breastfeeding duration.

Data were analyzed using logistic regression tests at 95% confidence intervals. Data were analyzed using logistic regression tests at 95% confidence intervals to assess the relationships between independent and dependent variables. Logistic regression allowed for the examination of how these factors predicted the likelihood of stunting among children aged 0-23 months in the Aceh Province. Odds ratios and their corresponding p-values were calculated to determine the strength and significance of the associations between each independent variable and stunting status, controlling for potential confounding factors.

The research findings are presented in the form of tables and narrative descriptions of the statistical inference results. This study was approved by the Ethics Review Committee of the Faculty of Public Health at the University of Indonesia. Ethical approval was obtained by preparing a proposal and uploading it for review, followed by a presentation to the ethics committee. After revising the proposal based on committee feedback, we await approval, typically within two weeks. (reference number 357/UN2). F10.D11/PPM.00.j02/2022

Result and Discussion

The findings of this study (Table 1) suggest that several factors significantly contribute to the occurrence of stunting in infants and toddlers in Aceh. Children's sex (p=0,03), sanitation (p=0,012), maternal (p=0,001), paternal education (p=0,024), exclusive breastfeeding (p=0,024), complementary feeding (p=0,024), incomplete immunization status (p=0,003), no supplementary feeding (p=0,036), and breastfeeding duration <6 months (p=0,002).

The research findings indicate that the gender of children under two years old has a significant influence on the occurrence of stunting, with male children being more susceptible to stunting than female children. This result is consistent with previous studies that reported a higher prevalence of stunting among male children than among female children (Mugianti et al., 2018; Salimar et al.,

2013). However, this contradicts the findings of Savita & Anggraeni, who stated that the proportion of female children who experienced stunting was higher than that of male children (Anggraeni et al., 2020; Savita & Amelia, 2020).

Generally, the growth phases of male and female children are similar, with a rapid deceleration phase occurring during infancy, a stagnant phase from 5 to 9 years of age, and a growth spurt phase at 12 years of age (Pulungan, 2020). However, the weight and height gain that children must achieve per month differs between the sexes. According to the WHO growth curve, male children must reach a higher point than female children of the same age (CDC, 2001).

The analysis also showed that sanitation (toilet facilities) has a significant influence on stunting. Children living in unsanitary environments are 1,4 times more likely to experience stunting than those living in a sanitary environment. This finding is consistent with that of another study that showed a significant association between access to toilets and stunting (Anggraini et al., 2022). In Aceh, 35,3% of stunted children still used inadequate toilet facilities associated with poor sanitation out of 289 cases. Adequate toilet facilities are essential to break the chain of disease transmission from human waste and to prevent vector-borne diseases (Sinatrya & Muniroh, 2019).

The educational levels of both the mother and father also had a significant impact on the occurrence of stunting in Aceh. Approximately 30% of parents of stunted children in Aceh had low levels of education. This finding is consistent with Mugianti's (2018) study, which suggests that low levels of education for both parents are contributing factors to stunting, In Mugianti et al, 's study, 32,3% of fathers and 48,4% of mothers of stunted children had low levels of education (Mugianti et al., 2018). A study conducted in the Public Health Centre sub-district of Kandanghaur also found that low maternal education was a contributing factor to stunting, with more than 60% of children having mothers with low knowledge (Husnaniyah et al., 2020). Children with parents who have low education are at 3,2 times higher risk of experiencing stunting (Nirmalasari, 2020).

