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Nutritional Status of Children Aged 6-59 Months Based on Composite Index of Anthropometric Failure

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Abstract

Composite Index Anthropometric Failure (CIAF) is an alternative indicator for assessing nutritional status in children which can identify all children who are malnourished, whether they are stunting, wasting, underweight, wasting and underweight, stunting and underweight, or a combination of all three. The problem of failure to thrive in children aged 6-59 months based on CIAF in Bojongsari District, Depok City, in 2023 is 29,8%. This figure is higher than conventional measurements with single indicators of stunting, wasting, and underweight in Depok City based on the 2023 SKI, respectively, namely 14.3%, 5.8%, and 12.8%. The research aims to determine the determinants of the nutritional status of children aged 6-59 months based on CIAF in Bojongsari District, Depok City, West Java Province in 2023. This quantitative research with a cross-sectional study design used secondary data, and data analysis was conducted using the Chi-square test and multiple logistic regression. There were 317 children aged 6-59 months in this study. Bivariate analysis showed that variables related to children's nutritional status based on CIAF were energy intake, protein intake, fat intake, and carbohydrate intake. Multivariate analysis shows that energy intake is the risk factor in children's nutritional status based on CIAF in children aged 6-59 months in Bojongsari District, Depok City, West Java Province in 2023 after controlling for the variables protein intake and fat intake (p=0.006; OR = 3.493, 95% CI = 1.428 – 8.543).

Introduction

This study used a quantitative method with a cross-sectional research design to obtain an overview of the relationship between independent and dependent variables at the same time of observation. The study used secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023". The study population consisted of all children aged 0–59 months in the Bojongsari subdistrict, Depok City, West Java, who were registered as respondents in the primary study, totaling 359 children. The study sample was obtained using non-probability sampling with the total sampling method, and the test power was calculated using the hypothesis test formula for the difference between two proportions. The sample was determined based on inclusion and exclusion criteria. The inclusion criteria for the secondary study were children aged 6–59 months at the time of measurement. Meanwhile, the exclusion criteria for this study were if the Z-score for PB or TB/U was <-5 or >4, the Z-score for BB/U was <-5 or >8, and the Z-score for BB/TB or PB was <-4 or >8 (CDC, 2023). The number of secondary data samples was 317 children.

The independent variables used were energy intake, protein intake, fat intake, carbohydrate intake, animal

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protein consumption, dietary diversity, history of diarrhea, birth weight, complete basic immunization status, vitamin A supplementation status, food insecurity, use of contraceptives, number of family members, access to safe drinking water, and water management. The dependent variable studied was the nutritional status of children based on the CIAF. The secondary data in this study were obtained by reviewing the questionnaires used to collect data on child factors, family factors, and environmental factors. A 1x24-hour recall sheet was used to obtain data on infants' nutritional intake, an FFQ sheet was used to obtain data on animal protein consumption habits, and anthropometric measurements were used to obtain data on infants' nutritional status. Secondary data analysis was conducted in March–April 2024 at the Faculty of Public Health, University of Indonesia, Depok. The data analysis used in this study included univariate analysis to determine the frequency distribution of each variable studied, bivariate analysis using the Chi-Square test to determine the relationship between dependent and independent variables, and multivariate analysis using a logistic regression model to obtain the best independent variable model for predicting dependent variable outcomes.

Result And Discussion

Assessment of children's nutritional status based on the CIAF is more prevalent than the three conventional nutritional status

TABLE 1. Distribution of Respondents' Nutritional Status

Indicator	Number (n)	Presentation (%)
Weight-for-age (WAZ)		
Severely underweight	9	2,8
Underweight	32	10,1
Normal	247	77,9
Risk of overweight	29	9,1
Length/Height-for-age (HAZ)		
Severely stunted	22	6,9
Stunted	42	13,2
Normal	248	78,2
High	5	1,6
Weight-for-height (WHZ)		
Severely wasted	7	2,2
Wasted	24	7,6
Normal	232	73,2
Possible risk of being overweight	34	10,7
Overweight	14	4,4
Obese	6	1,9
CIAF		
Normal/no failure (A)	219	69,1
Wasting only (B)	14	4,4
Underweight & wasting (C)	14	4,4
Underweight, wasting, & stunting (D)	3	0,9
Underweight & stunting (E)	18	5,7
Stunting only (F)	43	13,6
Underweight only (Y)	6	1,9
Growth Failure (B+C+D+E+F+Y)	98	30,9

Source: Secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023".

indicators. Table 1 presents the distribution of nutritional status in children aged 6-59 months.

