




ORIGINAL ARTICLE

VITAMIN A SUPPLEMENTATION COVERAGE AND PREVALENCE OF MALNUTRITION STATUS AMONG TODDLERS IN SIDOARJO, INDONESIA

Cakupan Pemberian Vitamin A dan Kejadian Status Gizi Buruk pada Balita di Sidoarjo, Indonesia

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ABSTRACT

Background: A toddler's nutrition status is an essential indicator of public welfare, and the occurrence of malnutrition leads to severe problems that impact child growth development. **Purpose:** This research aims to understand the coverage correlation of giving vitamin A with the occurrence of malnutrition among toddlers in Sidoarjo regency. **Methods:** The researchers used ecological study methods followed by the usage of secondary data retrieved from Sidoarjo's Regency Health Profile in 2020-2022 with a sub-district analysis unit. Vitamin A coverage and the nutrition status amount by sub-district were visualized on the map using QGIS. Pearson's correlation test was used to find out the correlation between coverage of giving vitamin A and nutrition status. **Results:** The findings show that there are none of the significant correlations found between giving vitamin A and the occurrence of malnutrition in toddlers, which tends to increase annually. **Conclusion:** Therefore, it can be concluded that there is no significant correlation between the coverage of vitamin A and the occurrence of malnutrition among toddlers, which indicates there are a few factors and risks that play an essential role in participating in the impact of malnutrition status among toddlers in Sidoarjo regency.

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ABSTRAK

Latar Belakang: Status gizi balita merupakan indikator penting kesejahteraan masyarakat, dengan gizi buruk menjadi masalah serius yang

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berdampak pada perkembangan anak. Tujuan: Penelitian ini bertujuan untuk mengetahui korelasi antara cakupan pemberian vitamin A dan kejadian gizi buruk pada balita di Kabupaten Sidoarjo. *Metode:* Metode studi ekologi dengan menggunakan data sekunder dari Profil Kesehatan Kabupaten Sidoarjo tahun 2020-2022 dengan unit analisis kecamatan. Sampel penelitian menggunakan total sampling population. Analisis univariabel melihat gambaran sebaran cakupan pemberian vitamin A dan jumlah status gizi berdasarkan wilayah. Uji korelasi Pearson untuk mengetahui korelasi antara cakupan pemberian vitamin A dengan status gizi. *Hasil:* Hasil menunjukkan tidak adanya korelasi signifikan antara cakupan pemberian vitamin A dan kejadian gizi buruk pada balita. Selain itu ditemukan adanya kesenjangan, dimana terjadi kasus gizi buruk balita yang cenderung meningkat setiap tahunnya, meskipun angka cakupan pemberian vitamin A pada balita juga terus meningkat setiap tahunnya. *Simpulan:* Dengan demikian, tidak terdapat korelasi yang signifikan antara cakupan pemberian vitamin A dengan kejadian gizi buruk pada balita. Hal ini mengindikasikan bahwa faktor-faktor risiko lainnya juga berperan penting dalam mempengaruhi status gizi buruk pada balita di Kabupaten Sidoarjo.

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INTRODUCTION

According to UNICEF, Indonesia is the country with the fourth largest number of children in the world. There are common problems related to this, like the occurrence of urban poverty and difficulty in accessing children's health services, especially in disadvantaged areas. This condition affects the child's life and growth, and it can potentially cause malnutrition in children (1). Nutrition is one of the determining factors in improving the quality of human resources. Candidates for quality human resources come from childhood aged 1-6 years, which is known as the golden age (2). Malnutrition is a condition where an individual experiences nutritional deficiency, such as a lack amount of energy intake, protein, vitamins, and minerals over a long period. The effects of malnutrition on children not only interrupt the growth of cognitive development but also contribute to the number of children's morbidity and mortality rates (3).

Societal conditions such as geographical area differences, feeding practices, food vulnerability, and maternal awareness of balanced nutrition are known as some of the factors and risks that cause malnutrition (4). According to UNICEF, nutrition status is classified into two concepts: the direct cause and the indirect cause. The direct cause that influences the nutrition status is the type of food consumed from 2020 to 2022 and the disease suffered among toddlers. The indirect cause also influences the nutrition status in the fields of economic status, education, knowledge, income

level, food vulnerability, environmental sanitation, and the awareness usage of health facility services (3).

