



## RISK FACTORS OF STUNTING AND WASTING IN TODDLER DURING THE COVID-19 PANDEMIC

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### ABSTRACT

Stunting is a child's height growth that is shorter than their age. Wasting is the development of a child's weight that is too thin to their height. In 2019, the prevalence of Stunting cases that occurred in the world was 21.3%, and the prevalence of Wasting cases was 6.9%. The pandemic situation has disrupted nutritional services, especially in health service facilities and integrated health posts, due to the lack of community mobility. This study aims to determine the risk factors for stunting and wasting in toddlers during the Covid-19 pandemic. This study is descriptive analytical with a cross-sectional design. The population in this study were toddlers under two years of age. The sample in this study was 93 using a purposive sampling technique. The data collection method was carried out using a validated questionnaire and interviews using the Chi-Square statistical test. The results of the analysis showed that the most dominant risk factor for Stunting was Exclusive Breastfeeding (OR = 9.37; 95% CI: 2.14-40.86; p = 0.003); The most dominant risk factor for Wasting is Environmental Sanitation (OR=16.44; 95%CI: 3.68-73.47; p=0.000) and the most dominant risk factor for Stunting plus Wasting is Environmental Sanitation (OR=3.86; 95%CI: 1.39-10.75; p=0.009). For Nutrition Program Managers, it is important to improve the nutritional status and nutrient intake levels of the community, especially after the pandemic ends.

Keywords: coastal areas; fishermen; mental health issues

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### INTRODUCTION

Globally, 1 in 3 toddlers (infants under two years old) experience malnutrition, which can cause stunted and wasted cases (Ministry of Health of the Republic of Indonesia, 2014). Indonesia is ranked 10th out of 44 countries included in the Hunger and Nutrition Commitment Index (Bappenas, 2017). In 2019, the prevalence of Stunting cases in the world was 21.3%, and the prevalence of Wasting cases was 6.9% (UNICEF, 2020). Children with stunting cases have shorter bodies than children of the same age, but not all children who have short bodies experience stunting (Ministry of Health of the Republic of Indonesia, 2018). Stunting can be said if a child experiences failure in the growth and development process due to malnutrition in the fetus or a newborn baby. Still, the condition of Stunting can only be known after the child is 5 years old (TNP2K, 2017). Infants under two years old with a short history in the Z-score <-2.0 category based on Body Length/Age measurements can increase the risk of stunting if not addressed immediately (TNP2K, 2019).

Wasting is a condition in which a child experiences malnutrition based on body weight according to height, characterized by a z-score of Body Weight/Height of less than -2 SD.

Wasting occurs due to drastic weight loss or inability to gain weight (Ministry of Health of the Republic of Indonesia, 2016). Wasting risks inhibiting children's growth and development in the long term, decreasing the child's immune system, being easily infected with diseases, and having a high risk of death (UNICEF, 2020). The current Covid-19 pandemic has hampered the nation's life (Yulianti, 2021). Starting from the incident in Wuhan, Hubei Province, China, the first case was found linked to the animal market in Wuhan (Kriswibowo & Utomo, 2020). The outbreak of Coronavirus Disease 2019 or Covid-19 has haunted the entire world. Now the deadly virus has claimed many victims from various countries. Along with the spread of Covid-19, all world movements have been paralyzed (Mardiyah<sup>1</sup> & Nurwati, 2020).

The United Nations International Children's Fund (UNICEF) stated that the Covid-19 pandemic has caused an increase in the number of children experiencing nutritional problems in Indonesia (UNICEF, 2020). The Covid-19 pandemic also has the potential to increase malnutrition in breastfeeding mothers (Bohari & Gaffar, 2021). This is due to the decline in the community's economy which can then affect children's food needs. According to the Indonesian Nutritionists Association, children who experience nutritional problems are caused by inadequate food security (Kriswibowo & Utomo, 2020). Basic Health Research of the Ministry of Health of the Republic of Indonesia reported an increase in Stunting cases from 2016 (27.5%), increasing to 29.6% in 2017 then decreasing in 2020 with the prevalence of Stunting nutritional status decreasing to 11.6%. The percentage of Wasting cases itself continues to decline nationally. Calculated from 2016 the percentage of Wasting cases in Indonesia was 14.88%, 2017 (14.8%), 2018 (15.2%) and 2020 (6.7%) (RiskesdasRI, 2018, 2020, 2021).