Table 1 shows that, based on conventional indices, children aged 6-59 months who experienced total underweight and severely underweight amounted to 12.9%, stunting and severely stunted amounted to 20.1%, and wasting and severely wasted amounted to 9.8%. The total number of children aged 6-59 months who experienced growth failure based on the CIAF was 30.9%. The largest category of growth failure was in category F, or only stunting, which

TABLE 2. Recapitulation of Univariate Analysis Results

Variable	Number (n)	Presentation (%)
Energy Intake		
Less (<100% AKG)	188	59,3
Adequate (≥100% AKG)	129	40,7
Protein Intake		
Less (<100% AKG)	37	11,7
Adequate (≥100% AKG)	280	88,3
Fat Intake		
Less (<100% AKG)	178	56,2
Adequate (≥100% AKG)	139	43,8
Carbohydrate Intake		
Less (<100% AKG)	253	79,8
Adequate (≥100% AKG)	64	20,2
Animal Protein Consumption Habits		
Non-Often (< mean)	155	48,9
Frequently (≥ mean)	162	51,1
Food Diversity		
Non-diverse (Skor < 5)	171	53,9
Diverse (Skor ≥ 5)	146	46,1
Diarrhea History		
Yes	66	20,8
No	251	79,2
Birth Weight		
Low Birth Weight (LBW) (< 3000 grams)	139	43,8
Normal (≥3000 grams)	178	56,2
Complete Basic Immunization Status		
Incomplete	123	38,8
Complete	194	61,2
Vitamin A Status		
Not Provided	45	14,2
Provided	272	85,8
Food Insecurity		
Vulnerable	196	61,8
Non-Vulnerable	121	38,2
Use of Family Planning Tools		
Not Using Family Planning	117	36,9
Using Family Planning	200	63,1
Number of Household Members		

Variable	Number (n)	Presentation (%)
Large (> 4 people)	118	37,2
Small (≤ 4 people)	199	62,8
Proper Drinking Water Facilities		
Not Proper	73	23,0
Proper	244	77,0
Drinking Water Management		
Unboiled (Water Not Boiled Before Consumption)	111	35
Boiled (Water Boiled Before Consumption)	206	65

Source: Secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023".

amounted to 13.6%. The results of univariate analysis in this study are presented in Table 2.

Most of the energy intake in children aged 6-59 months was in the less category (59.3%), protein intake was in the sufficient category (88.3%), fat intake was in the less category (56.2%), and carbohydrate intake was in the less category (79.8%). Animal protein consumption habits in children aged 6-59 months were mostly in the frequent category (51.1%), while food diversity was in the non-diverse category (53.9%). The results of the study of diarrhea history in children 6-59 months showed that most were in the category of having no history of diarrhea (79.2%). The birth weight of children aged 6-59 months was mostly in the normal category (56.2%). Most children aged 6-59 months in this study had complete basic immunization status in the complete category (61.2%) and vitamin A status in the provided category (85.8%). In the family factor, the highest percentage in the food insecurity variable was in the vulnerable category (61.8%), using family planning (63.1%), and the number of household members in the small category (62.8%). The environmental factor shows that the highest percentage in the variable of proper drinking water facilities is the proper category (77.0%) and drinking water management by boiling (65%).