The severe problem of malnutrition may significantly influence a toddler's growth and development for an extended period and cause an increasing number of morbidity and mortality. Stunting is one of the forms of malnutrition; in the year 2020, The prevalence of cases was 149 million, and the stunted was 45 million toddlers globally (5). This problem of malnutrition generally happens in developing countries and threatens children. According to the data provided by WHO in the year 2019, there are 22.20% or approximately 150,8 million toddlers globally suffer from malnutrition, and half of the malnutrition toddlers are Asians (55%) (6). In 2019, the highest prevalence of malnutrition was in Southeast Asia at 25.5%, followed by Africa at 16.60%, the Eastern Mediterranean at 12.30%, the West Pacific at 2.40%, and the Americas at 1.6% (7). Indeed, it is also known that the children's mortality risks who suffer from malnutrition are 13 times more significant compared to the children who have well-maintained nutrition (8).

In 2022, the prevalence of malnutrition or wasting in Indonesia was 7.70%. This number has increased compared to a few years ago (9). Respectively, the prevalence of malnutrition in Indonesia in the year 2019 is 7.40%, and 2021 is 7.10% (10). However, those numbers are still far from the target SDG 2.2 in 2030, that zero prevalence of toddler malnutrition in a country (11).

According to the Basic Health Research (Riskesmas) of East Java Province in 2018, the prevalence of malnourished toddlers in East Java was 16.80% (12). In 2022, according to SSGI, the prevalence of malnourished toddlers in East Java was 7.20% (10). Based on Sidoarjo Regency Health Profile data in 2020-2022 shows that there has been an increase in cases of malnutrition among children under five, namely showing a prevalence rate of 7.77% in 2020, 8.10% in 2021, and 11.75% in 2022 (13). This shows that the incidence of malnutrition among toddlers is still a serious health problem that needs to be addressed by the government and society to be fixed.

The Indonesian government has implemented several programs and policies to address cases of malnutrition in children, one of which is the distribution of vitamin A capsules to infants (6-11 months) and toddlers (12-59 months) simultaneously every February and August (14). Vitamin A is a micronutrient that helps children build and improve immune system resistance and healthy vision (15). Vitamin A deficiency (VAD) can increase the risk of infectious diseases, such as ISPA and diarrhoea, inhibit the growth of toddlers, and cause death (16). Lack of vitamin A is caused by daily food intake or obstruction of the absorption and formation of vitamins in the body due to metabolic disorders in the body (17). Children who experience a lack of vitamin A are highly susceptible to malnutrition and becoming infected with diseases due to their decreased immune system resistance (18). This research was conducted to explore the correlation between the current coverage of vitamin A administration carried out by the Sidoarjo Regency government and the increasing incidence of malnutrition among toddlers in the last three years, especially in the Sidoarjo Regency area. Sidoarjo Regency was used for this research because, from the latest SSGI 2022 data, Sidoarjo Regency has high cases of malnutrition among toddlers with a prevalence rate of 9.60%, which is higher than the prevalence of malnutrition in East Java of 7.20% (10).

METHODS

Study Design

This study was conducted using an ecological study design and secondary data from the Health Profile of Sidoarjo Regency from 2020 to 2022.

Population

This study utilized aggregated data about the prevalence of malnutrition and coverage of vitamin

A in toddlers retrieved from the Health Profile of Sidoarjo Regency from 2020 to 2022. It can be accessed in general on the Sidoarjo Health Office website, with the district unit analysis totalling 18 districts in Sidoarjo Regency, The Province of East Java.

Variable

The variables in this study include data on the prevalence of malnutrition among toddlers and the coverage of vitamin A among toddlers in the Sidoarjo Regency from 2020 to 2022. The prevalence of malnutrition among toddlers is calculated by dividing the number of cases in malnourished or underweight toddlers based on weight-for-height measurement by the total number of toddlers aged 0-59 months, then multiplied by one hundred per cent. The prevalence of malnutrition among toddlers is calculated by the author utilizing secondary data from the Health Profile of Sidoarjo Regency from 2020 to 2022 to determine the extent of malnutrition issues within the toddler population in Sidoarjo Regency. Meanwhile, the coverage of vitamin A administration is determined by comparing the percentage of toddlers who have received vitamin A supplements to the total toddler population in each district of Sidoarjo. The coverage of giving vitamin A is used to measure the level of effectiveness of implementing health programs, especially in dealing with the incidence of malnutrition among toddlers.