In 2018, the case of Stunting nutritional status in Aceh was 37.9%, and decreased in 2020 to 14.7%. Similarly, cases of Wasting in Aceh also decreased, in 2018 the percentage of Wasting cases in Aceh was 20.7%, and in 2020 it was 11.7% (Ministry of Health of the Republic of Indonesia, 2021; RiskesdasRI, 2020). Based on these data, it can be concluded that the nutritional health conditions of children in Aceh are improving. However, on April 1, 2021, Pidie Jaya Regency was designated as the Stunting Intervention Focus Location (Stunting locus), the determination of this Stunting locus is seen based on the following indicators; number of Stunting toddlers, Stunting prevalence and poverty level (TP2AK, 2022). The purpose of determining the Stunting locus is to implement integrated Stunting reduction interventions that support the achievement of the 2020-2024 National Medium-Term Development Plan targets (Bappenas, 2020).

The Nutritional Status Monitoring Report of the Pidie Jaya District Health and Family Planning Office shows that there are 856 cases of Stunting in Pidie Jaya (20.9%). The three sub-districts with the highest cases of Stunting are Meurah Dua, Cubo and Jangka Buya sub-districts. The number of Stunting cases in Meurah Dua Sub-district is 140 cases (40.7%), Cubo Sub-district has 122 cases (36.9%) and Jangka Buya Sub-district has 215 cases (34.7%). For Wasting cases in Pidie Jaya based on the PSG Report, it is known that there are 386 cases (9.4%). In Meurah Dua Sub-district there are 49 cases (14.3%), Cubo Sub-district 9 cases (2.7%) and in Jangka Buya Sub-district there are 105 cases (17.0%) (Pidie Jaya Health Office, 2021). This study aims to determine the risk factors for stunting and wasting in toddlers during the Covid-19 pandemic.

## **METHOD**

This study is a descriptive analytical study with a cross-sectional design. The population in this study were all toddlers in the working area of the Health and Family Planning Office of Pidie Jaya Regency. The sample in this study was 93 using a purposive sampling technique.

The data collection method used primary and secondary data. Primary data was carried out using a validated questionnaire and interviews, while secondary data was taken from the Report on the results of measuring Height/Age and Weight/Height of toddlers at the Health Center in the Pidie Jaya Health & Family Planning Office in 2022 and records of Maternal and Child Health books. Furthermore, the data was analyzed univariately, bivariately using the chi-square test and multivariately using multiple logistic regression tests.

## **RESULT**

The results showed that out of 93 toddlers, 58.06% experienced stunting, 38.71% wasting, and 25.81% experienced both. Most were male (66.67%). The highest education of the head of the family was at the Senior High School/MAMadrasah Aliyah level (48.39%), while the mother's education was dominated by Senior High School/Madrasah Aliyah (39.78%) and diploma (33.33%). The highest occupation of the head of the family was self-employed (36.56%), and most mothers were unemployed (58.06%). As many as 38.71% of mothers experienced Chronic Energy Deficiency during pregnancy and 59.14% did not make ANC visits according to standards. The majority of toddlers did not experience LBW (80.65%) and received exclusive breastfeeding (69.89%). However, 48.39% did not receive standard complementary feeding, 59.14% did not receive standard immunization, and 29.03% had experienced infectious diseases. Most parenting patterns were classified as good (86.02%) and mothers did not experience pregnancy complications (75.27%). As many as 51.61% of mothers had poor knowledge, 46.24% of respondents had poor environmental sanitation, and 41.94% lived below the minimum wage (Table 1).

The results of the analysis of Stunting determinants showed six variables that had a P value <0.05 in the determinants of Stunting, including: LBW (OR= 4.61; 95%CI: 1.23-17.27; P=0.016), Exclusive Breastfeeding (OR= 7.00; 95%CI: 2.18-22.45; p=0.001), immunization history (OR= 2.53; 95%CI: 1.08-5.95 p=0.030), infectious diseases (OR= 3.50; 95%CI: 1.25-9.78; p=0.014) pregnancy complications (OR= 3.40; 95%CI: 1.13-10.17; p=0.024), and maternal knowledge (OR= 3.03; 95%CI: 1.28-7.14 p=0.010;) where H0 is rejected indicating that there is a relationship between the six variables and the incidence of Stunting in the work area of the Health and Family Planning Service of Pidie Jaya Regency (Table 2). Several factors were significantly associated with the incidence of stunting, wasting, and stunting plus wasting in toddlers during the COVID-19 pandemic in Pidie Jaya Regency (Table 3 to Table 19). These factors include exclusive breastfeeding status (Table 7), history of infectious diseases (Table 16), history of low birth weight (LBW) (Table 10), MP-ASI status (Table 12), and environmental sanitation (Table 18). The results of the Chi-Square test showed that exclusive breastfeeding had a significant relationship with the incidence of stunting (p = 0.003) (Table 7), while environmental sanitation showed a significant relationship with both wasting (p = 0.000) (Table 18) and a combination of stunting and wasting (p = 0.009) (Table 19). These findings confirm that breastfeeding practices and physical environmental conditions play an important role in determining children's nutritional status during a crisis such as a pandemic.