The results of bivariate analysis showed that there were 4 variables associated (p-value <0.05) with nutritional status based on CIAF in children aged 6-59 months, namely energy intake, protein intake, fat intake, and carbohydrate intake. This shows that children aged 6-59 months who have less energy intake have a 4.568 times greater risk of experiencing growth failure based on CIAF than children who have sufficient intake. Based on the protein intake variable, it shows that children with insufficient protein intake have a 2.368 times higher risk of experiencing growth failure than children with adequate protein intake. The fat intake variable shows that children with insufficient fat intake have a 2.952 times higher risk of growth failure than children with sufficient fat intake. The carbohydrate intake variable shows that children with insufficient carbohydrate intake have a 3.316 times higher risk of experiencing growth failure than children with sufficient carbohydrate intake. A

TABLE 3. Recapitulation of bivariate analysis results

Variable	Nutritional Status Based on CIAF						OR (95% CI)	P-value
	Growth Failure		Normal		Total			
	n	%	n	%	N	%		
Energy Intake								
Less (<100% AKG)	80	42,6	108	57,4	188	100	4,568 (2,568-8,125)	<0,001*
Adequate (≥100% AKG)	18	14,0	111	86,0	129	100		
Protein Intake								
Less (<100% AKG)	18	48,6	19	51,4	37	100	2,368 (1,182-4,745)	0,022*
Adequate (≥100% AKG)	80	28,6	200	71,4	280	100		

Variable	Nutritional Status Based on CIAF						OR (95% CI)	P-value
	Growth Failure		Normal		Total			
	n	%	n	%	N	%		
Fat Intake								
Less (<100% AKG)	72	40,4	106	59,6	178	100	2,952 (1,754-4,970)	<0,001*
Adequate (≥100% AKG)	26	18,7	113	81,3	139	100		
Carbohydrate Intake								
Less (<100% AKG)	89	35,2	164	64,8	253	100	3,316 (1,566-7,024)	0,002*
Adequate (≥100% AKG)	9	14,1	55	85,9	64	100		
Animal Protein Consumption Habits								
Non-Often (< mean)	54	34,8	101	65,2	155	100	1,434 (0,889-2,314)	0,175
Frequently (≥ mean)	44	27,2	118	72,8	162	100		
Food Diversity								
Non-diverse (Skor < 5)	56	32,7	115	67,3	171	100	1,206 (0,746-1,949)	0,520
Diverse (Skor ≥ 5)	42	28,8	104	71,2	146	100		
Diarrhea History								
Yes	21	31,8	45	68,2	66	100	1,055 (0,588-1,890)	0,977
No	77	30,7	174	69,3	251	100		
Birth Weight								
LBW (< 3000 grams)	47	33,8	92	66,2	139	100	1,272 (0,788-2,053)	0,387
Normal (≥3000 grams)	51	28,7	127	71,3	178	100		
Complete Basic Immunization Status								
Incomplete	42	34,1	81	65,9	123	100	1,278 (0,787-2,076)	0,386
Complete	56	28,9	138	71,1	194	100		
Vitamin A Supplementation Status								
Not Provided	9	20,0	36	80,0	45	100	0,514 (0,237-1,114)	0,124
Provided	89	32,7	183	67,3	272	100		
Food Insecurity								
Vulnerable	66	33,7	130	66,3	196	100	1,412 (0,856-2,330)	0,220
Non-Vulnerable	32	26,4	89	73,6	121	100		
Use of Family Planning Tools								
Not Using Family Planning	36	31,0	80	69,0	116	100	1,009 (0,615-1,654)	1,000
Using Family Planning	62	30,8	139	69,2	201	100		
Number of Household Members								
Large (> 4 people)	38	32,2	80	67,8	118	100	1,100 (0,674-1,797)	0,798
Small (≤ 4 people)	60	30,2	139	69,8	199	100		
Proper Drinking Water Facilities								
Not Proper	23	31,5	50	68,5	73	100	1,037 (0,590-1,821)	1,000
Proper	75	30,7	169	69,3	244	100		
Drinking Water Management								
Unboiled (Water Not Boiled Before Consumption)	28	25,2	83	74,8	111	100	0,655 (0,391-1,098)	0,138
Boiled (Water Boiled Before Consumption)	70	34,0	136	66,0	206	100		

*P-value <0.05 (significant)

Source: SPSS analysis from secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023".

recapitulation of the bivariate analysis results is presented in Table 3.

