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RELATIONSHIP BETWEEN STATUS AND FREQUENCY OF WEIGHING WITH PREVALENCE OF SEVERELY WASTING AND WASTING IN TODDLERS IN INDONESIA

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ABSTRACT

Background: *Wasting is a health problem that affects children's growth and development. This study aims to analyze the relationship between weighing frequency and the prevalence of nutritional status (severely wasting and wasting) in children aged 0-23 months in Indonesia.*
Methods: *This study used a descriptive correlation method with a cross-sectional approach. The study sample consisted of toddlers aged 12-18 months who met the inclusion criteria. Data were collected through the Healthy Menu Card (KMS) and analyzed using a correlation statistical test.*
Result: *The results showed that the Papua region had the highest proportion of toddlers who were not weighed (67.6%), while Java and Bali had the highest proportion of toddlers who were weighed more than 8 times (73.8%). The highest wasting prevalence was found in Papua (14.2%) and the lowest in Java and Bali (3.2%). The results of the analysis showed a significant relationship between weighing frequency and the prevalence of wasting (p = 0.011) and severe wasting (p = 0.001).*
Conclusion: *Therefore, increasing the frequency of weighing and nutritional interventions are needed to address the problem of wasting in toddlers.*

Keywords: *weight measurement, nutritional status, toddler*

INTRODUCTION

Nutritional problems in the community are often measured based on the prevalence of nutritional issues in toddlers, who are a vulnerable group to such problems (Muliyati et al., 2021). The prevalence of nutritional problems in toddlers is often used to illustrate the nutritional conditions of the community (Syarfaini et al., 2022). One of the nutritional problems in toddlers that need attention is wasting (underweight) and severe wasting (very underweight) (Alfadhila Khairil Sinatrya, 2020). The prevalence of wasting and severe wasting in toddlers is a health problem that is still a major challenge in Indonesia. Wasting and severe wasting are acute nutritional problems that occur in a short time and are at risk of causing death if not treated immediately (Mareta et al., 2024). According to data from the World Health Organization (WHO), the prevalence of severe wasting in children aged 0-23 months in Indonesia is quite high and still far from the reduction target set by the government (Tri Ariani et al., 2024). This condition, if not addressed immediately, can have long-term impacts on children's physical and cognitive development, as well as increase their vulnerability to infectious diseases (Muliyati et al., 2021) In toddlers, underweight nutrition can reduce intelligence, productivity, and creativity. This problem also has a major impact on the quality of human resources (HR) in the future (Mantur et al., 2023). Toddlers who experience wasting and severe stunting not only threaten their physical health but also hinder their future development potential.

WHO states that wasting is a public health problem, a public health problem is categorized as serious if it has a percentage between 10.0% to 14.0%, and is considered critical if it exceeds 15%(Mantur et al., 2023). The incidence of wasting in Indonesia has shown a decline in recent years, namely 12.1% in 2013 increasing to 13.3% in 2010 (Ministry of Health of the Republic of Indonesia 2013) and 10.2% in 2018 (Rosyida et al., 2024). Although the waste rate in Indonesia fluctuates, the percentage is still above 10%, which makes the waste problem a serious issue to be addressed (Rosyida et al., 2024). Problem-wasting children aged 0-23 months in Indonesia also have a high prevalence and wide disparities between provinces and regions. According to the 2022 Indonesian Nutritional Status Survey (SSGI), the prevalent age group still shows quite worrying figures. These figures reflect poor eating patterns and general health conditions at the family and community level, which are closely related to low access to health services and good food security(Mareta et al., 2024).

The high prevalence of malnutrition and poor nutrition in toddlers is influenced by three main factors. The first factor is the low quality and quantity of food consumption due to weak family food security. The second factor is poor parenting. The third factor is limited access to health facilities (Yanti et al., 2019). In response to this problem, one important step that needs to be considered is the frequency of weighing children to monitor children's nutritional status in a more structured manner. Routine weighing is one of the essential interventions in efforts to monitor the nutritional status of toddlers. Routine weighing will help detect significant weight loss, which is an important indicator for identifying nutritional problems, including severe wasting and wasting. Research conducted by (Putriastuti et al., 2024). Shows that a higher frequency of weighing can accelerate the detection and treatment of nutritional problems in children, reducing the risk of wasting, and increasing the success of nutritional interventions carried out.