Table 1. Factors associated with stunting among children aged 0-23 months

Variables	Nutritional status (HAZ)				p-value	AOR	95% CI
	Stunting		Normal				
	n	%	n	%			
Sex of Children (n=2395)							
Male	396	31,9	847	68,1	0,032	1,000	0,287-
Female	298	25,9	854	74,1		0,520	0,944
Family size (n=2395)							
>4 member of household	346	30,3	796	69,7	0,174	1,000	0,947-
≤4 member of household	348	27,8	905	72,2		1,130	1,349
Source of drinking water n=2395)							
Not proper	73	40,6	107	59,4	0,764	1,000	0,405-
Proper	621	28,0	1594	72,0		1,178	3,429
Sanitation (closet) (n=2395)							
Not proper	102	35,3	187	64,7	0,012	1,000	1,076-
Proper	592	28,1	1514	71,9		1,395	1,808
Ownership of JKN (n=2395)							
No (Do not know)	262	27,4	695	72,6	0,159	1,000	0,732-
Yes	432	30,0	1006	70,0		0,878	1,052
Availability of health service (n=2395)							
No (Do not know)	5	26,3	14	73,7	0,798	1,000	0,314-
Yes	689	29,0	1687	71,0		0,874	2,437
Mother's education (n=2390)							
Low	585	30,4	1339	69,6	0,001	1,000	0,515-
High	107	23,0	359	77,0		0,662	0,852
Father's education (n=2344)							
Low	607	29,7	1437	70,3	0,024	1,000	0,543-
High	70	89,7	230	76,7		0,721	0,958

Mother's occupation (n=2390)							
Does not work	477	29,3	1153	70,7	0,490	1,000	0,877-
Work	215	28,3	545	71,7		1,074	1,316
Early initiation of breastfeeding (n=2364)							
No (Do not know)	290	27,6	761	72,4	0,187	1,000	0,742-
Yes	404	30,1	940	69,9		0,887	1,060
Exclusive breastfeeding (n=2395)							
No	420	28,5	1053	71,5	0,024	1,000	0,653-
Yes	219	33,4	437	66,6		0,796	0,970
Timely Introduction of Complementary (n=2395)							
Birth to 6 Months	420	28,5	1053	71,5	0,024	1,000	0,653-
6 Months	219	33,4	437	66,6		0,796	0,970
Immunization status (n=1068)							
Incomplete	30	17,5	141	82,5	0,003	1,000	0,350-
Complete	256	28,5	641	71,5		0,533	0,811
Iron supplements (n=2364)							
No (Do not know)	28	32,6	58	67,4	0,451	1,000	0,753-
Yes	656	28,8	1622	71,2		1,194	1,891
Classes for toddler mother (n=1068)							
No (Do not know)	199	27,5	525	72,5	0,802	1,000	0,693-
Yes	87	25,3	257	74,7		1,055	1,606
Classes for pregnant (n=1068)							
No (Do not know)	171	27,8	445	72,2	0,879	1,000	0,692-
Yes	115	25,4	337	74,6		1,031	1,538
Use of contraceptives (n=2386)							
No (Do not know)	111	25,8	319	74,2	0,112	1,000	0,651-
Yes	580	29,7	1376	70,3		0,826	1,046
Received supplementary feeding (n=2148)	542	29,3	1306	70,7	0,036	1,000	0,587-
No	106	35,3	194	64,7		0,760	0,982
Yes							
Birth spacing (n=2359)							
≤2 Years	611	28,7	1518	71,3	0,408	1,000	0,844-
>2 Years	72	31,3	158	68,7		1,132	1,519
Ownership of KIA book (n=1068)							
No	43	33,6	85	66,4	0,078	1,000	0,960-
Yes	243	25,9	697	74,1		1,447	2,183
Insecurity of food (n=1068)							
Yes	24	36,9	41	63,1	0,072	1,000	0,363-
No (Do not know)	262	26,1	741	73,9		0,615	1,045
Infectious diseases (n=1086)							
Yes	11	52,3	15	57,7	0,090	1,000	0,226-
No	275	26,4	767	73,6		0,502	1,114
Long breastfeeding (n=468)							
≤6 Months	74	24,7	226	75,3	0,002	1,000	1,283-
6-24 Months	65	38,7	103	61,3		1,927	2,894

p = significant level at 95%; HAZ = Height for Aged z-score; AOR = Adjusted Odd Ratio

Education is directly proportional to knowledge: the higher the level of education, the higher the level of knowledge. Inadequate education can affect children's dietary patterns (Rahmad et al., 2023; Efrizal, 2021; Husnaniyah et al., 2020; Wanimbo & Wartiningsih, 2020), parenting styles (Yanti et al., 2020), unhygienic sanitation, and recurrent infections in children

(Savita & Amelia, 2020). The risk of stunting is six times higher in children with poor dietary patterns (Aramico et al. 2016). Poor parenting patterns increase the risk of stunting by 5.57 times (Ramadhani et al., 2019). Sanitation and infectious diseases cause stunting, particularly in developing countries (Sakti, 2020; Budiastutik & Rahfiludin, 2019).