Furthermore, the data show that toddlers who are not exclusively breastfed (Table 7), live in environments with poor sanitation (Table 18), and have a history of infectious diseases (Table 16) and LBW (Table 10), have a higher risk of stunting and wasting. Although several factors such as gender (Table 4), parental education (Tables 5 and 6), and parental occupation (Tables 8 and 9) were also studied, not all of them showed significant relationships. This reinforces the importance of family-based and environment-based health interventions in preventing malnutrition. Overall, this study highlights the urgent need to strengthen the promotion of exclusive breastfeeding and improved sanitation as part of malnutrition control strategies in high-risk areas, especially in public health emergencies such as pandemics.

Table 1.  
Respondent characteristics (n = 93)

Variables	f	%
Stunting		
Stunting	54	58,06
No Stunting	39	41,94
Wasting		
Wasting	36	38,71
No Wasting	57	61,29
Stunting+ Wasting		
Stunting+ Wasting	24	25,81
No Stunting+ Wasting	69	74,19
Gender		
Woman	31	33,33
Man	62	66,67
Head of Family Education		
Elementary School/Islamic Elementary School	1	1,08
Junior High School/Islamic Junior High School	5	5,38
Senior High School/Islamic Senior High School	45	48,39
Diploma	23	24,73
Bachelor	19	20,43
Mother's Education		
Junior High School/Islamic Junior High School	4	4,30
Senior High School/Islamic Senior High School	37	39,78
Diploma	31	33,33
Bachelor	21	22,58
Head of Family Occupation		
Other	15	16,13
Doesn't work	5	5,38
Service	15	16,13
Civil Service Member	24	25,81
Trade/Self-Employed	34	36,56
Mother's Job		
Other	17	18,28
Doesn't work	54	58,06
Service	11	11,83
Civil Service Member	11	11,83
Mother Chronic Energy Deficiency		
Chronic Energy Deficiency	36	38,71
No Chronic Energy Deficiency	57	61,29
Antenatal Care		
Non-Standard	55	59,14
According to Standard	38	40,86
LBW		
LBW	18	19,35
No LBW	75	80,65
Exclusive Breastfeeding		
Not Exclusive Breastfeeding	28	30,11
Exclusive Breastfeeding	65	69,89
Complementary Foods for Breast Milk		
Non-Standard	45	48,39
According to Standard	48	51,61
Immunization History		
Non-Standard	55	59,14
According to Standard	38	40,86
Parenting		
Not good	13	13,98
Good	80	86,02

Variables	f	%
Infectious Diseases		
Once	27	29,03
Never	66	70,97
Pregnancy Complications		
Any	23	24,73
There isn't Any	70	75,27
Mother's Knowledge		
Not good	48	51,61
Good	45	48,39
Environmental Sanitation		
Not good	43	46,24
Good	50	53,76
Total Income		
< Minimum Wage	39	41,94
≥ Minimum Wage	54	58,06

Table 2.  
Bivariate analysis of risk factors for stunting in infants under two years old

