Jurnal Kesehatan Ibu dan Anak
Vol.17, No.2, November 2023, pp. 79~88
10.29238/kia.v17i2.2068

ISSN: 2599-3224 (Online)
ISSN: 2302-6014 (Print)

The Relationship Between A History Of Diarrhea And Stunting In Children Aged 24-59 Months In Bantul Regency In 2021

Zaida Rahma Hilmawati[1], Sujiyatini[2], Yuliantisari Retnaningsih[3], Maretalinia
[1]Poltekkes Kemenkes Yogyakarta
zaida21mafal@gmail.com
[2]Poltekkes Kemenkes Yogyakarta
sujiyatini@poltekkesjogja.ac.id
[3]Poltekkes Kemenkes Yogyakarta
yuliantisarir@gmail.com
[4]Mahidol University, Thailand
maretalinia@gmail.com

TICLE INFO

Article history:

Received November 16th, 2023
Revised November 23rd, 2023
Accepted November 30th, 2023

Keyword:

LBW, Exclusive Breastfeeding, M-PASI

ABSTRACT

Background: The prevalence of stunting in Indonesia remains relatively high. Various consequences can arise due to stunting, including impaired cognitive development in children, suboptimal school performance, and potential long-term impacts on women during adulthood. Diarrhea is identified as one of the triggers for stunting, often caused by insufficient parental supervision and inadequate Exclusive Breastfeeding (EBF) and Complementary Feeding (CF) practices.
Objective: To investigate the relationship between diarrhea occurrence and stunting among toddlers aged 24-59 months in the working area of Bantul Regency in the year 2021.
Method: The research employed an observational analysis design using a case-control approach. Sample selection was done through Purposive Sampling, involving criteria for inclusion and exclusion. The total sample size was 130 individuals, comprising 65 case samples and 65 control samples. The study was conducted at Dlingo II, Pajangan, and Imogiri II Community Health Centers. Secondary data from registers and medical records were utilized. Data analysis involved the use of the chi-square test and odds ratio (OR).
Results: The majority of stunted toddlers were male, had low birth weight, a history of exclusive breastfeeding, and a history of complementary feeding for less than six months. There was a significant relationship between diarrhea and stunting incidence (p=0.023) with an OR value of 3.335 (1.625-6.844). This implies that toddlers with a history of recurrent diarrhea are three times more likely to experience stunting.
Conclusion: There is a significant association between diarrhea occurrence and stunting among toddlers aged 24-59 months in the working area of Bantul Regency.

Corresponding Author:

Sujiyatini
Poltekkes Kemenkes Yogyakarta
Email: sujiyatini@poltekkesjogja.ac.id

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

INTRODUCTION

Stunting is a condition where a child's height or body length does not meet the expected growth for their age. It is a manifestation of chronic nutritional deficiency with long-term consequences that need to be addressed. One of its consequences is that it can make children more susceptible to diseases.[1] Additionally, stunting can have an impact on developmental disorders, including physical development. Other effects of stunting occur in educational performance and economic productivity during adulthood. Furthermore, the consequences of stunting can influence the reproductive health of female children.[2] Stunting can be caused not only by poor nutrition but also by several household-related factors. This is directly linked to parents. Additionally, nutritional factors, such as complementary feeding practices, play a role, as well as breastfeeding practices, which are associated with exclusive breastfeeding.[3] Stunting can also be caused by Low Birth Weight (BBLR), environmental cleanliness, and a history of infectious diseases. Among the infectious diseases that can lead to stunting is diarrhea.[4]

Stunting is one of the main focuses of the Sustainable Development Goals (SDGs) in 2030 and is expected to experience a decrease according to the set targets[5] Stunting is a global issue, with 149.2 million children under the age of five suffering from stunting in the year 2020.[6] The prevalence of stunting in Indonesia, based on the Indonesian Health Profile for the year 2021, is 24.4%, which is still higher than the annual target set by the Ministry of Health of the Republic of Indonesia.[7] The Special Region of Yogyakarta has a relatively high prevalence of stunting. In 2018, the prevalence was 12.37%, but it decreased to 10.69% in 2019. However, in 2020, it rose again to 11.08%. Based on a preliminary study conducted on August 25, 2022, at the Bantul District Health Office, it was found that the stunting prevalence in Bantul District in 2021 was 8.36%. This percentage is derived from 47,788 children under the age of 5 who underwent anthropometric measurements, and among them, 3,996 children were identified as experiencing stunting.

