PROCEEDING
5th International Conference of Health Polytechnic of Jambi 2025
icon@poltekkesjambi.ac.id
http://journal.poltekkesjambi.ac.id/index.php/ICoHPJ
doi.org/10.35910/icohpj.v5i0

VITAMIN A COVERAGE AND PREVALENCE OF STUNTING, UNDERWEIGHT, AND WASTING IN CHILDREN 6-59 MONTHS OF AGE (ANALYSIS OF IHS 2023 DATA)

Alfi Rahmi[1*], Demsa Simbolon [1], Azya Destia Putri[1], Dita Marsela Putri[1], Intan Destika[1], Naya Nabila Aisyah[1], Silvia Nanda Ayu Pratama[1], Teza Monika[1]
[1] Departement of Nutrition, Politeknik Kesehatan Kemenkes Bengkulu, Bengkulu, Indonesia
Corresponding author: alfirahmi1905@gmail.com

ABSTRACT

Background: *Nutritional problems, such as stunting, wasting, and being underweight, are significant contributors to the global burden of disease in children, including in Indonesia. Indonesia has been identified as having low levels of Vitamin A sufficiency among under-fives. Vitamin A deficiency can inhibit protein synthesis, which is critical for cell development. As a result, Vitamin A-deficient children are at high risk of growth impairment. This study aims to analyze the association between Vitamin A supplementation and the prevalence of stunting, wasting, and underweight among children under five years of age in Indonesia using the 2023 IHS (Indonesia Health Survey) data.*
Method: *This study used a cross-sectional design using secondary aggregate data from the 2023 IHS covering 38 provinces in seven regions in Indonesia. The independent variable in this study is the proportion of Vitamin A supplementation, while the dependent variable is the prevalence rate of stunting, wasting, and underweight. The analysis will be conducted using the Pearson correlation test, after previously testing the normality of the data.*
Result: *The results showed that vitamin A coverage was significantly associated with the prevalence of stunting, underweight, and wasting. The higher the vitamin A coverage, the lower the prevalence of stunting, underweight, and wasting.*
Conclusion: *The conclusion of this study is that vitamin A supplementation plays an important role in reducing the prevalence of stunting and wasting. This study provides a basis for more effective policies and interventions aimed at addressing child malnutrition in Indonesia.*

Keywords: *Vitamin A, Stunting, Underweight, Wasting, IHS 2023*

INTRODUCTION

Stunting refers to a condition where a child's height is below the expected standard deviation for their age group, indicating that they are shorter than their peers. These children are vulnerable to degenerative diseases as adults. The impact is not only physical, but also general health, including affecting IQ or intelligence levels. According to the World Health Organization (WHO, 2022), stunting occurs in children who are short, measured using anthropometric tools with results below -2 SD. This condition indicates that significant nutrition is a chronic problem with multiple underlying causes, including inadequate nutrient intake during infancy, insufficient maternal nutrition during pregnancy and lactation, socioeconomic factors, and maternal knowledge. As a result, affected children may face challenges in achieving optimal physical and cognitive development in the future (Amelia Yuniarti and Asih Setiarini, 2024).

Nutrition is a major contributor to the global burden of disease among children. According to the World Health Organization (WHO, 2022), by 2022 22.3% of all children under 5 years old, or equal to 148.1 million children are too short for their age, while 45.0 million children are considered underweight, or too underweight for their height 45.0 million are too thin for their height (wasting). According to the 2018 Global Nutrition Report, 22.2% of the world's children under five (aged

0-59 months) are stunted, 7.5% are wasted, and 5.6% are overweight. In Indonesia, according to the 2018 Basic Health Research in Indonesia, the prevalence of undernourished children was 17.7%, the prevalence of stunting (very short and short) was 30.8%, and the prevalence of underweight children (very thin and thin) was 10.2% (Kemenkes RI, 2018). The three main indicators used to assess child malnutrition are stunting, wasting, and underweight, which are measured using height-for-age (H/A), weight-for-age (W/A), and weight-for-height (W/H) indices, respectively. Indonesia is one of the countries with relatively low levels of Vitamin A intake in children under five. In 2020, Vitamin A supplementation coverage for children in Indonesia was reported to be 86.3% (Wijaya, Azizah and Rohman, 2024) The 2018 Basic Health Research in Indonesia data shows that 28.8% of Vitamin A capsule distribution did not meet standards, and 17.6% of children never received Vitamin A capsules.

The results of previous research in the city of Surabaya showed an association between vitamin A administration and the incidence of stunting (Putri, Irawan and Mukono, 2021) Research results elsewhere also prove that vitamin A provision has an impact on the incidence of stunting (Fatimah and Wirjatmadi, 2018; Ramadhani, 2023) However, there are also research results that find no relationship between vitamin A coverage and the incidence of stunting (Bahmat, Bahar and Jus'at, 2019; Sugianti, 2021; Kundarwati *et al.*, 2022). Research by (Muliah, Wardoyo and Mahmudiono, 2018; Yuziani and Sofia, 2022) shows that vitamin A coverage is associated with the incidence of underweight. Based on the results of the research (Amelia Yuniarti and Asih Setiarini, 2024), subjects classified as wasted showed inadequate vitamin A levels. Vitamin A supplementation can synergistically affect health improvement in children.