Measurement Results	Stunting Variables				
	Stunting	Normal	OR	(95% CI)	P-Value
Mother Chronic Energy Deficiency (CED)					
CED	20 (55,56)	16 (44,44)	0,84	0,36-1,96	0,697
No CED	34 (59,65)	23 (40,35)			
Antenatal Care					
Non-Standard	32 (58,18)	23 (41,82)	1,01	0,43-2,33	0,978
According to Standard	22 (57,89)	16 (42,11)			
LBW					
LBW	15 (83,33)	3 (16,67)	4,61	1,23-17,27	*0,016
No LBW	39 (52,00)	36 (48,00)			
Exclusive Breastfeeding					
Not Exclusive					
Breastfeeding	24 (85,71)	4 (14,29)	7,00	2,18-22,45	*0,001
Exclusive Breastfeeding	30 (46,15)	35 (53,85)			
Complementary Foods for Breast Milk					
Non-Standard	29 (64,44)	16 (35,56)	1,66	0,72-3,83	0,227
According to Standard	25 (52,08)	23 (47,92)			
Immunization History					
Non-Standard	37 (67,27)	18 (32,73)	2,53	1,08-5,95	*0,030
According to Standard	17 (44,74)	21 (55,26)			
Parenting					
Not good	10 (76,92)	3 (23,08)	2,72	0,69-10,66	0,137
Good	44 (55,00)	36 (45,00)			
Infectious Diseases					
Once	21(77,78)	6 (22,22)	3,50	1,25-9,78	*0,014
Never	33 (50,00)	33 (50,00)			
Pregnancy Complications					
Any	18 (78,26)	5 (21,74)	3,40	1,13-10,17	*0,024
There isn't Any	36 (51,43)	34 (48,57)			
Mother's Knowledge					
Not good	34 (70,83)	14 (29,17)	3,03	1,28-7,14	*0,010
Good	20 (44,44)	25 (55,56)			
Environmental Sanitation					
Not good	28 (65,12)	15 (34,88)	1,72	0,74-3,98	0,201
Good	26 (52,00)	24 (48,00)			
Total Income					
< Minimum Wage	23 (58,97)	16 (41,03)	1,06	0,46-2,45	0,880
≥ Minimum Wage	31 (57,41)	23 (42,59)			

Table 3.  
Multivariate analysis of risk factors for stunting in infants under two years old

Variables	Stunting	
	OR (95% CI)	Sig Lower
Child Factor		
LBW	3,17 (0,75-13,38)	0,115
Exclusive Breastfeeding	5,19 (1,47-18,34)	0,011
Immunization History	1,93 (0,70-5,29)	0,199
Infectious Diseases	3,21 (1,01-10,12)	0,046
Maternal Factors		
Pregnancy Complications	4,40 (1,37-14,10)	0,013
Mother's Knowledge	3,71 (1,49-9,26)	0,005

Table 4.  
Multivariate analysis of model 1 of stunting risk factors in infants under two years old based on child and maternal factors.

Variables	Stunting	
	OR (95% CI)	Sig Lower
Exclusive Breastfeeding	9,37 (2,14-40,86)	0,003
Infectious Diseases	7,32 (1,85-28,95)	0,005
Parenting	2,82 (0,57-13,76)	0,199
Pregnancy Complications	8,10 (1,78-36,92)	0,007
Mother's Knowledge	7,82 (2,18-28,06)	0,002

Table 5.  
Multivariate analysis of the 2-factor model of stunting risk in infants under two years old based on child and environmental factors.

Variables	Stunting	
	OR (95% CI)	Sig Lower
LBW	3,17 (0,75-13,38)	0,115
Exclusive Breastfeeding	5,19 (1,47-18,34)	0,011
Immunization History	1,93 (0,70-5,29)	0,199
Infectious Diseases	3,21 (1,01-10,12)	0,046

Table 6.  
Multivariate analysis of the 3-factor model for stunting risk in infants under two years old based on maternal and environmental factors.

Variables	Stunting	
	OR (95% CI)	Sig Lower
ANC Visit		
Pregnancy Complications	4,40 (1,37-14,10)	0,013
Mother's Knowledge	3,71 (1,49-9,26)	0,005
Environmental Sanitation		

Table 7.  
Multivariate analysis of the 4-factor model of stunting risk in infants under two years old based on child, mother and environmental factors.

Variables	Stunting	
	OR (95% CI)	Sig Lower
Exclusive Breastfeeding	9,37 (2,14-40,86)	0,003
Infectious Diseases	7,32 (1,85-28,95)	0,005
Pregnancy Complications	8,10 (1,78-36,92)	0,007
Parenting	2,82 (0,57-13,76)	0,199
Mother's Knowledge	7,82 (2,18-28,06)	0,002

Table 8.  
Bivariate analysis of wasting risk factors in infants under two years old