In this study, exclusive breastfeeding significantly affected the incidence of stunting among the infants in Aceh. This result is consistent with the findings of Ramadhan et al., analysis of the 2017 nutritional status monitoring data showed that exclusive breastfeeding had a significant impact on the occurrence of stunting in Aceh (Ramadhan et al., 2018). This is also supported by an analysis of the SSGI data for 2021, which showed that exclusive breastfeeding is still the main factor causing stunting in Aceh. Savita's research also mentioned that the rate of non-exclusive breastfeeding is higher among stunted toddlers (Savita & Amelia, 2020).

The provision of exclusive breastfeeding without any other food except medication until the child is six months old is a government program in the plan to accelerate the reduction of stunting. This program was conducted through counseling and consultation with pregnant women and prospective brides (Al Rahmad et al., 2022). Breast milk is the main food source for babies and cannot be replaced by other foods. Breast milk contains all the nutrients needed, and is suitable for the digestive system of newborns. The advantages of breastfeeding include reducing gastrointestinal infections, increasing immunity, and bonding between mother and baby (Rahayu et al., 2018).

The provision of complementary food to breastfed infants significantly affected the incidence of stunting. Research results reported that 28,5% of 1,473 infants aged six months and younger were given complementary foods. This is consistent with research in Jember, who found that the early introduction of complementary foods (<6 months) affects nutritional status (Wargiana et al., 2013). The risk of stunting in infants is 1.6 times higher with the provision of complementary foods before six months of age (Hanum, 2019).

Complementary feeding is the food provided to babies over six months old. The provision of complementary foods aims to meet the increasing needs of infants. Age is very influential in the provision of complementary feeding because the digestive system of babies under six months old is not ready to receive complementary foods other than breast milk. The baby's digestive system is highly sensitive and can lead to diarrhea caused by contaminated complementary foods (Wargiana et al., 2013). Complementary feeding must be considered to ensure that the baby's digestive system is ready to receive the food provided. The factors to be considered when providing complementary feeding include the baby's age, food texture, feeding frequency, amount of food, food variety, response, and hygiene (Sutraningsih et al., 2021).

Immunization has a significant influence on the occurrence of stunting, which is in line with previous findings (Asmin & Abdullah, 2021). Immunization is related to the immune system in children. Children who do not receive immunization are vulnerable to various diseases that can reduce their appetite and weaken their bodies (Sutriyawan et al., 2020). In addition, children's growth and development may be hampered (Saputri 2019). Immunization is a form of health intervention aimed at supporting the national health system to minimize infant mortality rates (Sutriyawan et al., 2020).

Immunization has a significant influence on the occurrence of stunting, which is in line with the findings of Asmin and Abdullah (2021). Immunization is related to the immune system in children. Children who do not receive immunization are vulnerable to various diseases that can reduce their appetite and weaken their bodies (Sutriyawan et al., 2020). In addition, children's growth and development may be hampered (Saputri 2019). Immunization is a form of health intervention aimed at supporting the national health system to minimize infant mortality rates (Sutriyawan et al., 2020).

The stunting rate remains high if not all parties collaborate to find solutions. One form of government attention to reduce the stunting rate is the provision of complementary breastfeeding. The government strives to provide complementary feeding through the Maternal and Child Health Handbook (MCHHB) program and village fund program. The results showed a significant correlation between complementary feeding and occurrence of stunting. Similar findings were reported by Arfan, who stated that more than 50% of stunted children do not receive complementary feeding (Nur & Annisa, 2022).

Various studies have been conducted to modify complementary feeding to meet children's nutritional needs. In Probolinggo, complementary feeding was modified using moringa leaves (Santi et al., 2020), and in Bukit Tinggi Village, supplementary feeding was made from local foods (yellow squash, potatoes, carrots, sweet corn, and other ingredients such as nutmeg, coconut milk, scallions, and formula milk (Irwan, 2019).