The Indonesian government has carried out various interventions and government programs to reduce the number of waste and severe wasting. Study of the relationship between the frequency of weighing and the prevalence of nutritional problems in children aged 0-23 months in Indonesia has not been widely studied. Existing research is still limited to other nutritional factors, such as food consumption and access to health services(Mareta et al., 2024). Therefore, it is important to identify the role of routine weighing in reducing the prevalence of wasting and severe wasting in this age group. The results of this study are expected to provide scientific evidence that can be used to design more effective policies and programs in reducing the prevalence of nutritional problems in children. The purpose of this study was to describe the proportion of weight and the prevalence of growth disorders by region and to analyze the relationship between the proportion of weight and the prevalence of severe wasting and wasting in children aged 0-23 months in Indonesia. The results of this study are expected to provide evidence-based recommendations regarding the importance of increasing the frequency of weighing in efforts to prevent and overcome nutritional problems in children (Andini et al., 2020).

METHODS

This study used a cross-sectional design method, where data on the proportion of body weight with prevalence of severe wasting and wasting collected at one time simultaneously on the same subject. This study uses a unit of analysis from aggregate data in 38 provinces from the 2023 Indonesian Health Survey (IHS) report with the population in this study covering all children aged 0-59 months in Indonesia recorded in the IHS 2023.

Independent variables are the proportion of weighing status and the proportion of weighing frequency in the last 12 months, while the dependent variable is the prevalence of children aged 0-23 months who experience wasting and severely wasting. Both variables are measured using a ratio scale. The proportion of weighing is calculated using the formula Proportion of growth monitoring in children aged 0-59 months = Number of children aged 0-59 months who weigh or measure their length/ height divided by the total number of toddlers x 100%. Growth monitoring through weighing (WEIGHT) or measuring body length/height (PB/TB) in the last 12 months. The intended weighing and measuring of body length/height is calculated a maximum of only 1 time in 1 month, so if there are 2 or more weighing/measurements, it is considered only 1 time, weighing and measuring PB/TB does not include weighing and measuring height carried out during this survey or when the child is sick. The categories of data collection results on weighing are not weighed, weighed 8 times in 12 months, and weighed less than 8 times in 12 months. In children who have never been weighed or measured for height in the past year, the main reason for never being weighed or measured for height was asked. The prevalence of toddlers who experience wasting and severely wasting in toddlers aged 0-23 months is calculated using the formula for dividing the Number of Toddlers Severely Wasting or wasting divided by the number of toddlers measured weight and PB x 100. The weight of toddlers is weighed using a digital scale with a precision of 0.05 kg, while the length body was measured using a body length measuring tool with a precision of 0.1 cm. To assess the nutritional status of toddlers, the weight and length figures for each toddler were converted into standardized values (Z-score) using the WHO 2005 anthropometric standards for toddlers. Classification of nutritional status based on the Body Weight according to Body Length (WHZ) indicator is categorized as wasting if Z-score≥ -3.0 to Z-score< -2.0 and is categorized as severely wasting if Z-score< -3.0

The data processing process includes checking the 2023 IHS report, coding, and compiling data. Univariate analysis was conducted to describe the size of the distribution of the proportion of weighing and the prevalence of wasting and severe wasting data (minimum, maximum, average, and standard deviation). Bivariate analysis was conducted to identify the relationship between the proportion of weighing and the prevalence of severe wasting and wasting in children aged 0-23 months in Indonesia, using the Pearson correlation test. The implementation of the Indonesian Health Survey (IHS) has received approval and an ethical clearance letter from the National Health Research and Development Ethics Commission (KEPPKN) with the number HK.01.07/MENKES/156/2023. During the implementation of the IHS, all procedures were carried out by observing ethical principles, including data confidentiality and informed consent. The study participants were given an explanation of the purpose and procedures of the study and their right to participate voluntarily, and they gave written consent before the data were collected.

RESULTS AND DISCUSSION

Table 1 shows that the highest distribution of unweighed weight occurs in the Papua region (67.6%) and the lowest in the Java and Bali regions (3.8%). The highest distribution of weighted weight occurs in the Java and Bali regions (96.2%) and the lowest in the Papua region (32.4%). Table 2 shows that the distribution of Weighing more than 8 times is highest in Java and Bali (73.8%) and the lowest in Papua (13.5%). The distribution of Weighing less than 8 times is highest in Papua (58.8%) and the lowest in Nusa Tenggara (13.5%). This study revealed a gap in the distribution of weighing services in various

regions in Indonesia. Papua is the region with the highest percentage of unweighed toddlers (67.6%) and has the lowest number of weighing more than 8 times (13.5%). In contrast, Java and Bali recorded the highest number of toddlers weighing (96.2%) and the largest proportion weighing more than 8 times (73.8%). This difference shows that access to health services is still a problem, and challenges in several regions, especially Papua and Maluku. Geographical constraints, limited health infrastructure, and low public awareness are thought to be the main factors in the low frequency of weighing in these areas. Meanwhile, areas with high weighing coverage, such as Java and Bali, generally have more adequate health facilities and more active education programs in raising awareness of the importance of monitoring nutritional status.