However, while many studies have been conducted on vitamin A coverage and child nutritional status, no studies have used national data to analyze the relationship between vitamin A coverage and the prevalence of height deficiency, undernutrition, and underweight among children under five in Indonesia. Therefore, this study aims to describe and analyze these relationships using the 2023 IHS data. The novelty of this study lies in the use of national IHS 2023 data to compare vitamin A coverage with the prevalence of stunting, underweight, and wasting across Indonesia, as well as the differences between Indonesia's 7 regions. The objectives of the study were to describe the description of vitamin A coverage in 7 Indonesian regions, the description of the prevalence of height deficiency, undernutrition, and wasting in children under five in 7 Indonesian regions, and the relationship between vitamin A coverage and the prevalence of stunting, underweight, and wasting in children under five in Indonesia.

METHODS

The study was conducted using a cross-sectional method with aggregate data from the 2023 IHS. The population in this study was children aged 6-59 months throughout Indonesia who were stunted, underweight and wasted in 38 Indonesian provinces, which were grouped into seven regions, namely Sumatra, Java-Bali, Nusa Tenggara, Kalimantan, Sulawesi, Maluku, and Papua. The study sample consisted of the total population in all provinces covered by the 2023 IHS. This study uses data from all provinces in Indonesia totaling 79,625 people. The data used in this study come from the IHS 2023, which was conducted in the period August to October 2023.

The independent variable in this study is vitamin A coverage. According to the Minimum Service Standards for Health, it is stated that every toddler should receive vitamin A capsules twice a year. Vitamin A coverage was calculated using the formula: number of

children aged 6-59 months who received vitamin capsules divided by the total number of children under five, multiplied by 100%. The research instrument used was an individual questionnaire developed by the IHS team in 2023. The dependent variables analyzed included the prevalence of stunting, wasting, and underweight in children under five. The prevalence rates of stunting, wasting, and underweight were determined by dividing the number of children experiencing each condition by the total number of children under five, then multiplying by 100%.

Stunting is based on the anthropometric ratio of body length according to age (length-for-age) <-2 SD, to obtain height data, anthropometric measurements are taken using a height/length measuring instrument with an accuracy level of 1 mm. Underweight was determined from body weight-for-age <-2 SD and wasting based on body weight-for-length <-2 SD. Body weight data was obtained using a digital weight scale with an accuracy of 0.1 kg. The anthropometric process was carried out by trained enumerators with a minimum educational background of D3 health to ensure the accuracy of the data obtained. Height measurements were carried out by following the standard procedures set out in the IHS 2023 enumerator training. The data collection process was carried out by means of direct interviews and anthropometric measurements in each household selected as a sample.

Descriptive analysis was used to describe vitamin A coverage and the prevalence of stunting, underweight, and wasting across provinces in Indonesia. Univariate analysis or description of the characteristics of each variable, using measures of center and variance (mean, standard deviation, minimum value, and maximum value). Bivariate analysis aimed to analyze the relationship between the variable proportion of diverse food consumption and the prevalence of stunting, underweight, and wasting using the Pearson correlation test. The implementation of IHS 2023 has obtained ethical approval from the National Health Research and Development Ethics Commission (KEPPKN) with number HK.01.07/MENKES/1562023 to ensure that all research procedures meet the applicable ethical standards in health research.

RESULTS AND DISCUSSION

Vitamin A coverage never in one year is highest in the Papua region, namely the province of Papua Mountains (37.5%), and the lowest in the Java and Bali region, namely DI Yogyakarta Province (13.9%).

Table 1. Distribution of One-Year Vitamin A Coverage by Region in Indonesia by 2023

	Never			1 time		
Region	**Minimum**	**Maximum**	**$\bar{X}$± SD**	**Minimum**	**Maximum**	**$\bar{X}$± SD**
Sumatera	11.0	27.7	20.8± 5.6	44.2	54.0	48.9±3.4
Jawa dan Bali	10.2	22.1	13.9± 3.9	49.9	60.2	53.1±3.3
Nusa Tenggara	13.8	14.0	13.9± 0.1	47.4	47.9	47.6±0.3
Kalimantan	12.7	21.3	17.6± 3.7	45.7	56.7	49.8±4.1
Sulawesi	22.3	30.4	25.7± 2.9	43.9	47.9	46.4±1.4
Maluku	30.6	31.5	31.0± 0.6	39.6	42.1	40.8±1.7
Papua	22.3	54.8	37.5± 14.0	25.3	49.6	39.1±9.7
Indonesia	**10.2**	**54.8**	**22.7±10.1**	**25.3**	**60.2**	**47.4±6.4**
	2 time			**< 2 time**		
Region	**Minimum**	**Maximum**	**$\bar{X}$± SD**	**Minimum**	**Maximum**	**$\bar{X}$± SD**
Sumatera	18.4	44.7	30.1±6.7	55.3	81.7	69.8±6.7
Jawa dan Bali	24.8	37.4	32.8±4.8	62.6	75.1	67.1±4.8
Nusa Tenggara	38.4	38.6	38.5±0.1	61.4	61.7	61.5±0.2
Kalimantan	30.6	34.7	32.5±1.7	65.3	69.4	67.5±1.7
Sulawesi	23.5	30.7	27.8±2.6	69.3	76.5	72.2±2.6
Maluku	27.4	28.9	28.1±1.0	71.1	72.7	71.9±1.1
Papua	16.3	32.9	23.2±6.1	67.1	83.7	76.7±6.0
Indonesia	**16.3**	**44.7**	**29.8±5.9**	**55.3**	**83.7**	**70.1±5.9**

Meanwhile, the highest coverage of vitamin A once a year was found in the Java and Bali regions, namely DKI Jakarta province (53.1%), and the lowest was found in the Papua region, namely Papua mountainous province (39.1%).