Immunization has a significant influence on the occurrence of stunting, which is in line with the findings of Asmin and Abdullah (2021). Immunization is related to the immune system in children. Children who do not receive immunization are vulnerable to various diseases that can reduce their appetite and weaken their bodies (Sutriyawan et al., 2020). In addition, children's growth and development may be hampered (Saputri 2019). Immunization is a form of health intervention aimed at supporting the national health system to minimize infant mortality rates (Sutriyawan et al., 2020).

Exclusive breastfeeding for children under 6 months and continued until the age of 2 years is a child's priority need. However, some mothers do not provide their children with breast milk until they are 2 years old. Breastfeeding duration significantly correlated with the occurrence of stunting. Children who stopped breastfeeding before the age of 6 months were at a 1,4 times higher risk of stunting than those who breastfed until the ages of 12 or 23 months. Several studies have reported a correlation between breastfeeding duration and stunting (Chairunnisa1 et al., 2020; Doloksaribu et al., 2022).

The average breastfeeding duration in Indonesia is only 10,31 months. Children can only obtain breast milk when they are less than a year old (Chairunnisa1 et al., 2020). The milk needs of Indonesian children are not met, and the benefits of breastfeeding until the age of two are not maximized for the child. In theory, children are vulnerable to infectious diseases, diarrhea, and malnutrition, which are among the causes of stunting in Indonesia, including Aceh (Budiastutik and Rahfiludin 2019).

Almost all determinants of stunting in Aceh's infants were related to low knowledge, except for gender. Increasing knowledge through counseling and education can be attempted, especially in families with children or toddlers. Support for evaluating the results of counseling and education should also be monitored routinely and continuously. Cadres and health workers at the Health Center level played the most important role. This could be an alternative for the government to address and reduce stunting rates in Aceh.

The government is currently striving to address the issue of stunting not only in the health sector. The non-health sector also plays a role in addressing stunting through sensitive nutritional interventions (Al Rahmad et al. 2024; Kiik & Nuwa 2020). However, not all programs can be implemented and cross-sector collaboration has not been maximized. Strong cross-sector improvements and collaboration are necessary to improve health care services. The stunting problem in Aceh arises from several factors. Therefore, this solution must be applied in multiple sectors.

Reducing stunting rates cannot be achieved in a short time. Indonesia may adopt programs from other countries such as several countries including Nepal, Peru, Senegal, Ethiopia, India, Bhutan, Pakistan, Bangladesh, Sri Lanka, Afghanistan, and the Maldives, which have already experienced a decrease in stunting rates (Conway et al., 2020). All countries use cross-sector programs to tackle stunting, and none of them rely solely on one field. Stunting is a social problem that cannot be solved from a single perspective.

Conclusion

Children's sex, sanitation, maternal and paternal education, exclusive breastfeeding, complementary feeding, incomplete immunization status, no supplementary feeding, and breastfeeding duration were associated with stunting for < 6 months.

There is a need for nutritional education and family assistance to improve parenting patterns for providing breast milk, complementary foods, and additional foods as well as to improve environmental sanitation to reduce the prevalence of stunting

Acknowledgements

The authors express their sincere gratitude to the following institutions that played important roles in the success of this study: Universitas

Teuku Umar, Universitas Syiah Kuala, Balitbangkes Aceh RI, and Poltekkes Kemenkes Aceh. The authors also wish to acknowledge funding provided by the Asian Development Bank, which made this research possible. We are grateful for the support and contributions of all individuals involved in this research. This research was funded by a grant from the Asian Development Bank and Ministry of Health of the Republic of Indonesia.

References

Ahmad, A., Madanijah, S., Dwiriani, C. M., & Kolopaking, R. (2018). Complementary feeding practices and nutritional status of children 6-23 months old: A formative study in Aceh, Indonesia. *Nutrition Research and Practice*, *12*(6), 512–520. https://doi.org/10.4162/nrp.2018.12.6.512

Al Rahmad, A. H., Hadi, A., Miko, A., & Ahmad, A. (2022). Pemanfaatan konseling ASI eksklusif menggunakan media leaflet pada calon pengantin. *Poltekita: Jurnal Pengabdian Masyarakat*, *3*(2), 191–200. https://doi.org/10.33860/pjpm.v3i2.974

Al Rahmad, A. H., Sofyan, H., Usman, S., & Mudatsir. (2024). The Accuracy Data of the Toddlers' Nutritional Status using the "PSG Balita" App. In T. Tahlil & P. Ardia (Eds.), *The 6th Aceh International Nursing Conference* (pp. 82–86). Journal of Liaquat University of Medical and Health Sciences. https://doi.org/10.22442/jlumhs.2024.01130

Anggraeni, Z. E. Y., Kurniawan, H., Yasin, M., & Aisyah, A. D. (2020). Hubungan Berat Badan Lahir, Panjang Badan Lahir dan Jenis Kelamin dengan Kejadian Stunting. *The Indonesian Journal of Health Science*, *12*(1), 158–168.