Measurement Results	Wasting Variable				
	Wasting	Normal	OR	(95%CI)	P-Value
Mother Chronic Energy Deficiency (CED)					
CED	17 (47,22)	19 (52,78)			
No CED	19 (33,33)	38 (66,67)	1,78	0,76-4,20	0,180
Antenatal Care					
Non-Standard	29 (52,73)	26 (47,27)	4,93	1,86-13,11	*0,001
According to Standard	7 (18,42)	31 (81,58)			
LBW					
LBW	11 (61,11)	7 (38,89)	3,14	1,08-9,09	*0,030
No LBW	25 (33,33)	50 (66,67)			
Exclusive Breastfeeding					
Not Exclusive Breastfeeding	16 (57,14)	12 (42,86)	3,00	1,20-7,49	*0,017
Exclusive Breastfeeding	20 (30,77)	45 (69,23)			
Complementary Foods for Breast Milk					
Non-Standard	23 (51,11)	22 (48,89)	2,81	1,18-6,67	*0,017
According to Standard	13 (27,08)	35 (72,92)			
Immunization History					
Non-Standard	23 (41,82)	32 (58,18)	1,38	0,58-3,25	0,459
According to Standard	13 (34,21)	25 (65,79)			
Parenting					
Not good	6 (46,15)	7 (53,85)	1,42	0,43-4,65	0,552
Good	30 (37,50)	50 (62,50)			
Infectious Diseases					
Once	14 (51,85)	13 (48,15)	2,15	0,86-5,36	0,096
Never	22 (33,33)	44 (66,67)			
Pregnancy Complications					
Any	9 (39,13)	14(60,87)	1,02	0,38-2,68	0,962
There isn't Any	27 (38,57)	43 (61,43)			
Mother's Knowledge					
Not good	24 (50,00)	24 (50,00)	2,75	1,15-6,56	*0,021
Good	12 (26,67)	33 (73,33)			
Environmental Sanitation					
Not good	24 (55,81)	19 (44,19)	4,00	1,65-9,69	*0,002
Good	12 (24,00)	38 (76,00)			
Total Income					
< Minimum Wage	15 (38,46)	24 (61,54)	0,98	0,42-2,28	0,967
≥ Minimum Wage	21 (38,89)	33 (61,11)			

Table 9.  
Multivariate analysis of wasting risk factors in infants under two years old

Variables	Wasting	
	OR (95%CI)	Sig Lower
Child Factor		
LBW	2,22 (0,71-6,92)	0,166
Exclusive Breastfeeding	2,76 (1,06-7,23)	0,037
Providing complementary food	2,45 (0,98-6,12)	0,054
Maternal Factors		
ANC Visit	5,01 (1,83-13,67)	0,002
Mother's Knowledge	2,80 (1,11-7,10)	0,029
Environmental Factors		
Environmental Sanitation	4 (1,65-9,62)	0,002

Table 10.

Multivariate analysis of model 1 of wasting risk factors in infants under two years old based on child and maternal factors.

Variables	Wasting	
	OR (95%CI)	Sig Lower
Exclusive Breastfeeding	3,66 (1,22-10,95)	0,020
Infectious Diseases	3,12 (1,02-9,51)	0,044
Mother Chronic Energy Deficiency	2,15(0,78-5,91)	0,137
ANC Visit	5,80(1,92-17,44)	0,002
Mother's Knowledge	3,19(1,16-8,77)	0,025

Table 11.

Multivariate analysis of the 2-factor model of wasting risk in infants under two years old based on child and environmental factors.

Variables	Wasting	
	OR (95%CI)	Sig Lower
LBW	2,29 (0,68-7,74)	0,180
Exclusive Breastfeeding	2,70 (0,94-7,69)	0,063
Providing complementary food	3,72 (1,30-10,61)	0,014
Environmental Sanitation	5,61 (1,98-15,87)	0,001

Table 12.

Multivariate analysis of the 3-factor model for wasting risk in infants under two years old based on maternal and environmental factors.

Variables	Wasting	
	OR (95%CI)	Sig Lower
ANC Visit	8,49(2,62-27,51)	0,000
Mother's Knowledge	2,38 (0,87-6,49)	0,089
Environmental Sanitation	6,39 (2,14-19,08)	0,001

Table 13.

Multivariate analysis of the 4-factor model of wasting risk in infants under two years old based on child, mother and environmental factors.

Variables	Wasting	
	OR (95%CI)	Sig Lower
ANC Visit	15,60 (3,37-72,07)	0,000
Exclusive Breastfeeding	5,83 (1,39-24,34)	0,016
Providing complementary food	4,66 (1,15-18,84)	0,031
Infectious Diseases	2,91 (0,80-10,55)	0,103
Mother Chronic Energy Deficiency	3,33 (0,89-12,43)	0,073
Parenting	0,07 (0,00-0,89)	0,040
Mother's Knowledge	2,37 (0,72-7,77)	0,151
Environmental Sanitation	16,44 (3,68-73,47)	0,000

Table 14.