One of the causes of stunting is infectious diseases, including diarrheal illness.[8] Diarrhea can be defined as a condition where the passage of liquid or watery stools occurs three times or more per day.[9] Diarrhea can be accompanied by vomiting, making the individual vulnerable to dehydration. A child experiencing diarrhea may also face malabsorption of nutrients, preventing the optimal absorption and distribution of essential nutrients by the body. This can lead to repeated occurrences of malnutrition, ultimately resulting in stunting later on.[10] Diarrhea is caused by various factors, including environmental factors, household behavioral factors, low knowledge about diarrhea, and malnutrition. Examples of poor environmental factors include inadequate sanitation conditions and insufficient facilities for clean water infrastructure. Community behavior can also contribute to diarrhea, such as infrequent handwashing before meals and after using the toilet, as well as improper disposal of feces.[11] The causes of diarrhea are also influenced by household factors, including the source of drinking water, water treatment, availability of toilet facilities, sharing of toilet facilities, and toilet facility hygiene. In addition, poor environmental conditions can contribute to the high risk of bacterial contamination, leading to diarrhea.[10]

Toddlers are one of the vulnerable groups susceptible to diseases. According to a report from the WHO in 2016, approximately 5.6 million toddlers died, with 8.8% of these deaths attributed to diarrhea. The incidence of diarrhea in the Special Region of Yogyakarta is still relatively high. In the Bantul region, based on data obtained from a preliminary study conducted by the Bantul District Health Office, the prevalence of toddlers experiencing diarrhea is around 7.9%, approximately 1771 children. The target set for diarrhea cases in Bantul in 2019 was 1000 cases, indicating that the actual cases surpass the predetermined target.

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

Research related to the relationship between a history of diarrhea and the occurrence of stunting in toddlers aged two to five years has been widely conducted in several regions, but not in the Special Region of Yogyakarta. Therefore, the author is interested in investigating this matter in the Special Region of Yogyakarta. This study will encompass factors that may cause stunting and their correlation with the history of diarrhea in toddlers.

METHOD

This research falls under the category of observational analysis. The research design employed is a case-control study. The population for this study includes all children aged 24-59 months in the working area of Bantul Regency in the year 2021. Sampling was done using the Purposive Sampling technique. The case samples consist of stunted toddlers, while the control samples are non-stunted toddlers in the working area of Bantul Regency, each with a total of 62 toddlers. The determination of the sample size was obtained using the Lemeshow formula for the case-control study design. Toddlers were selected based on inclusion and exclusion criteria set by the researcher. The research was conducted in three community health centers, namely Dlingo II Community Health Center, Pajangan Community Health Center, and Imogiri II Community Health Center. Data collection was performed using secondary data obtained from medical records and health center registers. The variables used in this study consist of independent and control variables. The independent variable in this study is the history of diarrhea occurrence in toddlers aged 7 to 12 months. The dependent variable in this study is stunting that occurs in toddlers aged 24 to 59 months.

The inclusion criteria established by the researcher for the case group are toddlers aged 2 to 5 years in 2021 who experienced stunting and are recorded in the health center registry, with available data in the medical records at Puskesmas Dlingo II, Puskesmas Pajangan, and Puskesmas Imogiri II. Meanwhile, the exclusion criteria set are toddlers aged 2 to 5 years in 2021 who experienced stunting and are not recorded in the health center registry at Puskesmas Dlingo II, Puskesmas Pajangan, and Puskesmas Imogiri II.

he relationship between independent and dependent variables was analyzed using the Chi-Square test ($p < 0.05$), and the Odds Ratio test was conducted to determine the risk bearing of each variable that is interrelated. This research utilized the Research Ethics from the Health Polytechnic of the Ministry of Health in Yogyakarta with the registration number DP.04.03/e-KEPK.2/112/2023.