Vitamin A coverage twice a year is highest in the Sumatra region, namely Jambi province (30.1%), and the lowest in the Papua region, namely Central Papua province (23.2%). Whereas vitamin A coverage of less than 2 times a year is highest in the Papua region, namely Central Papua province (76.7%), and the lowest in the Sumatra region, namely Jambi province (69.8%). The results show that there are significant differences in the proportion of vitamin A administration and prevalence of nutritional problems (underweight, wasting, underweight) between regions in Indonesia. In general, the proportion of vitamin A administration in Indonesia is still low, with a national average of 47.4%.

This figure illustrates the low provision of vitamin A, which has an impact on the nutritional status of children. The highest proportion of vitamin A administration is found in Java and Bali, while the lowest is found in Papua. This suggests inequalities in vitamin A provision between regions. Social factors such as maternal education level, maternal knowledge level, and occupation may influence low vitamin A intake. The distance from home to the posyandu, and the number of visits to the posyandu in certain areas may exacerbate this problem (Samosir, Sinaga and Batubara, 2023; Haikal, Yuziani and Mardiati, 2024).

Based on the Regulation of the Minister of Health of the Republic of Indonesia Number 21 of 2015 concerning the provision of vitamin A to toddlers, infants, and postpartum mothers, infants aged 6 to 11 months receive 100,000 international units (IU) of vitamin A in the form of blue capsules. Meanwhile, toddlers aged 12 to 59 months and postpartum women receive 200,000 IU of vitamin A in the form of red capsules. Vitamin A administration is carried out twice a year, in February and August, and is carried out simultaneously for all children aged 6 to 59 months. Vitamin A administration can be done at the posyandu (Kemenkes RI, 2015). Table 1 shows that the proportion of vitamin A administration by province in Indonesia is lowest in Papua and highest in Java and Bali. Vitamin A deficiency can inhibit protein synthesis which is essential for cell growth. As a result, children who are vitamin A deficient have a higher risk of developing growth disorders. In addition, vitamin A is also very important in maintaining the body's immune system. Therefore, vitamin A deficiency can weaken the body's defenses, increasing the likelihood of disease seeds, such as diarrhea when it attacks the intestinal lining (Ramadhani, 2023).

Table 2. Distribution of Stunting Prevalence by Region in Indonesia in 2023

Region	Stunting			Severely Stunting			Stunting + Severely Stunting		
	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD
Sumatera	9.5	20.3	13.8±3.2	3.3	9.1	5.3±1.7	13.5	29.4	19.2±4.9
Jawa dan Bali	5.5	16.9	13.7±3.9	1.7	7.0	4.3±1.6	7.2	23.9	18.1±5.3
Nusa Tenggara	19.3	26.2	22.7±4.8	5.2	11.7	8.4±4.5	24.5	37.9	31.2±9.4
Kalimantan	12.8	17.3	16.0±1.8	4.6	7.8	6.5±1.3	17.4	24.7	22.5±2.9
Sulawesi	14.8	22.8	19.4±2.7	6.5	9.4	7.7±1.0	21.3	30.4	27.1±3.2
Maluku	16.0	18.3	17.1±1.6	7.6	10.1	8.8±1.7	23.6	28.4	26.0±3.3
Papua	15.8	20.3	17.8±1.5	8.0	20.7	13.2±5.6	24.8	39.3	31.0±6.1
Indonesia	**5.5**	**26.2**	**16.2±3.8**	**1.7**	**20.7**	**7.2±3.9**	**7.2**	**39.3**	**23.5±6.8**

Vitamin A sufficiency is mainly obtained through dietary intake, such as fruits and vegetables that are rich in this vitamin. Generally, orange and red fruits and vegetables have high vitamin A content. In addition, vitamin A can also be obtained from animal protein sources such as fish, eggs, and shrimp. Apart from food, vitamin A supplementation is also routinely conducted in February and August as a preventive measure against vitamin A deficiency. This program aims to reduce the risk of diseases such as measles and diarrhea.

With regular vitamin A supplementation, children are expected to stay strong and healthy, have a better immune system, and achieve optimal growth and development (Kemenkes RI, 2016).

Table 2 shows that the prevalence of stunting was highest in the Nusa Tenggara region, namely East Nusa Tenggara province (22.7%) and the prevalence of stunting was lowest in the Java and Bali regions, namely Bali province (13.7%). Meanwhile, the prevalence of severe stunting was highest in the Papua region, namely Central Papua province (13.2%), and the prevalence of severe stunting was lowest in the Java and Bali regions, namely Bali province (4.3%). The total incidence of stunting was highest in the Papua region in Central Papua Province (31.0%) and lowest in the Java and Bali regions in Bali Province (18.1%).