In the next stage, candidate variables were selected by bivariate analysis of independent variables with dependent variables. The variables of energy intake, protein intake, fat intake, carbohydrate intake, animal protein consumption habits, vitamin A provision status, food insecurity, and drinking water management can continue to the modeling stage because they have a p-value <0.25. The variable of birth weight also continues to the modeling stage because it is considered important in the substance where birth weight is a factor that directly affects the nutritional status of children. The bivariate selection results

TABLE 4. Bivariate analysis results

Variable	P-value	Description
Energy Intake	<0,001*	Multivariate advanced
Protein Intake	0,016*	Multivariate advanced
Fat Intake	0,000*	Multivariate advanced
Carbohydrate Intake	0,001*	Multivariate advanced
Animal Protein Consumption Habits	0,139*	Multivariate advanced
Food Diversity	0,586	Not multivariate advanced
Diarrhea History	0,859	Not multivariate advanced
Birth Weight	0,325**	Multivariate advanced (substance)
Complete Basic Immunization	0,323	Not multivariate advanced
Vitamin A Supplementation Status	0,077*	Multivariate advanced
Food Insecurity	0,174*	Multivariate advanced
Use of Family Planning Tools	0,972	Not multivariate advanced
Number of Household Members	0,703	Not multivariate advanced
Proper Drinking Water Facilities	0,901	Not multivariate advanced
Drinking Water Management	0,104*	Multivariate advanced

*p-value <0.25; ** important in substance
Source: SPSS analysis from secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023"

TABLE 5. Multivariate First Model Results

Variable	P-value	aOR	95%CI
Energy Intake	0,006	3,493	1,428 – 8,543
Protein Intake	0,372	1,416	0,660 – 3,035
Fat Intake	0,638	1,183	0,587 – 2,384
Carbohydrate Intake	0,974	1,017	0,385 – 2,682
Animal Protein Consumption Habits	0,632	1,141	0,664 – 1,960
Birth Weight	0,712	0,908	0,543 – 1,517
Vitamin A Supplementation Status	0,115	0,507	0,218 – 1,180
Food Insecurity	0,486	1,218	0,700 – 2,119
Drinking Water Management	0,497	0,823	0,470 – 1,442

*p-value <0.05 (significant)
Source: SPSS analysis from secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023".

are presented in Table 4.

The first results of multivariate modeling are presented in Table 5. The multivariate modeling stages can be seen in Table 5. The table shows that modeling was then carried out, consisting of nine stages of multivariate analysis modeling. The modeling stages are carried out by looking from the largest p-value to the smallest and analyzing all variables simultaneously.

Furthermore, the interaction test was conducted on variables that were suspected to have substantial interaction, namely protein intake and energy intake. The results of the interaction test resulted in a p-value = 0.000 (p-value> 0.05), which means there is no interaction between protein intake and energy intake. Then, the interaction test was conducted again on fat intake and energy intake. The analysis results obtained p-value=0.269 (p-value>0.05), which means there is no interaction between fat intake and energy intake. Modeling has been completed; the valid model is a model without any interaction.

The final model was obtained after bivariate selection, and then modeling and interaction tests were conducted. The multivariate analysis showed that there was a variable that was significantly associated with children's nutritional status based on CIAF, namely energy intake (p-value=0.001). Energy intake was the dominant variable associated with children's nutritional status based on CIAF, with OR=3.663 (95% CI: 1.759 - 7.629). This means that children aged 6-59 months with insufficient energy intake have a 3.663 times higher risk of growth failure than children aged 6-59 months with sufficient energy intake after controlling for protein intake and fat intake. The final modeling results are presented in Table 6.

The results of this study are based on the results of conventional nutritional status indicators of children aged 6-59 months in Bojongsari Subdistrict, Depok City, which showed that 20.1% of children were stunted, 9.8% of children were wasted, and 12.9% were underweight. The prevalence of stunting, wasting, and underweight in an area is said to be a public health problem if, respectively, the prevalence is >20%, >5%, and >10% (WHO, 2022; De Onis *et al*., 2019). Based on the latest Indonesian Health Survey (IHS) data in 2023, the prevalence of stunting, wasting, and underweight in Depok City was 14.3%, 5.8%, and 12.8%, respectively (Kemenkes RI, 2023). When compared to the 2023 IHS results, the prevalence of underweight, stunting, and wasting in Bojongsari Sub-district in 2023 is still above the prevalence of Depok City.