Anggraini, W., Febriawati, H., & Amin, M. (2022). Akses Jamban Sehat pada Balita Stunting. *Material Safety Data Sheet*, *6*(1), 117–123.

Aramico, B., Sudargo, T., & Susilo, J. (2016). Hubungan sosial ekonomi, pola asuh, pola makan dengan stunting pada siswa sekolah dasar di Kecamatan Lut Tawar, Kabupaten Aceh Tengah. *Jurnal Gizi Dan Dietetik Indonesia (Indonesian Journal of Nutrition and Dietetics)*, *1*(3), 121. https://doi.org/10.21927/ijnd.2013.1(3).121-130

Asmin, E., & Abdullah, M. R. (2021). ASI Eksklusif dan Imunisasi Berhubungan dengan Kejadian Stunting pada Anak Usia 9-24 Bulan di Puskesmas Rumah Tiga, Ambon. *Poltekita : Jurnal Ilmu Kesehatan*, *15*(2), 196–201. https://doi.org/10.33860/jik.v15i2.487

Balitbangkes. (2013). Riset Kesehatan Dasar (RISKESDAS) 2013. In *Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan Republik Indonesia*. https://doi.org/10.3406/arch.1977.1322

Balitbangkes. (2021). *Hasil studi status gizi Indonesia (SSGI) tingkat Nasional, Provinsi, dan Kabupaten/Kota tahun 2021*. Kemenkes.

Beal, T., Tumilowicz, A., Sutrisna, A., Izwardy, D., & Neufeld, L. M. (2018). A review of child stunting determinants in Indonesia. *Maternal and Child Nutrition*, *14*(4), 1–10. https://doi.org/10.1111/mcn.12617

Budiastutik, I., & Rahfiludin, M. Z. (2019). Faktor risiko stunting pada anak di negara berkembang. *Amerta Nutrition*, *3*(3), 122–129. https://doi.org/10.2473/amnt.v3i3.2019.122-129

CDC. (2001). *Kurva Pertumbuhan CDC 2000* (pp. 1–2). National Center for Health Statistics National Center for Chronic Disease Prevention and Health Promotion.

Chairunnisa1, S. A. J., Nugraheni, S. A., & Kartini, A. (2020). MPraktik Menyusui yang Berhubungan dengan Kejadian Stunting pada Balita di Indonesia: Telaah Literatur Syifa. *Media Kesehatan Masyarakat Indonesia*, *19*(5), 353–362. https://doi.org/10.14710/mkmi.19.5.353-362

Conway, K., Akseer, N., Subedi, R. K., Brar, S., Bhattarai, B., Dhungana, R. R., Islam, M., Mainali, A., Pradhan, N., Tasic, H., Thakur, D. N., Wigle, J., Maskey, M., & Bhutta, Z. A. (2020). Drivers of stunting reduction in Nepal: a country case study. *American Journal of Clinical Nutrition*, *112*, 844s-859s. https://doi.org/10.1093/ajcn/nqaa151

Doloksaribu, L. M., Doloksaribu, T. M., & Nainggolan, E. S. (2022). Lama Menyusui Dan Tingkat Kemiskinan Keluarga Kaitannya Dengan Kejadian Stunting Pada Anak Balita : Studi Literatur. *Nutrient:*

Jurnal Gizi, *2*(1), 95–101.