Table 3. Distribution of Underweight Prevalence by Region Indonesia in 2023

Region	Underweight			Severely Underweight			Underweight + Severely Underweight		
	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD
Sumatera	7.4	17.7	11.3±2.9	1.5	4.9	2.6±0.9	8.9	22.6	13.9±3.8
Jawa dan Bali	4.9	14.2	11.1±2.9	0.7	3.5	2.2±0.9	5.6	17.7	13.3±3.7
Nusa Tenggara	17.2	22.9	20.0±4.0	3.6	6.8	5.2±2.2	20.8	29.7	25.1±6.2
Kalimantan	12.7	16.2	14.7±1.4	2.6	5.4	4.0±1.2	15.3	21.6	18.7±2.6
Sulawesi	11.4	18.6	16.6±2.7	2.9	5.9	4.6±1.0	14.3	24.4	21.2±3.7
Maluku	16.0	18.4	17.2±1.6	4.9	6.7	5.8±1.2	20.9	25.1	23.0±2.9
Papua	11.7	17.2	14.6±1.8	3.7	8.5	5.7±1.6	15.4	23.9	20.3±2.8
Indonesia	**4.9**	**22.9**	**13.8±3.6**	**0.7**	**8.5**	**3.8±1.7**	**5.6**	**29.7**	**17.7±5.1**

Table 3 shows that the prevalence of underweight was highest in the Nusa Tenggara region, namely East Nusa Tenggara province (20.0%) and the prevalence of underweight was lowest in the Java and Bali regions, namely Bali province (11.1%). Meanwhile, the prevalence of severely underweight was highest in Papua, Central Papua province (5.7%) and lowest in Java and Bali, Bali province (2.2%). The total incidence of underweight was highest in the Nusa Tenggara region in East Nusa Tenggara province (25.1%) and lowest in the Java and Bali region in Bali province (13.3%).

Table 4. Distribution of Wasting Prevalence by Region Indonesia in 2023

Region	Wasting			Severely Wasting			Wasting + Severely Wasting		
	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD	Min	Max	$\bar{X}$±SD
Sumatera	4.9	9.8	6.1±1.5	1.4	3.8	2.2±0.7	6.3	13.6	8.4±2.1
Jawa dan Bali	3.1	7.2	5.5±1.3	0.5	3.2	1.7±0.9	3.6	10.2	7.3±2.2
Nusa Tenggara	7.2	9.4	8.3±1.5	1.4	4.2	2.8±1.9	8.6	13.6	11.1±3.5
Kalimantan	6.5	9.2	7.7±1.3	2.2	4.1	2.9±0.7	8.7	13.3	10.7±2.0
Sulawesi	6.4	9.7	8.0±1.2	1.7	3.8	2.8±0.8	9.1	12.9	10.9±1.8
Maluku	10.5	11.0	10.7±0.3	4.4	5.3	4.8±0.6	15.4	15.8	15.6±0.2
Papua	6.4	9.6	8.6±1.1	3.2	9.2	4.8±2.1	10.9	18.2	13.4±2.5
Indonesia	**3.1**	**11.0**	**7.3±1.8**	**0.5**	**9.2**	**2.9±1.5**	**3.6**	**18.2**	**10.2±3.1**

Table 4 shows that the prevalence of wasting is highest in the Maluku region, namely Maluku province (10.7%) and the prevalence of wasting is lowest in the Java and Bali regions, namely Bali province (5.5%). Meanwhile, the prevalence of severe wasting was highest in the Papua region, namely Central Papua province (4.8%), and the prevalence of severe wasting was lowest in the Java and Bali regions, namely Bali province (1.7%). The total incidence of wasting was highest in the Papua region in Central Papua Province (13.4%) and lowest in the Java and Bali regions in Bali Province (7.3%).

Table 5. Relationship between One-Year Vitamin A Coverage and Prevalence of Stunting in Children Aged 6-59 Months in Indonesia in 2023

Vitamin A coverage	Stunting	Severely Stunting	Severy Stunting + Stunting
Vitamin A coverage never/year			
Beta	0.28	0.80	0.62
Constant	13.84	0.31	14.15
Correlation Coefficient (r)	0.10	0.30	0.41
p-value	0.08	0.00	0.00
Vitamin A coverage 1 times/year			
Beta	-0.17	-0.48	-0.65
Constant	24.36	30.41	54.78
Correlation Coefficient (r)	0.28	0.80	0.62
p-value	0.08	0.00	0.00
Vitamin A coverage <2 times/year			
Beta	0.11	0.33	0.44
Constant	8.19	16.01	7.82
Correlation Coefficient (r)	0.18	0.50	0.39
p-value	0.27	0.00	0.01
Vitamin A coverage 2 times/year			
Beta	-0.11	-0.33	-0.44
Constant	19.66	17.15	36.81
Correlation Coefficient (r)	0.17	0.50	0.39
p-value	0.28	0.00	0.01

The results of the data analysis in Table 5 showed that vitamin A coverage was never associated with the prevalence of severe stunting (p-value 0.00) and the prevalence of total stunting (p-value 0.00), but not with the prevalence of stunting (p-value 0.08). Vitamin A coverage of 1 time was associated with the prevalence of severely stunted (p-value 0.00) and the prevalence of total stunting (p-value 0.00) but was not associated with the prevalence of stunting (p-value 0.08). Vitamin A coverage <2 times was associated with the prevalence of severely stunted (p-value 0.00) and the prevalence of total stunting (p-value 0.01), but was not associated with the prevalence of stunting (p-value 0.27). 2 times vitamin A coverage was associated with the prevalence of severe stunting (p-value 0.00) and the prevalence of total stunting (p-value 0.01), but not with the prevalence of stunting (p-value 0.28). Based on the beta coefficient value, the higher the proportion of vitamin A administration, the lower the prevalence of stunting.