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

RESULTS

Table 1 Frequency Distribution of Stunted Toddlers

No	"Characteristics	Case (*Stunting*)		Control (Tidak *Stunting*)	
		Frequency (n)	Percentage (%)	Frequency (n)	Percentage (%)
1.	**Gender**				
	Male	37	56,90	35	53,80
	Female	28	43,10	30	46,20
2.	**Birth Weight**				
	Low Birth Weight (LBW)	49	75,40	13	20,00
	Low Birth Length (LBL)	16	24,60	52	80,00
3.	**Exclusive Breastfeeding History**				
	Yes	22	33,80	40	61,50
	No	43	66,20	25	38,50
4.	**History of M-PASI Administration**				
	Age ≥ 6 months	23	35,40	42	64,60
	Age < 6 months	42	64,60	23	35,40

Based on Table 1, it is known that the majority of respondents in the case group are male. The frequency distribution of respondent characteristics in the study includes gender, birth weight, history of exclusive breastfeeding, and a history of low birth weight breastfeeding. Additionally, the history of exclusive breastfeeding for less than six months and the history of introducing complementary feeding (M-PASI) in less than six months are also considered. Meanwhile, for the control group, the majority are males with normal birth weight, a history of exclusive breastfeeding for the recommended duration of six months, and a history of introducing complementary feeding at the appropriate time.

Table 2: Analysis of the Relationship Between the History of Diarrhea Incidents and the Occurrence of Stunting

Diarrhea Incident History	*Stunting*				OR 95% CI	*P value*
	Yes		No			
	n	%	n	%		
Diarrhea	42	64,60	23	35,40	3,335 (1,62-6,84)	0,002
No Diarrhea	23	35,40	42	64,60		
Total	65	100	65	100		

Based on Table 2, it is evident that the characteristics of the majority of cases in the stunted toddler group are male gender, low birth weight, a history of non-timely Exclusive Breastfeeding (EBF) for six months, and a history of complementary feeding (M-PASI)

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

introduction before the age of six months. On the other hand, in the control group of non-stunted toddlers, the majority are male, have normal birth weight, and have a history of M-PASI introduction after the age of six months.

DISCUSSION

The risk of stunting is higher in boys compared to girls.[13] Additionally, boys are more prone to diarrhea compared to girls.[14] This is because boys tend to interact more with their environment, and sometimes, children are unable to differentiate between clean and unclean items, making them susceptible to bacterial infections, especially diarrhea. Additionally, the reason for this is that boys play more outdoors, while girls play outside less frequently. Boys are more likely to contract diarrhea due to their increased interaction with the outside world.[15] A child who has already been contaminated, especially with diarrhea, will be more susceptible to recurrent infections if there are no changes in their lifestyle and dietary habits.

Baby with Low Birth Weight (BBLR) has a higher risk of mortality, delayed development, and growth compared to babies born with normal birth weight. Additionally, individuals born with low birth weight tend to be more vulnerable to diseases, especially infections, and cognitive developmental disorders.[16] Low birth weight poses a significant risk factor for the occurrence of stunting.[17] Nutritional limitations can also lead to low birth weight in infants, which ultimately results in stunting. This is due to the restricted intake of nutrients received by the fetus, even though nutrition plays a crucial role in supporting the growth and development of the fetus during pregnancy.[18]

Exclusive breastfeeding is one of the contributing factors to stunting. For the first 6 months of life, providing adequate exclusive breastfeeding without additional food has been proven to have a significant relationship with stunting.[19] Even children raised by their biological mothers are less likely to experience stunting compared to those not raised by their biological mothers. This is because children raised by their biological mothers are more likely to receive exclusive breastfeeding compared to those raised by other household members.[20]

Breast milk contains proteins, which are essential for the growth process. Although the protein content in breast milk is lower compared to formula milk, the quality of the proteins in breast milk is very high.[21] In addition, exclusive breastfeeding for 6 months has significant benefits in reducing the risk of gastrointestinal infections, especially diarrhea. Infants who are breastfed for the first 6 months tend to thrive because breast milk helps protect them from infectious diseases and supports optimal body growth, reducing the likelihood of infections such as diarrhea that could lead to stunting.[22]