Efrizal, W. (2021). Analisis Status Gizi Baduta (0-2 tahun) Di Provinsi Kepulauan Bangka Belitung Berdasarkan e-PPGBM Agustus 2020. *Jurnal Kesehatan*, *14*(1), 17–25. https://doi.org/10.23917/jk.v14i1.12331

Hanum, N. H. (2019). Hubungan Tinggi Badan Ibu dan Riwayat Pemberian MP-ASI dengan Kejadian Stunting pada Balita Usia 24-59 Bulan. *Amerta Nutrition*, *3*(2), 78–84. https://doi.org/10.2473/amnt.v3i2.2019.78-84

Husnaniyah, D., Yulyanti, D., & Rudiansyah. (2020). Hubungan tingkat pendidikan ibu dengan kejadian stunting. *Journal of Health Science*, *12*(1), 57–64.

Irwan, I. (2019). Pemberian Pmt Modifikasi Berbasis Kearifan Lokal Pada Balita Stunting dan Gizi Kurang. *Jurnal Sibermas (Sinergi Pemberdayaan Masyarakat)*, *8*(2), 139–150. https://doi.org/10.37905/sibermas.v8i2.7833

Islam, M. M., Sanin, K. I., Mahfuz, M., Ahmed, A. M. S., Mondal, D., Haque, R., & Ahmed, T. (2018). Risk factors of stunting among children living in an urban slum of Bangladesh: Findings of a prospective cohort study. *BMC Public Health*, *18*(1), 1–13. https://doi.org/10.1186/s12889-018-5101-x

Izwardy, D. (2020). Studi Status Gizi Balita Terintegrasi Susenas 2019. In *Pusat Penelitian dan Pengembangan Upaya Kesehatan Masyarakat*. Kementerian Kesehatan Republik Indonesia. https://persi.or.id/wp-content/uploads/2020/11/event8-02.pdf.

Kemenkes. (2019). Riset Kesehatan Dasar 2018. In *Badan Penelitian dan Pengembangan Kesehatan* (p. 674). Lembaga Penerbit Badan Litbang Kesehatan.

Kiik, S. M., & Nuwa, M. S. (2020). Stunting dengan pendekatan Framework WHO. In *CV. Gerbang Media Aksara* (Pertama). CV. Gerbang Media Aksara.

Mugianti, S., Mulyadi, A., Anam, A. K., & Najah, Z. L. (2018). Faktor Penyebab Anak Stunting Usia 25-60 Bulan di Kecamatan Sukorejo Kota Blitar. *Jurnal Ners Dan Kebidanan (Journal of Ners and Midwifery)*, *5*(3), 268–278. https://doi.org/10.26699/jnk.v5i3.art.p268-278

Nirmalasari, N. O. (2020). Stunting pada anak: Penyebab dan faktor risiko stunting di Indonesia. *Qawwam: Journal For Gender Mainstreming*, *14*(1), 19–28. https://doi.org/10.20414/Qawwam.v14i1.2372

Nur, A., & Annisa, N. (2022). Hubungan Pemberian Makanan Tambahan (PMT) pada balita yang mengakibatkan stunting di wilayah UPT Puskesmas Ulaweng. *Jurnal Berita Kesehatan*, *XV*(1), 1–8.

Prendergast, A. J., & Humphrey, J. H. (2014). The stunting syndrome in developing countries. *Paediatrics and International Child Health*, *34*(4), 250–265. https://doi.org/10.1179/2046905514Y.0000000158

Pulungan, A. B. (2020). Auxology, Kurva Pertumbuhan, Antropometri, dan Pemantauan Pertumbuhan. *Sari Pediatri*, *22*(2), 123. https://doi.org/10.14238/sp22.2.2020.123-30

Rahayu, A., Rahman, F., Marlinae, L., Husaini, Meitria, Yulidasari, F., Rosadi, D., & Laily, N. (2018). Buku Ajar Gizi 1000 Hari Pertama Kehidupan. In *CV Mine*.

Rahmad, A. H., Sofyan, H., Usman, S., Mudatsir, M., & Firdaus, S. B. (2023). Pemanfaatan leaflet dan poster sebagai media edukasi gizi seimbang terhadap peningkatan pengetahuan dan sikap remaja putri di Aceh Besar. *Jurnal Media Penelitian Dan Pengembangan Kesehatan*, *33*(1), 23–32. https://jurnal.polkesban.ac.id/index.php/jmp2k/article/view/1863/973

Ramadhan, R., Ramadhan, N., & Fitria, E. (2018). Determinasi penyebab stunting di Provinsi Aceh. *Sel Jurnal Penelitian Kesehatan*, *5*(2), 68–76. https://doi.org/10.22435/sel.v5i2.1595

Ramadhani, F. N., Kandarina, B. I., & Gunawan, I. M. A. (2019). Pola Asuh dan Pola Makan Sebagai Faktor Risiko Stunting Balita Usia 6-24 Bulan Suku Papua dan non- Papua. *Home Economic*, *35*(7), 175–183.