The prevalence of stunting in Java and Bali is relatively lower (16.2%), which may be related to better maternal attitudes and accessibility of health facilities in these regions. Stunting in Indonesia is influenced by various factors, including maternal knowledge and socioeconomic (Wello *et al.*, 2022; Nirmalasari, 2025). The findings of this study suggest a correlation between vitamin A coverage and stunting prevalence in Region Indonesia. Research by Bahmat, Bahar, and Jus'at, (2019) and Kundarwati *et al.*, (2022) did not find a direct relationship between vitamin A supplementation and the incidence of stunting but identified other influencing factors, such as iron and protein intake. In contrast, Putri, Irawan, and Mukono, (2021) stated that vitamin A coverage is associated with stunting in children aged 24-59 months. This study is also in line with the research Fatimah and Wirjatmadi (2018) which shows that stunted toddlers experience a deficit in vitamin A sufficiency levels.

Vitamin A deficiency affects protein synthesis, which in turn affects cell growth. As a result, children who are deficient in vitamin A may develop growth disorders. In addition, vitamin A plays an important role in the

functioning of the human immune system. As a result, vitamin A deficiency can lead to a weak immune response, making individuals more susceptible to infections, such as diarrhea if it occurs in the intestinal wall (Sugianti, 2021). Food sources rich in vitamin A include various fruits and vegetables, especially orange-colored ones, which tend to have higher vitamin content. However, stunted toddlers often do not eat fruits and prefer soupy foods. Protein sources consumed by stunted toddlers, which provide vitamin A, include eggs, mackerel, and pindang fish (Fatimah and Wirjatmadi, 2018).

Factors that cause stunting can be both individual and family factors. A history of exclusive breastfeeding and a history of maternal LBW are causes of stunting. The main factor that indirectly contributes to the problem of stunting is the socioeconomic status of the family, which is influenced by the parent's education level. When parents have a higher level of education, the likelihood of earning an adequate income increases, allowing the family to live in a healthy and supportive environment (Wello *et al.*, 2022).

When analyzed regionly, the highest prevalence of stunting in 2020 occurred in Africa, with 31.7% according to WHO data. This is followed by Southeast Asia with 30.1% and the Eastern Mediterranean with 26.2%. In Southeast Asia, Indonesia is ranked second highest for stunting, after Timor-Leste which has a rate of 31.8% in 2020. Timor-Leste tops the list with a stunting prevalence of 48.8% in children. Laos ranked third after Indonesia with 30.2%, followed by Cambodia with 29.9%, Philippines with 28.7%, Myanmar with 25.2%, and Vietnam with 22.3%. In addition, Malaysia reported a prevalence of 20.9%, Brunei Darussalam 12.7%, and Thailand 12.3%. Singapore has the lowest prevalence of stunting among children in Southeast Asia at 2.8%. Data collected in 2022 showed that the prevalence of stunting in Indonesia was 21.6%, while Malaysia reported 20.9%, Thailand 12.3%, Japan 5.5%, and Singapore maintained a low rate of 2.8%.

Table 6. Relationship between One-Year Vitamin A Coverage and the Prevalence of Underweight Children Aged 6-59 Months in Indonesia in 2023

Vitamin A coverage	Underweight	Severely Underweight	Severy Underweight + Underweight
Vitamin A coverage never/year			
Beta	0.07	0.09	0.16
Constant	12.2	1.64	13.86
Correlation Coefficient (r)	0.28	0.55	0.33
p-value	0.21	0.00	0.03
Vitamin A coverage 1 times/year			
Beta	-0.11	-0.13	-0.25
Constant	19.23	10.31	29.55
Correlation Coefficient (r)	0.20	0.49	0.31
p-value	0.22	0.00	0.05
Vitamin A coverage <2 times/year			
Beta	0.08	0.12	0.20
Constant	8.22	4.90	3.31
Correlation Coefficient (r)	0.13	0.42	0.23
p-value	0.42	0.00	0.14
Vitamin A coverage 2 times/year			
Beta	-0.07	-0.12	-0.20
Constant	16.22	7.54	23.77
Correlation Coefficient (r)	0.13	0.41	0.23
p-value	0.43	0.00	0.15

Table 6 shows that never vitamin A coverage is associated with the prevalence of severely underweight (p-value 0.00) and the prevalence of total underweight incidence (p-value 0.03), but not with the prevalence of underweight (p-value 0.21). Vitamin A coverage of 1 time was associated with the prevalence of severely underweight (p-value 0.00) but was not associated with the prevalence of total underweight (p-value 0.05) and the prevalence of underweight (p-value 0.22). Vitamin A coverage <2 times was associated with the prevalence of severely underweight (p-value 0.00), but not with the prevalence of total underweight (p-value 0.14) and underweight prevalence (p-value 0.42). 2 times vitamin A coverage was associated with the prevalence of severely underweight (p-value 0.00), but was not associated with the prevalence of total underweight (p-value 0.15) and underweight prevalence (p-value 0.43). Based on the beta coefficient value, the higher the proportion of vitamin A administration, the lower the prevalence of underweight.