Bivariate analysis of risk factors for stunting and wasting in infants under two years old

Stunting and Wasting Variables	Stunting and Wasting Variables				
	Stunting and Wasting	Normal	OR	(95%CI)	P-Value
Mother Chronic Energy Deficiency (CED)					
CED	8 (22,22)	28 (77,78)			
No CED	16 (28,07)	41 (71,93)	0,73	0,27-1,94	0,530
Antenatal Care					
Non-Standard	16 (29,09)	39(70,91)			
According to Standard	8 (21,05)	30 (78,95)	1,53	0,58-4,07	0,384

Stunting and Wasting Variables	Stunting and Wasting Variables				
	Stunting and Wasting	Normal	OR	(95%CI)	P-Value
LBW					
LBW	4 (22,22)	14 (77,78)	0,78	0,23-2,67	0,699
No LBW	20 (26,67)	55 (73,33)			
Exclusive Breastfeeding					
Not Exclusive Breastfeeding	11 (39,29)	17 (60,71)			
Exclusive Breastfeeding	13 (20,00)	52 (80,00)	2,58	0,97-6,84	0,051
Complementary Foods for Breast Milk					
Non-Standard	11 (24,44)	34 (75,56)			
According to Standard	13 (27,08)	35 (72,92)	0,87	0,34-2,21	0,771
Immunization History					
Non-Standard	17 (30,91)	38 (69,09)			
According to Standard	7 (18,42)	31 (81,58)	1,98	0,72-5,38	0,176
Parenting					
Not good	4 (30,77)	9 (69,23)	1,33	0,37-4,80	0,659
Good	20 (25,00)	60 (74,19)			
Infectious Diseases					
Once	5 (18,52)	22 (81,48)			
Never	19 (28,79)	47 (71,21)	0,56	0,18-1,70	0,304
Pregnancy Complications					
Any	6 (26,09)	17 (73,91)			
There isn't Any	18 (25,71)	52 (74,29)	1,01	0,34-2,98	0,972
Mother's Knowledge					
Not good	14 (29,17)	34 (70,83)			
Good	10 (22,22)	35 (77,78)	1,44	0,56-3,68	0,444
Environmental Sanitation					
Not good	17 (39,53)	26 (60,47)			
Good	7 (14,00)	43 (86,00)	4,01	1,46-10,98	*0,005
Total Income					
< Minimum Wage	9 (23,08)	30 (76,92)	0,78	0,30-2,02	0,609
≥ Minimum Wage	15 (27,78)	39 (72,22)			

Table 15.

Multivariate analysis of risk factors for stunting and wasting in infants under two years old

Variables	Stunting	
	OR (95%CI)	Sig Lower
Child Factor		
Exclusive Breastfeeding	2,58 (0,97-6,84)	0,055
Environmental Factors		
Environmental Sanitation	4,01(1,46-10,98)	0,007

Table 16.

Multivariate analysis of model 1 of risk factors for stunting and wasting in infants under two years old based on child and maternal factors.

Variables	Stunting + Wasting	
	OR (95%CI)	Sig Lower
Exclusive Breastfeeding	2,58 (0,97-6,84)	0,055

Table 17.

Multivariate analysis of the 2-factor model for stunting and wasting risk in infants under two years old based on child and environmental factors.

Variables	Stunting+ Wasting	
	OR (95%CI)	Sig Lower
Exclusive Breastfeeding	2,43(0,88-6,73)	0,086
Environmental Sanitation	2,86(1,39-10,75)	0,009

Table 18.

Multivariate analysis of the 3-factor model for stunting and wasting risk in infants under two years old based on maternal and environmental factors.

Variables	Stunting+ Wasting	
	OR (95%CI)	Sig Lower
ANC Visit		
Pregnancy Complications		
Mother's Knowledge		
Environmental Sanitation	4,01 (1,46-10,98)	0,007

Table 19.

Multivariate analysis of the 3-factor model for stunting and wasting risk in infants under two years old based on maternal and environmental factors.

Variables	Stunting+ Wasting	
	OR (95%CI)	Sig Lower
ANC Visit		
Exclusive Breastfeeding	2,43 (0,88-6,73)	0,086
Providing complementary food		
Infectious Diseases		
Pregnancy Complications		
Mother Chronic Energy Deficiency		
Parenting		
Mother's Knowledge		
Environmental Sanitation	3,86 (1,39-10,75)	0,009