Data Analysis

Among the total of 18 districts in Sidoarjo Regency, districts with an increasing trend in malnutrition cases among toddlers are more dominant compared to districts where malnutrition cases are declining. Although the coverage rate for giving vitamin A has predominantly increased. The data was analyzed using Pearson's correlation test to examine the correlation between the coverage of vitamin A supplementation and the prevalence of malnutrition status among toddlers in Sidoarjo Regency from 2020 to 2022, which can be said to have a significant relationship if the p-value <0.05. Through the Pearson correlation coefficient value, the level of correlation strength can be determined. Correlation is said to be very weak if ($0.00 \leq r \leq 0.25$), moderate ($0.26 \leq r \leq 0.50$), strong ($0.51 \leq r \leq 0.75$), robust ($0.76 \leq r \leq 0.99$), and perfect correlation ($r=1$). Apart from that, the value of the Pearson correlation coefficient can be interpreted as $r=1$, a perfect positive relation (both variables move together with a positive linear relation), $r=0$; there

is no linear relation between the variables (the variables are not linearly correlated), and $r = -1$ negative perfect relation (both variables move together with a negative linear relation). The Pearson correlation test was used because all variables are normally distributed with a value of ($p > 0.05$). The data was analyzed by using SPSS-18 and QGIS Software.

Ethical Clearance

This research has obtained an ethical clearance certificate from the Faculty of Public Health,

Universitas Airlangga, with certificate number 218/EA/KEPK/2023.

RESULTS

The research findings are descriptively presented in a map illustrating the coverage of giving vitamin A among toddlers alongside the prevalence of malnutrition among toddlers in Sidoarjo Regency from 2020 to 2022, based on data from the Health Profile of Sidoarjo Regency, as depicted in the Figure 1:

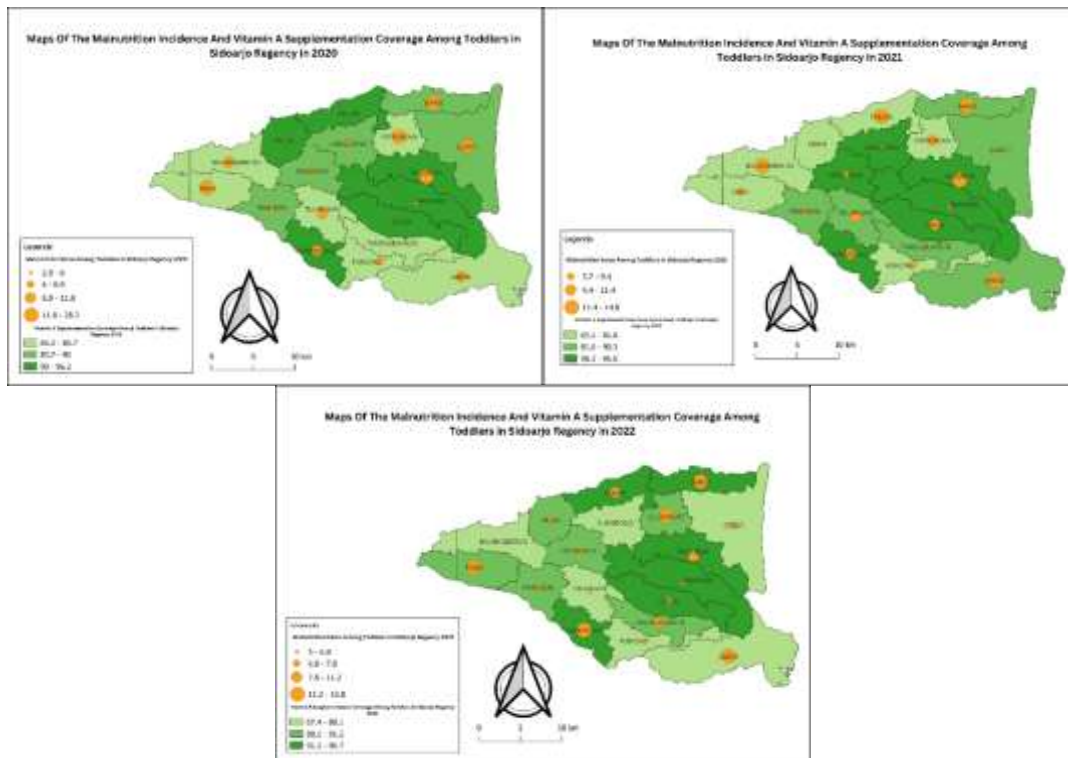


Figure 1. Map on the prevalence of malnutrition in toddlers and coverage of vitamin A among toddlers in Sidoarjo Regency, East Java, 2020-2022