The introduction of complementary feeding before six months of age can affect a child's health, leading to issues such as diarrhea and constipation, ultimately resulting in stunted growth.[23] A child who receives complementary feeding (M-PASI) at an age less than 6 months has a 1.23 times greater risk of stunting compared to a child who receives complementary feeding at the age of 6 months or older. Children who experience insufficient nutrition below the minimum frequency also have a high risk of experiencing stunting.[24] Additionally, low food quality also affects the occurrence of stunting in children, where complementary foods provided often do not sufficiently provide nutrients. As a result, supplementary foods with low nutritional content are given.[25]

Children require good nutrition, especially during the first 2000 days of life. During this crucial period, a healthy diet with diverse eating patterns is essential as optimal

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

nutritional fulfillment is crucial. For the initial 6 months of life, exclusive breastfeeding has been proven to have a significant correlation with preventing stunting when given adequately without additional food supplements.[19] Food vulnerability in children has long-term detrimental impacts.[26] The factor contributing to M-PASI (Minimum Acceptable Diet) that leads to other causes of stunting is the provision of inappropriate food within households. The reason for this is that continuously providing small portions of food can result in malnutrition, ultimately leading to stunting.[27]

The relationship between the history of diarrhea and the occurrence of stunting

Poor eating habits have a significant impact on a child's growth. When the food provided to a child does not meet their nutritional needs, it can lead to a lack of essential nutrients, affecting both growth and developmental abilities. If there is a persistent error in the child's diet without continuous adjustments, there is a high risk of malnutrition, ultimately leading to stunting. The term "eating habits" here not only refers to the frequency and types of food given but also encompasses the ingredients and preparation methods. Even if the food provided is nutritionally adequate, improper handling and preparation can compromise its cleanliness, leading to contamination and the potential onset of infectious diseases. Additionally, in the case of diarrheal diseases, environmental sanitation plays a significant role. Families without access to proper toilets and waste disposal facilities are more likely to experience sanitation-related issues, creating a significant correlation between a history of diarrheal incidents and stunting.[28]

The relationship between stunting and a history of diarrhea is highly significant.[29] This is due to toddlers who have a history of recurrent diarrhea may experience a loss of appetite and nutritional deficiencies due to the ongoing diarrhea, leading to inadequate intake to meet their nutritional needs. If severe dehydration occurs, it can further impact a child's growth and potentially result in stunting. The occurrence of diarrhea can lead to long-term effects such as a deficit in height growth.[29] Children are prone to experiencing diarrhea between the ages of 6 to 12 months because at this age, they undergo a transition to complementary feeding (M-PASI), leading to a decline in their immunity. In addition, inappropriate exclusive breastfeeding can also be a contributing factor to diarrhea. When a child does not receive adequate exclusive breastfeeding, their immune system may not reach its maximum potential in fighting harmful bacteria. During this stage, children also become more active, playing outdoors, and entering the oral stage, where they tend to put their hands or objects they see into their mouths. This makes them susceptible to infections, including diarrhea. This vulnerability can also be attributed to the fact that the child's microbiota is not fully mature at this age, reaching maturity around 24 months.[30]

This research is in line with the study conducted at the Citatrip Health Center in Bandung, which found a significant correlation between a history of infection and the occurrence of stunting in toddlers.[21] Infants with a history of infections such as diarrhea may experience disruptions in nutrient absorption and recurrent loss of nutrients, thereby affecting the growth process in these infants. Additionally, the consequences of repeated episodes of diarrhea in infants include impaired absorption of nutrients, leading to unmet nutritional needs and hindering the growth and development of the child. The hindrance of growth and development in infants has long-term effects, extending into adulthood. In girls, the impact is even more significant as they undergo reproductive changes. Therefore, any disturbances in growth and development during childhood can have substantial consequences for the future.