Regarding the prevalence of underweight, data shows that the Nusa Tenggara region has the highest rate at 20.0%, indicating a more severe malnutrition problem. Inadequate energy and carbohydrate intake can lead to weight loss in children. The link between inadequate nutrient intake and the risk of being underweight can be understood through the role of carbohydrates as a source of energy. When carbohydrate consumption is low, the body will metabolize protein and fat to meet its energy needs (Aprilya Roza Werdani and Syah, 2023).

Based on the research conducted, there is an association between vitamin A coverage and underweight prevalence between regions in Indonesia. A research finding (Yuziani and Sofia, (2022) that there is an association between vitamin A coverage and the incidence of underweight. The results showed that toddlers who received blue vitamin A at 6 months of age had a 37% chance of avoiding the risk of being underweight.

Toddlers who do not consume enough blue-colored vitamin A, especially from 6 months of age, have a high risk of being underweight. Children who do not get enough vitamin A tend to have higher rates of underweight and wasting compared to their peers who get adequate amounts of vitamin A intake. Vitamin A deficiency can increase the risk of mortality, morbidity, and greater incidence of infectious diseases in children. Vitamin A status in children is influenced by various factors, not only by vitamin A intake (Muliah, Wardoyo and Mahmudiono, 2018).

The prevalence of underweight in Indonesia is not only due to the lack of vitamin A supplementation but also to various other factors. The prevalence of underweight in Indonesia is influenced by various interrelated factors, including insufficient intake of energy and carbohydrates, which can lead to nutritional deficiencies and impaired growth. In addition, high rates of infectious diseases worsen health conditions, especially in vulnerable groups such as infants and children. The lack of exclusive breastfeeding is also an important factor, as breast milk contains essential nutrients needed for optimal development in the early years of life. Maternal parenting in providing food also plays a role in determining the quality of children's nutritional intake, which is often influenced by increased maternal knowledge about nutrition and health. Increased family income also affects access to nutritious food and adequate health services, and together these factors contribute to the high rates of nutrition and health problems in Indonesia (Aprilya Roza Werdani and Syah, 2023; Esti, 2024).

Table 7. Relationship between One-Year Vitamin A Coverage and Prevalence of Wasting in Children Aged 6-59 Months in Indonesia in 2023

Vitamin A coverage	Wasting	Severely Wasting	Severy Wasting + Wasting
Vitamin A coverage never/year			
Beta	0.17	0.10	0.17
Constant	6.15	0.45	6.15
Correlation Coefficient (r)	0.38	0.70	0.57
p-value	0.01	0.00	0.00
Vitamin A coverage 1 time/year			
Beta	-0.10	-0.15	-0.25
Constant	12.20	10.28	22.48
Correlation Coefficient (r)	0.35	0.64	0.52
p-value	0.03	0.00	0.00
Vitamin A coverage <2 times/year			
Beta	0.08	0.13	0.22
Constant	1.11	6.57	5.46
Correlation Coefficient (r)	0.28	0.52	0.42
p-value	0.08	0.00	0.00
Vitamin A coverage 2 times/year			
Beta	-0.08	-0.13	-0.22
Constant	9.93	6.93	16.86
Correlation Coefficient (r)	0.28	0.52	0.42
p-value	0.08	0.00	0.00

The results of data analysis in Table 7 show that never vitamin A coverage is associated with the prevalence of stunting (p-value 0.01), associated with the prevalence of severe wasting (p-value 0.00), and associated with the prevalence of total wasting (p-value 0.00). Vitamin A coverage of 1 time was associated with the prevalence of wasting (p-value 0.03), associated with severely wasted (p-value 0.00), and associated with the total prevalence of wasting (p-value 0.00). Vitamin A coverage <2 times was associated with the prevalence of severely wasted (p-value 0.00) and the prevalence of total wasting (p-value 0.01), but not with the prevalence of wasting (p-value 0.08). 2 times vitamin A coverage was associated with the prevalence of severe wasting (p-value 0.00) and the prevalence of total wasting (p-value 0.01), but not the prevalence of wasting (p-value 0.08). The beta coefficient showed that the higher the proportion of vitamin A supplementation, the lower the prevalence of wasting.

The highest prevalence of wasting was found in the Maluku region at 10.7%. Meanwhile, the prevalence of wasting in Java and Bali was the lowest at 5.5%. Wasting puts toddlers at risk of long-term developmental delays, decreased immune system function, increased severity and susceptibility to infectious diseases, and increased risk of death, especially toddlers who experience severe wasting (Soedarsono and Sumarmi, 2021).