In Figure 1, the greener the district on the map, the higher the coverage of vitamin A administration in that area. Meanwhile, the larger the dot in the district, the higher the prevalence of malnutrition in that area. From Figure 1, the map depicting the prevalence of malnutrition among toddlers and the coverage of vitamin A administration among toddlers in Sidoarjo Regency from 2020 to 2022, it can be observed that out of the total in 18 districts, there are 6 districts where the cases of malnutrition among toddlers tend to increase. These districts are Tarik, Prambon, Krembung, Jabon, Tanggulangin, and Waru. Only one district shows a decreasing trend in malnutrition cases among toddlers, which is the Sidoarjo district. As for the coverage of vitamin A administration, 5 districts are showing an

increasing trend, namely Prambon, Candi, Tulangan, Sidoarjo, and Buduran. Only one district, Jabon, shows a decreasing trend in the coverage of vitamin A administration. Overall, among the districts in Sidoarjo Regency, districts with a tendency to increase malnutrition cases among toddlers are still more dominant compared to districts where malnutrition cases are lower. However, the coverage of vitamin A supplementation and distribution is experiencing an overall increase. There are only 2 districts that are in accordance with the theory regarding the relationship between coverage of vitamin A and the incidence of malnutrition, namely Jabon and Sidoarjo. Jabon District has low coverage of

vitamin A, causing an increase in the incidence of malnutrition in this area.

Meanwhile, Sidoarjo District has high coverage of vitamin A, so the incidence of malnutrition in this area tends to decrease. However, there is a disparity in one district, namely Prambon. In the Prambon district, the cases of malnutrition among toddlers tend to increase every year, even though the coverage of vitamin A supplementation among toddlers in that district also continues to increase annually.

Normality Test

In this study, the normality test was conducted using the Kolmogorov-Smirnov test, with the interpretation of the result that a p -value > 0.05 indicates that the data is considered normally distributed. In this study, the variable acts as the dependent variable, which is the prevalence of malnutrition among toddlers, while the independent variable is the coverage of vitamin A given to toddlers. The normality test results revealed that all data related to the correlation between the coverage

of giving vitamin A among toddlers and the prevalence of malnutrition among toddlers are normally distributed because the p -value > 0.05 . The respective p -values for each year were as follows: in 2020, it was 0.550; in 2021, it was 0.822; and in 2022, it was 0.922.

Correlation Analysis

Based on Table 1, it can be observed that in the year 2020, the Sig. (2-tailed) value of $0.84 > 0.05$, indicating that there is no significant relation between the coverage of vitamin A and the occurrence of malnutrition status among toddlers. In the year 2021, the Sig. (2-tailed) value of $0.84 > 0.05$, indicating that there is no significant relationship between the coverage of vitamin A and the occurrence of malnutrition status among toddlers. In the year 2022, the Sig. (2-tailed) value of $0.42 > 0.05$, indicating that there is no significant relation between the coverage of vitamin A and the occurrence of malnutrition status among toddlers.

Table 1

Correlation Analysis of the Coverage of Giving Vitamin A and the Prevalence of Malnutrition Among Toddlers in Sidoarjo Regency for the Years 2020-2022

		The Coverage of vitamin A		
		2020	2021	2022
Malnutrition	Pearson Correlation	0.05	-0.05	-0.20
	Sig (2-tailed)	0.84	0.84	0.42
	N	18	18	18

DISCUSSION

The findings of this study indicate that there is no correlation between the coverage of vitamin A and the occurrence of malnutrition among toddlers in Sidoarjo Regency from 2020 to 2022. These results are consistent and in line with the study by Shabariah and Pradini (19), which supports the notion that there is no significant correlation between vitamin A status and the nutritional status of toddlers. This is because multiple factors influence the nutritional status of children; there are several other factors, such as food consumption, macronutrient energy, and micronutrient intake, such as calcium, mg, and fe.

Lestari's study (20) is not in line with this research opinion, as it suggests that there is a correlation between the administration of vitamin A and the occurrence of malnutrition. Food intake, especially vitamin A consumption, basically influences the nutritional status of toddlers.

However, the correlation between vitamin A consumption and the nutritional status of toddlers also needs to be supported by supporting knowledge and environmental factors to be able to create good food intake behavior from parents to their toddlers.