The results of the study based on CIAF showed that the composite of children aged 6-59 months who experienced growth failure was 30.9%. In contrast, 69.1% of children had a normal nutritional status / no anthropometric failure. When compared with the results of the prevalence of nutritional status based on CIAF with research in other countries, these results are still lower than some studies such as in India (58.59%) (Dhok & Thakre, 2016), Bangladesh (48,3%) (Islam & Biswas, 2019), dan Ethiopia (46.7%) (Workie & Tesfaw, 2021). Here were 19.9% of children with one growth failure (categories B, F, Y), 10.1% of children with two growth failures (categories C and E), and 0.9% of children with three growth failures (category D). A study conducted in India stated that children who experienced more than one growth failure had a significantly increased risk of morbidity and mortality compared to the group of children who experienced only one growth failure (Nandy *et al*., 2005). Children with three growth failures based on CIAF have the highest risk of morbidity (Dewan *et al*.,

TABLE 6. Final Multivariate Modeling Results

Variable	B	P-Value	aOR	95% CI (Lower – Upper)
Energy Intake	1,298	0,001*	3,663	1,759 – 7,629
Protein Intake	0,325	0,380	1,384	0,646 – 2,508
Fat Intake	0,242	0,485	1,273	0,670 – 2,856

*P-value <0.05 (significant)

Source: SPSS analysis from secondary data from the results of primary research entitled "Analysis of Risk Factors for Stunting in Toddlers during the COVID-19 Pandemic Transition Period in Depok City in 2023".

2016). The nutritional status of children can be known as a whole, especially when it can detect children who experience growth failure as a whole, so that it is expected to be the basis for making countermeasures or prevention programs for growth failure. Because if based only on one conventional nutritional status indicator, children who experience other nutritional status problems cannot be addressed, and children who experience more than one condition of growth failure cannot be identified.

The results of this study derived from child factors, there is a relationship between energy intake and less associated with growth failure, based on CIAF in children aged 6-59 months. In this study, children with less energy intake had a 4.568 times higher risk of experiencing growth failure than toddlers with sufficient energy intake. This is supported by research in India conducted on children under five years of age, also stating that toddlers with less energy intake have a 2.4 times higher risk of experiencing growth failure based on CIAF than toddlers with sufficient energy intake (Mohandas *et al*., 2023). After controlling for variables such as infectious diseases, fat intake, and carbohydrate intake, children with insufficient energy intake have a 5.9 times higher risk of stunting than toddlers with adequate energy intake (Werdani & Utari, 2020). Energy sources from food consist of several key nutrients, such as carbohydrates, protein, and fat, which are essential for growth, metabolism, and physical activity. Lack of energy intake can result in energy imbalance, which in turn can lead to nutritional problems such as Chronic Energy Deficiency (CED) and impact on a person's weight change (Bidira *et al*., 2021).

Other results from this study indicate that insufficient protein intake is a risk factor for growth failure based on CIAF (OR = 2.368). The study showed the tendency of respondents to consume sufficient protein intake, namely 88.3%. However, when viewed from the proportion of energy intake in children aged 6-59 months, most had insufficient energy intake (59.3%). Adequate energy intake to meet the needs of children will lead to a protein-sparing effect. This means that with sufficient energy intake, protein can be used for growth and tissue repair, rather than being used as an energy source (Balogun *et al.*, 2021). Most of the energy, fat, and carbohydrate intake of children aged 6-59 months in this study fell into the deficient category. When energy intake is deficient, along with fat and carbohydrate intake, protein is used as an energy source (Sahani *et al*., 2025). Adequate intake of overall energy, protein, fat, and carbohydrate can avoid growth failure in children.