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

There is a close relationship between diarrheal infections and malnutrition.[31] Infections contribute to malnutrition due to a decrease in food intake, reduced nutrient absorption in the small intestine, and increased nutrient catabolism required for tissue repair. Conversely, malnutrition can also be a predisposing factor for infections due to a decline in the protective barrier of the intestinal mucosa, triggering changes in the immune function of the individual and thereby increasing the risk of infections, especially enteric infections.

The mechanism behind diarrhea leading to stunting involves the gut microbiota, which is associated with dysbiosis.[32] In short, the mucosal epithelium of the intestine acts as a barrier that separates the luminal environment from the lamina propria and the immune system. The architectural design of the epithelial cell layer and the mucous layer covering them prevent the excessive translocation of bacteria, metabolites, and molecules such as LPS, keeping them from residing in the circulation. The mucous layer helps to segregate members of the intestinal microbiota from the epithelial cells of the intestine and the immune cells residing in the lamina propria. In this way, the functioning intestinal barrier contributes to the activation of the systemic immune system, preventing dysfunctional inflammation.[9]

Toddlers experiencing stunting typically have had three or more episodes of diarrhea in the last six months, whereas in the non-stunted group, the majority rarely experiences diarrhea. This condition is usually caused by bacteria commonly referred to as Enteropathogenic Escherichia coli, which is also a leading cause of thousands of child deaths in developing countries each year.[10] Bacteria that can cause diarrhea usually proliferate easily. Therefore, if a child has experienced diarrhea, recovered, and then returns to their usual eating and lifestyle patterns, the child is susceptible to experiencing diarrhea again or having recurrent diarrhea.

The mechanism of diarrhea related to stunting involves osmotic disturbances. Food that cannot be absorbed increases osmotic pressure in the intestinal cavity, causing a shift of water and electrolytes into the intestines. This results in an excess of contents in the intestines, leading to diarrhea. Additionally, it can cause secretion disturbances due to toxins in the intestinal wall, leading to an increase in the secretion of water and electrolytes and subsequent diarrhea.[33] Disturbance in intestinal motility resulting in hyperperistalsis and hypoperistalsis. The consequence of diarrhea itself is the loss of water and electrolytes (dehydration), leading to acid-base disturbances (metabolic acidosis and hypokalemia), nutritional disorders (inadequate intake, excessive output), hypoglycemia, and circulatory disturbances.[34] When the body experiences issues with metabolic circulation and diarrhea, it is often susceptible to stunting.

Infectious diseases, especially diarrhea, can lead to the loss of fluids and various nutrients in children.[35] A child suffering from diarrhea will experience malabsorption of nutrients, and repeated episodes of diarrhea will further deplete the child's nutritional reserves if not counterbalanced with appropriate dietary intake.[36] A child who is malnourished will have a low immune system against diseases, making them susceptible to infections. The impact of these infections can affect the cognitive development of the child and hinder their physical growth

CONCLUSION

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

Based on the characteristics, toddler stunting is mostly caused by repeated episodes of diarrhea in male toddlers with low birth weight, a history of less than six months of exclusive breastfeeding, and a history of inappropriate complementary feeding (M-PASI) at the age of six months. A history of frequent diarrhea in the last six months increases the risk of stunting by 3,335 times in toddlers aged 24-59 months.