The findings of this study indicate an association between vitamin A intake and the incidence of wasting. Research conducted by (Maulida and Pramono, 2015) revealed that subjects classified as wasting had inadequate vitamin A consumption. Vitamin A deficiency is often found in children with poor nutritional status. Synergistic vitamin A supplementation can improve children's health (Maulida and Pramono, 2015). Research (Lestari, 2020) supports these findings, showing a link between vitamin A consumption and nutritional problems. Food intake, especially vitamin A, fundamentally impacts the health of children under five. Research (Yuziani and Sofia, 2022) Suggests that toddlers who receive blue vitamin A supplements from the age of six months are 37% less likely to be underweight compared to toddlers who do not receive such supplements.

This is in line with research conducted in India, which indicated that children with adequate vitamin A intake were less likely to be wasted, underweight, and underweight compared to those without adequate vitamin A intake. In addition, vitamin A-deficient children are highly susceptible to malnutrition and disease due to a weakened immune system (Ghanynafi *et al.*, 2024). In theory, micronutrients play important roles in influencing nutritional status, including their involvement in the metabolism of macronutrients into energy, child development and growth, and the body's defense against infection.

CONCLUSION

This study shows a significant association between the proportion of vitamin A coverage and the prevalence of stunting, underweight, and wasting among children under five in Indonesia. Regions with a higher proportion of vitamin A provision, such as Java-Bali, tend to show lower rates of stunting, underweight, and wasting. Conversely, regions with low vitamin A coverage, such as Nusa Tenggara and Maluku, show higher prevalence. Nationally, the prevalence of stunting, underweight, and wasting remains very high, highlighting the importance of vitamin A supplementation for children to address under-five nutrition. Based on these findings, health policies should focus on increasing vitamin A coverage, especially in areas with a high prevalence of underweight and wasting, such as Maluku, Papua, and Nusa Tenggara.

Nutrition education programs and vitamin A distribution should be strengthened, as well as ensuring accessibility of health facilities in remote areas. Future researchers are advised to investigate other factors that influence children's nutritional status, such as eating habits, parenting, and environmental factors. In addition, conducting longitudinal studies is also recommended to determine the causal relationship between vitamin A supplementation and children's nutritional status.

ACKNOWLEDGMENT

Thank you to BKPK for facilitating the 2023 Indonesian Health Survey Report, so that further analysis can be carried out.

CONFLICT OF INTEREST

All authors declared that there was no conflict of interest.

REFERENCES

Amelia Yuniarti and Asih Setiarini (2024) 'Konsumsi Vitamin A untuk Mencegah Kejadian Stunting : Systematic Review', *Media Publikasi Promosi Kesehatan Indonesia (MPPKI)*, 7(3), pp. 588–595. Available at: https://doi.org/10.56338/mppki.v7i3.4784.

Aprilya Roza Werdani and Syah, J. (2023) 'Faktor-Faktor yang Berhubungan dengan Underweight pada Anak Usia 6-23 Bulan di Pagedangan Kabupaten Tangerang', *Nutrition Science and Health Research*, 1(2), pp. 33–39. Available at: https://doi.org/10.31605/nutrition.v1i2.2300.

Bahmat, D.O., Bahar, H. and Jus'at, I. (2019) 'Hubungan Asupan Seng, Vitamin A, Zat Besi, dan Kejadian Stunting pada Balita (24-59) Bulan di Kepulauan Nusa Tenggara (RISKESDAS 2010)', *Departement of Nutrition Faculty of Health Science Esa Unggul University*, (Riskesdas), pp. 1–14.

Esti, I.F. (2024) 'Faktor-Faktor Penyebab Kejadian Underweight Pada Balita Dari Ibu Pekerja Di Wilayah Kerja Puskesmas

Ceper', *NUTRIZIONE (Nutrition Research and Development Journal)*, 04(01), pp. 22–31. Available at: https://journal.unnes.ac.id/journals/nutrizione/index.

Fatimah, N.S.H. and Wirjatmadi, B. (2018) 'Tingkat Kecukupan Vitamin a, Seng Dan Zat Besi Serta Frekuensi Infeksi Pada Balita Stunting Dan Non Stunting', *Media Gizi Indonesia*, 13(2), pp. 168–175. Available at: https://doi.org/10.20473/mgi.v13i2.168-175.

Ghanynafi, A. *et al.* (2024) 'Vitamin A Supplementation Coverage And Prevalence Of Malnutrition Status Among Toddlers In Sidoarjo, Indonesia', 12(2), pp. 214–221. Available at: https://doi.org/10.20473/jbe.v12i22024.214.

Haikal, M.F., Yuziani and Mardiati (2024) 'Gambaran Faktor-Faktor Pemberian Vitamin A Pada Balita Di Puskesmas Kecamatan Muara Satu Kota Lhokseumawe Tahun 2020', *Jurnal Ilmu Kedokteran dan Kesehatan Indonesia*, 4(1), pp. 198–208. Available at: https://doi.org/10.55606/jikki.v4i1.300.

Kemenkes RI (2015) *Peraturan Menteri Kesehatan Republik Indonesia Nomor 21 Tahun 2015 Tentang Standar Kapsul Vitamin A Bagi Bayi, Anak Balita, dan Ibu Nifas*. Indonesia.

Kemenkes RI (2018) *Hasil Utama Riskesdas (Riskesdas)*. Jakarta.