Research conducted by Yuziani (21) also disagrees, stating that there is a correlation between the administration of vitamin A and the occurrence of underweight or nutritional status among toddlers. The data obtained shows that toddlers who receive blue vitamin A supplements from the age of 6 months have a 37% chance of avoiding the risk of being underweight compared to toddlers who do not receive blue vitamin A supplements at the age of 6 months. That is also consistent with research conducted in India, which shows that children who receive an adequate amount of vitamin A intake have a lower prevalence of stunting, being underweight, and wasting compared to children who receive an inadequate amount of vitamin A

intake. Moreover, children who lack vitamin A are highly susceptible to malnutrition and becoming infected with diseases due to their decreased immune systems.

However, there is also an explanation related to aligning this research, as stated in the study by Ssentongo (22), which suggests that there is a correlation between consuming vitamin A and the nutritional status of toddlers. This is because toddlers with vitamin A deficiency have a 43% higher risk of stunted growth compared to those without vitamin A deficiency. Meanwhile, toddlers with vitamin A deficiency also have a 64% increased risk of experiencing severe stunting.

The discovery of disparity related to the Prambon District in Sidoarjo Regency, which has cases of malnutrition among toddlers that tend to increase every year, despite the coverage of giving vitamin A in that district also consistently increasing every year. Not only does the administration of vitamin A affect the nutritional status of toddlers, but many risk factors also influence the nutritional status of toddlers. Some factors and risks also influence this which include maternal education, maternal knowledge, maternal occupation, and intensive breastfeeding intake (23). Mother plays a crucial role in the health and development of her child. Children with mothers who have low education levels have higher mortality rates compared to children with mothers who have higher education levels. The mother's level of education serves as a gateway to how much information a mother can receive related to this particular knowledge. Meanwhile, maternal knowledge plays a crucial role in determining the family's food intake, which undoubtedly impacts the nutritional status of children or toddlers (24).

On the other hand, Toby et al (23) argued that the factor and the influence of maternal employment are significant on the nutritional status of toddlers since working mothers are considered to have less time to devote to their toddlers. Meanwhile, toddlers are still unable to fulfil their own needs. Thus, they need to be accompanied and monitored, especially when providing nutritional intake, which can affect their health and nutritional status. After that, followed by the influence of exclusive and intensive breastfeeding on the nutritional status of toddlers, breast milk is the first natural food source for toddlers that provides various vitamins, nutrients, and minerals for growth and development of toddlers (13). Giving exclusive and intensive breastfeeding is the best food to meet nutritional needs in the first 6 months, and it

successfully made toddlers reach an excellent nutritional status (23).

Policy Implication

Integrated efforts are needed to improve toddler health. Paying more attention to other supporting factors that influence the nutritional status in toddlers, such as providing education to increase knowledge through increased educational campaigns about the benefits of vitamin A, promoting participation in health posts (Posyandu), and strengthening comprehensive vitamin A distribution programs. This can help address disparities in research findings related to the relationship between giving vitamin A and malnutrition. Strengthening overall child health programs is also necessary to protect and sustain children's growth and immunity.

Research Limitation

In this study, the researcher only examined or found the correlation between malnutrition in toddlers and one factor, namely the coverage of giving vitamin A in toddlers. Malnutrition in toddlers is a complex issue that various factors can cause. This research uses data from a government program, namely the administration of vitamin A for toddlers. So, it can also be used as an evaluation material for why programs implemented with the aim of preventing malnutrition among toddlers still have not yet achieved optimal results.

CONCLUSION

From 2020 to 2022, in Sidoarjo Regency, the incidence of malnutrition issue among toddlers has consistently increased over the year. Meanwhile, the coverage of vitamin A was declining, although it increased again in 2022. Out of a total of 18 districts, overall, districts in Sidoarjo Regency with a tendency of increasing cases of malnutrition among toddlers are still more dominant compared to districts where cases of malnutrition tend to decrease. Although the coverage of administering vitamin A has dominantly increased, the occurrence of malnutrition status in toddlers is a complex issue. Our study found that there is no correlation between the coverage of administering vitamin A and the occurrence of malnutrition in toddlers. Therefore, for future research, researchers can use better designs and methods to see the relationship between the variables of vitamin A coverage and the nutritional status of toddlers. Apart from that, further research can also consider other variables that might contribute to nutritional status.

CONFLICT OF INTEREST

There is no conflict of interest in this research.

AUTHOR CONTRIBUTION

AG: Conceptualization, methodology, data visualization, analysis, writing–original draft, writing–review, and editing. SSNS: Manuscript review and Proofreading, Final approval of this study. EA: Editing, manuscript review and proofreading, and final approval of this study. GNFH: Manuscript review and Proofreading.

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