REFERENCES

1. Modern, G., Sauli, E. & Mpolya, E. Correlates of diarrhea and stunting among under-five children in Ruvuma, Tanzania; a hospital-based cross-sectional study. Sci. African 8, 1–9 (2020).
2. Akombi, B. J. et al. Stunting and severe stunting among children under-5 years in Nigeria: A multilevel analysis. BMC Pediatr. 17, 1–16 (2017).
3. Nkurunziza, S., Meessen, B., Van, J. & Korachais, C. Determinants of stunting and severe stunting among Burundian children aged 6-23 months : evidence from a national cross-sectional household survey , 2014. 1–15 (2017) doi:10.1186/s12887-017-0929-2.
4. Tafesse, T., Yoseph, A., Mayiso, K. & Gari, T. Factors associated with stunting among children aged 6 – 59 months in Bensa District , Sidama Region , South Ethiopia : unmatched case-control study. BMC Pediatr. 1–11 (2021) doi:10.1186/s12887-021-03029-9.
5. Sinrang, W. & Hadju, V. Hubungan Riwayat Ispa, Riwayat Diare, dan Riwayat Malaria dengan Kejadian Stunting pada Baduta Usia 6-24 Bulan di Kelurahan Kelapa Lima Kabupaten Merauke Papua. J. Ilm. Indones. 7, (2022).
6. United Nation Children Fund/World Health Organitation. Levels and trends in child malnutrition UNICEF / WHO / World Bank Group Joint Child Malnutrition Estimates Key findings of the 2021 edition. World Heal. Organ. 1–32 (2021).
7. Kemenkes RI. Profil Kesehatan Indonesia. (Kementerian Kesehatan Republik Indonesia, 2021).
8. Islam, M. S., Zafar Ullah, A. N., Mainali, S., Imam, M. A. & Hasan, M. I. Determinants of stunting during the first 1,000 days of life in Bangladesh: A review. Food Sci. Nutr. 8, 4685–4695 (2020).
9. Liang, Y., Zhang, L., Zeng, L., Gordon, M. & Wen, J. Racecadotril for acute diarrhoea in children. Cochrane Database Syst. Rev. 2019, (2019).
10. Desyanti, C. & Nindya, T. S. Hubungan Riwayat Penyakit Diare dan Praktik Higiene dengan Kejadian Stunting pada Balita Usia 24-59 Bulan di Wilayah Kerja Puskesmas Simolawang, Surabaya. Amerta Nutr. 1, 243 (2017).
11. Prawati, D. D. Faktor Yang Mempengaruhi Kejadian Diare Di Tambak Sari, Kota Surabaya. J. PROMKES 7, 34 (2019).
12. Ikua, Muriithi David, John Obwa, W. & Japhan Omoke, K. Environmental Risk Factors Influencing Diarrheal Occurrence among Children Under Five Years Old in Informal Urban Settlements: A Case Study of Korogocho, in Nairobi County, Kenya. Sch. J. Arts, Humanit. Soc. Sci. 9, 19–30 (2021).
13. Thurstans, S. et al. Boys are more likely to be undernourished than girls : a systematic analysis of sex review and meta- - differences in undernutrition. (2020) doi:10.1136/bmjgh-2020-004030.
14. Banchonhattakit, P., Pisey, V. & Laohasiriwong, W. The association of socio-demographic and environmental factors on childhood diarrhea in Cambodia. F1000Research 9, 1–30 (2021).
15. Anteneh, Z. A., Andargie, K. & Tarekegn, M. Prevalence and determinants of acute diarrhea among children younger than five years old in Jabithennan District, Northwest Ethiopia, 2014. BMC Public Health 17, 1–8 (2017).
16. Sinaga, T. R., Purba, S. D., Simamora, M., Pardede, J. A. & Dachi, C. Berat Badan Lahir Rendah dengan Kejadian Stunting pada Batita. J. Ilm. Permas J. Ilm. STIKES