## DISCUSSION

The results of this study are in line with research conducted by Agustina and Hamisah (2019) which stated that toddlers who do not receive exclusive breastfeeding have a greater risk of stunting compared to toddlers who receive exclusive breastfeeding. Then the results of the multivariate analysis of Rahmawati et al. (2019) showed that giving exclusive breastfeeding to the high-risk category would be at greater risk of having a child with stunting 7.9 times. Exclusive breastfeeding is breast milk given by mothers when babies are six months old without additional fluids or other solid foods (Palino & Majid, 2017). Toddlers who are given exclusive breastfeeding according to their needs can reduce the risk of stunting. This is because at the age of 0-6 months, mothers of toddlers who provide exclusive breastfeeding can form immunity or immunity in toddlers so that they can avoid infectious diseases (Aridiyah & Rohmawati, 2015). In addition, infants under two years old who experience infectious diseases have a 7 times greater risk of experiencing Stunting compared to toddlers who do not experience infectious diseases. This is in accordance with the statement of Mentari and Hermansyah (2018) that there is a correlation between infectious diseases and Stunting status. Poor hygiene practices can cause bacteria to appear. Bacteria can enter through food that is usually served and can affect the child's health, one of which is diarrhea and can cause children to lose fluids and a number of nutrients that are essential for the body (Haq & Abbas, 2022).

Based on the statistical results of this study, it is known that mothers who experience pregnancy complications are 8 times more likely to give birth to children with Stunting. This is in line with research conducted by Priyanti and Syalfina (2018) which states that mothers with pregnancy complications are 4.024 times more likely to have children with Stunting than mothers without pregnancy complications (OR = 4.024; 95% CI 1.131–14.315; P = 0.032;). Stunting in children mostly occurs in mothers with pregnancy complications and children who are not stunted mostly occur in mothers without complications during pregnancy (Priyanti & Syalfina, 2018). The results of this study also show that maternal knowledge about nutritional

problems is related to the incidence of Stunting in infants under two years old, the results of the logistic regression analysis obtained an odds ratio value of 6.15, this indicates that poor maternal knowledge can increase the risk of Stunting 6 times greater than mothers who have good knowledge about nutrition. This is in line with the research of Kusumawati et al. (2015) which states that poor maternal knowledge has a risk of increasing the incidence of Stunting 3.27 times greater than good maternal knowledge.

Mother's knowledge of nutrition greatly determines the mother's behavior in providing food for her child. Mothers with good nutritional knowledge can provide food with the right type and amount to support the growth and development of toddlers (Aridiyah & Rohmawati, 2015). Knowledge of nutrition can be obtained from formal education or other information such as radio, TV, internet, newspapers, magazines, counseling and others (Margawati & Astuti, 2018). Toddlers who do not receive exclusive breastfeeding have a 5 times greater risk of wasting. This study is in accordance with the results of the study by Rochmawati et al. (2016) which stated that there is a significant relationship between exclusive breastfeeding and wasting in the Saigon Health Center and Perumnas II Health Center Working Areas, an OR value of 3.946 was obtained, indicating that toddlers who are not exclusively breastfed have a 3.946 times greater risk of experiencing thin nutrition. The results of the analysis by Rahayu et al. (2018) also showed that there is a significant relationship between exclusive breastfeeding status and wasting, statistically obtaining an OR value of 3.41, meaning that toddlers who do not receive exclusive breastfeeding have a 3 times greater risk of wasting. This is because breast milk is very important for the health and survival of children. In Indonesia, exclusive breastfeeding is highly recommended for babies under six months of age. In breast milk there is colostrum which is a golden liquid, a protective liquid rich in anti-infection substances and high protein which is released on the first and second day after giving birth. Colostrum contains more protein and anti-infection substances 10-17 times more than mature breast milk, so it can increase the growth process in the baby's digestive system and protect the baby against bacteria and viruses.

In addition to exclusive breastfeeding, providing complementary foods can also prevent stunting in toddlers, because good nutritional status can be achieved if the body gets enough substances that will be used efficiently, allowing optimal growth and development of toddlers. The results of this study showed that toddlers with wasting conditions were greater in the group that received non-standard complementary foods by 51.11% and the multivariate statistical results obtained an OR value of 4.66, meaning that toddlers who received non-standard complementary foods were at 4 times greater risk of wasting. This is in line with research by Zogara et al. (2021) which stated that toddlers who received early complementary foods experienced more problems with being thin and very thin compared to toddlers who received complementary foods on time. Early provision of complementary foods can interfere with exclusive breastfeeding and make babies susceptible to disease because digestive enzymes in babies have not reached sufficient levels to digest coarse food until the age of 6 months (Zogara et al., 2021). The assumption of researchers in Pidie Jaya Regency is that there are still many mothers who provide complementary foods that are not in accordance with standards, one of which is providing complementary foods before the age of 6 months, due to ignorance of providing complementary foods because mothers during pregnancy do not receive information about complementary foods.