Kemenkes RI, P.D. dan I. (PUSDATIN) (2016) *Situasi Balita Pendek (Stunting) di Indonesia*. Jakarta. Available at: https://pusdatin.kemkes.go.id/resources/download/pusdatin/buletin/Buletin-Stunting-2016.pdf.

Kundarwati, R.A. *et al.* (2022) 'Hubungan Asupan Protein, Vitamin A, Zink, dan Fe dengan Kejadian Stunting Usia 1-3 Tahun', *Jurnal Gizi*, 11(1), pp. 9–15. Available at: https://doi.org/10.26714/jg.11.1.2022.9-15.

Lestari, P. (2020) 'Hubungan Pengetahuan Gizi, Asupan Makanan dengan Status Gizi Siswi Mts Darul Ulum', *Sport and Nutrition Journal*, 2(2), pp. 73–80. Available at: https://doi.org/10.15294/spnj.v2i2.39761.

Maulida, A. and Pramono, A. (2015) 'Gambaran Asupan Vitamin a, Kadar Serum Seng, Dan Status Gizi Pada Anak Usia 9-12 Tahun', *Journal of Nutrition College*, 4(4), pp. 323–328. Available at: https://doi.org/10.14710/jnc.v4i4.10103.

Muliah, N., Wardoyo, A.S. and Mahmudiono, T. (2018) 'Hubungan Frekuensi Penimbangan, Penggunaan Garam Beryodium, Dan Pemberian Vitamin a Dengan Kejadian Underweight Pada Balita Di Provinsi Jawa Timur', *Media Gizi Indonesia*, 12(1), pp. 40–46. Available at: https://doi.org/10.20473/mgi.v12i1.40-46.

Nirmalasari, N.O. (2025) 'Stunting Pada Anak : Penyebab Dan Faktor Risiko Stunting Di Indonesia', 14(1), pp. 19–28. Available at: https://doi.org/10.20414/Qawwam.v14i1.2372.

Putri, M.G., Irawan, R. and Mukono, I.S. (2021) 'Hubungan Suplementasi Vitamin A, Pemberian Imunisasi, dan Riwayat Penyakit Infeksi Terhadap Kejadian Stunting Anak Usia 24-59 Bulan di Puskesmas Mulyorejo, Surabaya', *Public Health Nutrition Media*, 10(1), pp. 72–79. Available at: https://doi.org/https://doi.org/10.20473/mgk.v10i1.2021.72-79.

Ramadhani, M. (2023) 'Hubungan Pemberian Kapsul Vitamin A, Dengan Kejadian Stunting Pada Balita di Puskesmas Tanjung Rejo', *Journal of Biology Education, Science & Technology*, 6(1),

pp. 718–724. Available at: https://doi.org/https://doi.org/10.30743/best.v6i1.9237.

Samosir, T.R., Sinaga, R. and Batubara, Z. (2023) 'Faktor – Faktor Yang Berkaitan Dengan Pemberian Vitamin A Pada Balita di Posyandu Desa Kelambir Kec. Pantai Labu Kab. Deli Serdang Tahun 2023', *Calory Journal : Medical Laboratory Journal*, 1(3), pp. 12–25. Available at: https://doi.org/10.57213/caloryjournal.v1i3.103.

Soedarsono, A.M. and Sumarmi, S. (2021) 'Faktor yang Mempengaruhi Kejadian Wasting pada Balita di Wilayah Kerja Puskesmas Simomulyo Surabaya', *Media Gizi Kesmas*, 10(2), pp. 237–245. Available at: https://doi.org/10.20473/mgk.v10i2.2021.237-245.

Sugianti, E. (2021) 'Penimbangan Posyandu, Pemberian Imunisasi, dan Suplementasi Vitamin A pada Balita Stunting di Kota Pasuruan dan Kabupaten Jombang', *Jurnal Kesehatan Pena Medika*, 11(2), pp. 120–131. Available at: https://doi.org/DOI:10.31941/pmjk.v11i2.1630.

Wello, E.A. *et al.* (2022) 'Literature Review Faktor-Faktor yang Mempengaruhi Terjadinya Stunting pada Anak Balita', *Fakumi Medical Jurnal*, 1(3), pp. 234–240. Available at: https://doi.org/https://doi.org/10.33096/fmj.v1i3.70.

WHO (2022) *Joint child malnutrition estimates*. Available at: https://www.who.int/data/gho/data/themes/topics/joint-child-malnutrition-estimates-unicef-who-wb (Accessed: 22 January 2025).

Wijaya, A., Azizah, S.N. and Rohman, H. (2024) 'Pengetahuan Ibu Tentang Pemberian Vitamin A Pada Balita', 13(1), pp. 131–137. Available at: https://doi.org/DOI: 10.35328/keperawatan.v13i1.2624.

Yuziani and Sofia, R. (2022) 'Hubungan frekuensi penimbangan, penggunaan garam beryodium dan pemberian vitamin A dengan kejadian underweight pada balita di Puskesmas Kecamatan Muara Satu Kota Lhokseumawe', *Jurnal Kedokteran Syiah Kuala*, 22(2), pp. 111–116. Available at: https://doi.org/10.24815/jks.v22i3.23672.