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

Kendal 11, 493–500 (2021).
17. Khan, S., Zaheer, S. & Safdar, N. F. Determinants of stunting, underweight and wasting among children < 5 years of age: Evidence from 2012-2013 Pakistan demographic and health survey. BMC Public Health 19, 1–15 (2019).
18. Suhartin, P. Faktor-Faktor yang Berhubungan dengan Kejadian Stunting di Kabupaten Konawe Selatan: Factors That Are Related To Stunting Events In South Konawe District. J. Ilm. Kebidanan (Scientific J. Midwifery) 6, 95–104 (2020).
19. Dranesia, A., Wanda, D. & Hayati, H. Pressure to eat is the most determinant factor of stunting in children under 5 years of age in Kerinci region, Indonesia. Enferm. Clin. 29, 81–86 (2019).
20. Hadi, H. et al. Exclusive breastfeeding protects young children from stunting in a low-income population: A study from eastern indonesia. Nutrients 13, 1–14 (2021).
21. Sutriyawan, A., Kurniawati, R. D., Rahayu, S. & Habibi, J. Hubungan Status Imunisasi Dan Riwayat Penyakit Infeksi Dengan Kejadian Stunting Pada Balita: Studi Retrospektif. J. Midwifery 8, 1–9 (2020).
22. Fitriami, E. & Huriah, T. Determinan kejadian Stunting pada Anak di Indonesia : A Literature Review. J. Smart Keperawatan 6, 113 (2019).
23. Nurlita Putri, Simbolon, D. & Kusdalinah. Meta Analisis: Pengaruh Pemberian MP-ASI Terhadap Kejadian Stunting. J. Indones. community Nutr. 11 No.2,20, 1–9 (2022).
24. Putri, A. P. & Rong, J. R. Parenting functioning in stunting management: A concept analysis. J. Public health Res. 10, 213–219 (2021).
25. Sanin, K. I. et al. Micronutrient adequacy is poor , but not associated with stunting between 12-24 months of age : A cohort study findings from a slum area of Bangladesh. 1–17 (2018).
26. Moradi, S. et al. Food Insecurity and the Risks of Under-nutrition Complications among Children and Adolescents: A Systematic Review and Meta-Analysis. Nutrition (2018) doi:10.1016/j.nut.2018.11.029.
27. Binte, N., Id, A., Tahsina, T. & Hoque, D. E. Association of food security and other socio-economic factors with dietary diversity and nutritional statuses of children aged 6-59 months in rural Bangladesh. Matern. Child Heal. Div. (MCHD), icddr,b, Dhaka, Bangladesh 1–18 (2019).
28. Samsuddin, N. A., Isaura, E. R. & Sumarmi, S. Relationship of Former History of Diarrhea and Sanitation With the Prevalence of Stunting Among Children Aged 1–5 Years in Sidotopo Wetan, Surabaya. Media Gizi Indones. 16, 248 (2021).
29. Chyntithia, L. G. Hubungan Riwayat Penyakit Diara Dengan Kejadian Stunting Pada Balita. J. Med. Hutama 03, 1723-1725 p (2021).
30. Rukambile, E., Sintchenko, V., Muscatello, G., Kock, R. & Alders, R. Infection, colonization and shedding of Campylobacter and Salmonella in animals and their contribution to human disease: A review. Zoonoses Public Health 66, 562–578 (2019).
31. Irawan, A. & Hastuty, H. S. B. Kualitas Fisik Air, Kejadian Diare Dengan Stunting Pada Balita di Puskesmas Arso Kota. J. Kesehat. Komunitas 8, 130–134 (2022).
32. Ejemot-Nwadiaro, R. I., Ehiri, J. E., Arikpo, D., Meremikwu, M. M. & Critchley, J. A. Hand-washing promotion for preventing diarrhoea. Cochrane Database Syst. Rev. 2021, 8 (2021).
33. Fenta, A., Alemu, K. & Angaw, D. A. Prevalence and associated factors of acute diarrhea among under-five children in Kamashi district, western Ethiopia: Community-based study. BMC Pediatr. 20, 1–7 (2020).
34. Duri Kartika, C. Faktor Lingkungan yang berhubungan dengan kejadian Diare pada balita di Puskesmas Batang – Bantang Kabupaten Sumenep. Progr. Stud. Keperawatan Univ. Wiraraja 16, 1–37 (2019).
35. Lestari, M. Kontribusi Kondisi Fisik Lingkungan Rumah dengan Kejadian Diare dan

Jurnal Kesehatan Ibu dan Anak Vol.17, No.2, November 2023, pp. 79~88
ISSN: 2599-3224 (Online), ISSN: 2302-6014 (Print)

Hubungannya terhadap Kejadian Stunting. Indones. J. Public Heal. Nutr. 1, 101–113 (2021).
36. Humphrey, J. H. et al. Independent and combined effects of improved water, sanitation, and hygiene, and improved complementary feeding, on child stunting and anaemia in rural Zimbabwe: a cluster-randomised trial. Lancet Glob. Heal. 7, e132–e147 (2019).