In the fat intake variable, children with less fat intake have a 2.952 times higher risk of experiencing growth failure than toddlers with sufficient fat intake. In line with research in Karangmulyan village on 141 toddlers, which states that toddlers with insufficient fat intake have a 1.5 times higher risk of experiencing nutritional problems based on CIAF than toddlers with adequate fat intake (Anisadiyah & Sartika, 2022). Lack of fat intake, which then results in a decrease in energy in the body, can cause changes in body mass and tissue (Bidira *et al*., 2021). Other results from this study stated that children who have less carbohydrate intake have a 3.316 times higher risk of experiencing growth failure. This is in line with research in Bengkulu City, which suggests that toddlers with insufficient carbohydrate intake have an 8 times higher risk of experiencing growth failure compared to children with sufficient carbohydrate intake (Gassara & Chen, 2021).

Toddlers need adequate protein intake, especially from animal protein sources, to support optimal growth and development (Gropper *et al*., 2021). However, this study did not find a significant relationship between animal protein consumption habits and growth failure based on CIAF. These results are in line with experimental research in East Nusa Tenggara, which showed that there was no significant difference in changes in the nutritional status of toddlers before and after being given moringa nuggets to stunted children (Ariesthi *et al*., 2021). Another study mentioned that the habit of consuming milk during the day or at night was a protective factor against stunting based on CIAF in children aged 6-59 months in India (Vanderhout & Corsi, 2021). The non-significant results of the study could be due to the qualitative nature of the FFQ used in

this study, so researchers did not assess the size of the food consumed at each meal. Increased consumption of various foodstuffs indicates food diversity and can meet the nutritional needs of children completely (Rakotonirainy *et al*., 2018) . The insignificant relationship between food diversity and growth failure can be influenced because the diversity of food consumption cannot be assessed in terms of the portion and amount of intake. Nutritional status is not only influenced by food diversity but also by the frequency of feeding and how much food is received by toddlers (Wright *et al*., 2015).

The results of this study suggest that diarrhea is not associated with failure to thrive based on the CIAF. These results corroborate the evidence that, according to UNICEF's 2021 conceptual framework of the determinants of nutritional status in children, infectious diseases are not a direct cause of growth failure in children. The direct causes of growth failure in children are a good diet (child intake) and good child care practices (UNICEF, 2021). The results of this study from the child factor in the LBW variable stated that there was no significant relationship between LBW and growth failure based on CIAF. These results differ from research conducted in Gorontalo, which found that infants with low birth weight had a 7.3 times greater risk of stunting (Nurlaily *et al*., 2025). The data showed that 53.0% of information on the birth weight of children under five years old came from the mother's memory; the presence of bias in interviews or recording birth weight could cause statistical test results to show no significant relationship. Children who experience growth failure experience a decrease in important hormones that play a role in growth, such as insulin-like growth factor-1 (IGF-1) and thyroid hormones, resulting in a slowdown in linear growth (Berhe *et al*., 2019).

The results further stated that there was no significant relationship between complete basic immunization status and children's nutritional status based on CIAF. Research in Ethiopia also found no significant relationship between immunization status and child nutritional status based on the CIAF (Bidira *et al*., 2021). The adverse impact that can occur in children who do not get immunized is the increased risk of developing dangerous infectious diseases. Infectious diseases in children can prevent the optimal absorption of nutrients in the body (Jinarong *et al*., 2023). Vitamin A plays a role in various bodily functions, including immunity, growth, and development. Vitamin A insufficiency affects protein synthesis, which affects cell development (Gropper *et al*., 2021). However, the results of this study stated that there was no relationship between vitamin A provision status and nutritional status based on CIAF. The absence of a significant relationship between vitamin A supplementation status and nutritional status may be due to insufficient fat intake in children aged 6-59 months (56.2%).