Sakti, S. A. (2020). Pengaruh Stunting pada Tumbuh Kembang Anak Periode Golden Age. *Jurnal Ilmiah Fakultas Keguruan Dan Ilmu Pendidikan*, *6*(1), 169–175.

Salimar, Kartono, D., Fuada, N., & Budi Setyawati, D. (2013). Stunting Anak Usia Sekolah Di

Indonesia Menurut Karakteristik Keluarga. *Penelitian Gizi Dan Makanan, 36*(2), 121–126.

Santi, M. W., Triwidiarto, C., Syahniar, T. M., Firgiyanto, R., & Andriani, M. (2020). Peningkatan Pengetahuan Kader Posyandu dalam Pembuatan PMT Berbahan Dasar Kelor sebagai Upaya Percepatan Pencegahan Stunting. *Dharma Raflesia : Jurnal Ilmiah Pengembangan Dan Penerapan IPTEKS*, *18*(2), 77–89. https://doi.org/10.33369/dr.v18i2.12056

Saputri, R. A. (2019). Upaya Pemerintah Daerah Dalam Penanggulangan Stunting Di Provinsi Kepulauan Bangka Belitung. *JDP (JJurnal Dinamika Pemerintahan)*, *2*(2), 152–168.

Savita, R., & Amelia, F. (2020). Hubungan Pekerjaan Ibu, Jenis Kelamin, dan Pemberian Asi Eklusif Terhadap Kejadian Stunting Pada Balita 6-59 Bulan di Bangka Selatan. *Jurnal Kesehatan Poltekkes Kemenkes Ri Pangkalpinang*, *8*(1), 1. https://doi.org/10.32922/jkp.v8i1.92

Sinatrya, A. K., & Muniroh, L. (2019). Hubungan Faktor Water, Sanitation, and Hygiene (WASH) dengan Stunting di Wilayah Kerja Puskesmas Kotakulon, Kabupaten Bondowoso. *Amerta Nutrition*, *3*(3), 164–170. https://doi.org/10.2473/amnt.v3i3.2019.164-170

Sutraningsih, W., Marlindawani, J., & Silitonga, E. (2021). Implementasi Strategi Pelaksanaan Pencegahan Stunting di Kabupaten Aceh Singkil Tahun 2019. *Journal of Healthcare Technology and Medicine*, *7*(1), 49–68.

Sutriyawan, A., Rahayu, S., Kurniawati, R. D., & Habibi, J. (2020). Disease With Stunting Incidence in Toddlers : *Journal Of Midwifery Vol. 8 No. 2 Oktober 2020*, *8*(2), 1–9.

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*, *July*. https://doi.org/10.1016/j.enfcli.2019.04.093

Wanimbo, E., & Wartiningsih, M. (2020). Hubungan Karakteristik Ibu Dengan Kejadian Stunting Baduta (7-24 Bulan) Relationship Between Maternal Characteristics With Children (7-24 Months) Stunting Incident. *Jurnal Manajemen Kesehatan Yayasan RS Dr. Soetomo*, *6*(1), 83–93.

Wargiana, R., Susumaningrum, L. A., & Rahmawati, I. (2013). *Hubungan Pemberian MP-ASI Dini dengan Status Gizi Bayi Umur 0-6 Bulan di Wilayah Kerja Puskesmas Rowotengah Kabupaten Jember (The Correlation between Giving Early Complementary Breastfeeding and Level Baby Nutrition 0-6 Month in Work Area of Rowotengah C*. *1*(1).

Yanti, N. D., Betriana, F., & Kartika, I. R. (2020). Faktor Penyebab Stunting Pada Anak: Tinjauan Literatur. *REAL Nursing Journal*, *3*(1), 1–10.