The results of this study also show that ANC visits are related to the incidence of Wasting in toddlers, the results of the logistic regression analysis obtained an OR value of 15.60, this indicates that mothers who do not make ANC visits according to standards can increase the risk of Stunting 6 times greater than mothers who make ANC visits according to standards. The assumption of researchers in Pidie Jaya Regency is that there are still many pregnant

women who make ANC visits not according to standards by 59.14%. This is due to the lack of information about the importance of ANC visits, coupled with the conditions of the Covid-19 pandemic which has caused a negative stigma about health services in the eyes of the community. The results of this study are in line with Triveni (2020) research showing that mothers who do not make ANC visits experience a risk factor 3 times greater for Wasting in toddlers. Mothers who make ANC visits are less likely to experience malnutrition (Khan et al., 2019). Woldeamanuel and Tesfaye (2019) study identified ANC visits as a predictor of Wasting in toddlers, based on multivariate tests it was found that babies born to mothers who did not make at least 4 ANC visits had a much greater risk of Wasting. Previous research by Amare et al. (2016) stated that follow-up ANC care during pregnancy was significantly associated with decreased Wasting.

Antenatal Care (ANC) is a health service provided to pregnant women periodically to maintain the safety of the mother and fetus (Kawungezi et al., 2015). Mothers who visit ANC will get the health information needed by the mother regarding pregnancy or nutritional fulfillment including information on choosing a helper and place of delivery (Triveni, 2020). The results of this study are also in line with the research of Triveni and Hasnita (2021) on the incidence of Wasting and Environmental Sanitation with a p-value of 0.008 and OR 3.835. Wulandari's research (2020) stated that poor Environmental Sanitation has a risk of Wasting 13.5 times greater than good Environmental Sanitation, obtained a p-value of 0.048 <0.05, meaning that there is a significant relationship between environmental sanitation and the incidence of Wasting. The results of Andolina analysis (2021) obtained an OR value = 5.164, which means that poor sanitation has a 5 times greater chance of suffering from Wasting. Multivariate analysis of model 3 (Table 18) was conducted to see the relationship between maternal and environmental factors with the determinants of Stunting+Wasting, the results of the analysis showed that the significant variable with the determinants of Stunting+Wasting was Environmental Sanitation (OR= 4.01; 95%CI: 1.46-10.98; p=0.007). Furthermore, a multivariate test of model 4 was conducted (Table 19) to see the relationship between child, maternal and environmental factors with the determinants of Stunting+Wasting, based on the results of the analysis it can be seen that of the three factors, the most significant with the determinants of Stunting+Wasting is the Environmental Sanitation variable (OR= 4.01; 95%CI: 1.46-10.98; p=0.007).

The results of this study are in line with the research of Kusumawati & Rahardjo (2015) which stated that poor environmental sanitation increases the incidence of Stunting 8.28 times greater than poor environmental sanitation. Households that have better drinking water sources are 35% less likely to experience Stunting compared to households that have unsafe drinking water sources, in addition, families who process drinking water to make it safe to use are also significantly less likely to experience it. Childhood Stunting (Haq & Abbas, 2022). Research by B. T. Woldeamanuel & T. T. Tesfaye (2019) The chance of Stunting in children from families using protected drinking water is 0.68 (OR 0.68, 95% CI: 0.50- 0.92) times lower than children from families using unprotected drinking water. The results of Rahayu et al.'s (2018) multivariate analysis showed that there was a positive relationship between sanitation and the incidence of Stunting and Wasting (OR = 8.51; CI95% 2.24- 32.33; p = 0.002), this study states that households that do not have access according to the criteria will be at greater risk of Stunting and Wasting. Environmental sanitation has a fairly dominant role in providing support for children's growth and development (Rahayu et al., 2018). Poor sanitation is closely related to settlements. Settlements with poor environmental sanitation, such as the lack of clean water, toilets, garbage disposal sites, and the lack of wastewater drainage channels, make it possible for someone to suffer from infectious diseases (Haq & Abbas, 2022).

## CONCLUSION

During the Covid-19 pandemic, the main determinants of stunting in infants under two years old were lack of exclusive breastfeeding, infectious diseases, pregnancy complications, and low maternal knowledge; while wasting was most significantly influenced by ANC visits that did not meet standards, not receiving exclusive breastfeeding, providing inappropriate complementary foods, and poor environmental sanitation. For cases of combined stunting and wasting, environmental sanitation was the most dominant risk factor. Researchers are now conducting further studies with in-depth interviews regarding the low coverage of exclusive breastfeeding, ANC visits, and immunization

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