The family factor in this study states that there is no relationship between food insecurity and nutritional status based on CIAF. When a household experiences food insecurity, they have limited access to sufficient and nutritious food (Sufyan *et al*., 2024). Forms of food insecurity include a lack of variety in diet and its link to poverty within the family, which can ultimately endanger children's growth and development (Gassara & Chen, 2021). The effect of food insecurity on children's nutritional status can also be influenced by other determinants such as maternal knowledge about child nutrition and health care practices, household food allocation and utilization practices, and access to health services (Motbainor *et al*., 2015). Another result of family factors in this study stated that there was no relationship between the use of family planning tools and nutritional status based on CIAF in children aged 6-59 months. This study is in line with research conducted in India using the Indian National Health and Family Survey data, which states that there is no significant relationship between the use of contraceptives and the incidence of stunting (Das *et al*., 2022). The variable family size in this study also stated that there was no relationship with the nutritional status of children aged 6-59 months based on CIAF. Families with a large number of members will compete for food, so that it does not meet the needs of toddlers. Toddlers who do not get enough intake and do not consume diverse foods can result in malnutrition (Workie & Tesfaw, 2021). The incidence of growth failure

is influenced by various direct factors, namely diet and good care practices for toddlers. The number of family members is not a direct factor in the incidence of failure to thrive in children under five (UNICEF, 2021).

There is no relationship between proper drinking water sources and nutritional status based on CIAF in children aged 6-59 months. The results of this study are in line with research conducted in Ethiopia on children under 59 months of age, which found no significant relationship between drinking water sources and stunting in toddlers (Toma *et al*., 2023). Research in Pakistan on children under 5 years of age states that drinking from unsuitable water sources has a risk of growth failure, based on a CIAF of 1.10 times compared to children who drink from suitable water sources (Balogun *et al*., 2021).This study can cause insignificant results because it only examined the type of water used for household drinking without paying attention to the physical, chemical, and microbiological quality of water. Based on the source, drinking water that is suitable for consumption must meet several requirements, namely be colorless, odorless, have a natural taste, and look physically clear.

In terms of biological parameters, drinking water that is suitable for consumption must be free from Escherichia Coli and Coliform bacteria. While drinking water is said to meet chemical requirements, namely if the water is free from the content of materials such as heavy metals, or mercury (Hg), lead (Pb), and aluminum (Au), iron, and chloride, and does not contain radioactive materials (WHO, 2022). Further results state that there is no relationship between drinking water management and nutritional status in children aged 6-59 months based on CIAF. It is important to ensure that drinking water is safe before consumption by treating it properly, such as boiling it. Boiling water kills pathogens that can contaminate water (Sahani *et al*., 2025). Insignificant results can be caused because the drinking water management variable only looks at whether the water is boiled or not, but does not look at the storage of the drinking water, whether in a closed container or not.

Multivariate results showed that children aged 6-59 months with insufficient energy intake had a 3.663 times higher risk of stunting compared to children aged 6-59 months with sufficient energy intake after controlling for the variables of protein intake and fat intake, in line with research in Tangerang, which states that children with insufficient energy intake have a 5.785 times higher risk of stunting than toddlers with sufficient energy intake, after controlling for infectious disease variables, fat intake, and carbohydrate intake (Werdani & Utari, 2020). Food intake directly affects the nutritional status of children. Inadequate nutrient intake, especially of total energy, protein, fat, carbohydrates, and micronutrients, is associated with physical growth deficits in pre-school children (Gropper *et al*., 2021).

Conclusion

The prevalence of growth failure based on CIAF among children under five years old in Bojongsari District, Depok City, West Java, in 2023 was 30.9%. The results of the prevalence of children who experience growth failure based on CIAF are greater than using conventional nutritional status indicators (BB/U, PB/U, BB/PB). The bivariate results stated that there were 4 variables associated with growth failure based on CIAF, namely, less energy intake, less protein intake, less fat intake, and less carbohydrate intake. Multivariate test results showed that the factor associated with nutritional status based on CIAF in children aged 6-59 months in Bojongsari District, Depok City, West Java was energy intake. Children aged 6-59 months with insufficient energy intake had a 3.663 times higher risk of growth failure compared to children aged 6-59 months who had sufficient energy intake after controlling for the variables of protein intake and fat intake. The results of this study are expected to provide helpful information and guidance for health workers in educating mothers of toddlers on how to record food intake in toddlers in the past week, especially those who experience growth failure. The results of these records can be collected with the KIA book so that health workers can examine them during Posyandu. The results of the toddler's food intake records can be the basis for educating health workers and mothers of toddlers about adequate food intake according to their needs, frequency, and portion size,

according to the child's age.

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