Table 1. Distribution of Proportion of Weight Weighing Status by Region of Indonesia in 2023

Region	Unweighed			Weighed		
	Minimum	Maximum	$X \pm SD$	Minimum	Maximum	$X \pm SD$
Sumatera	14.4	32.4	25.3±6.6	67.6	85.6	74.6±6.6
Jawa dan Bali	3.8	22.1	9.8± 6.1	77.9	96.2	90.1± 6.1
Nusa Tenggara	9.3	12.4	10.8±2.2	87.6	90.7	89.1±2.1
Kalimantan	20.3	28.9	23.6±3.8	71.1	79.7	76.4±3.8
Sulawesi	17.4	31.8	24.4±4.6	68.2	82.6	75.5±4.6
Maluku	30.2	32.2	31.2±1.4	67.8	69.8	68.8±1.4
Papua	28.3	67.6	43.4±15.7	32.4	71.7	56.6±15.7
Indonesia	**3.8**	**67.6**	**24.52±12.9**	**32.4**	**96.2**	**75.47±12.9**

Table 2. Distribution of Proportion of Body Weight Weighing by Region of Indonesia in 2023

Region	Unweighed			Weighed		
	Minimum	Maximum	$X \pm SD$	Minimum	Maximum	$X \pm SD$
Sumatera	30.9	50.9	40.5± 6.9	34.7	56.6	48.3±7.3
Jawa dan Bali	41.3	73.8	62.7±11.5	24.4	50.4	32.84±9.4
Nusa Tenggara	68.5	69.8	69.1±0.9	23.7	25.4	24.55±1.2
Kalimantan	35.1	51.8	44.9±6.2	39.7	58.3	45.28±7.5
Sulawesi	36.4	56.7	44.2±7.1	34.5	47.4	42.98±4.6
Maluku	49.3	51.3	50.3±1.4	33.6	38.0	35.80±3.1
Papua	13.5	45.3	30.3±10.5	38.2	58.8	48.11±7.8
Indonesia	**13.5**	**73.8**	**46.17±13.8**	**23.7**	**58.8**	**42.2±9.9**

Table 3. Prevalence of Wasting and Severely Wasting in Toddlers by Region of Indonesia in 2023

Region	Unweighed			Weighed		
	Minimum	Maximum	$X \pm SD$	Minimum	Maximum	$X \pm SD$
Sumatera	30.9	50.9	40.5± 6.9	34.7	56.6	48.3±7.3
Jawa dan Bali	41.3	73.8	62.7±11.5	24.4	50.4	32.84±9.4
Nusa Tenggara	68.5	69.8	69.1±0.9	23.7	25.4	24.55±1.2
Kalimantan	35.1	51.8	44.9±6.2	39.7	58.3	45.28±7.5
Sulawesi	36.4	56.7	44.2±7.1	34.5	47.4	42.98±4.6
Maluku	49.3	51.3	50.3±1.4	33.6	38.0	35.80±3.1
Papua	13.5	45.3	30.3±10.5	38.2	58.8	48.11±7.8
Indonesia	**13.5**	**73.8**	**46.17±13.8**	**23.7**	**58.8**	**42.2±9.9**

Table 1 shows that the highest distribution of Unweighed Weight occurs in the Papua region (67.6%) and the lowest in the Java and Bali region (3.8%). The highest distribution

of Weighed Weight occurs in the Java and Bali region (96.2%) and the lowest in the Papua region (32.4%). Table 2 shows that the distribution of Weighing more than 8 times is highest in Java and Bali (73.8%) and the lowest in Papua (13.5%). The distribution of Weighing less than 8 times is highest in Papua (58.8%) and the lowest in Nusa Tenggara (13.5%).

Prevalence of Nutritional Status The prevalence rates of wasting and severely wasting vary across regions in Indonesia. Papua recorded the highest wasting rate, at 14.2%, while Java and Bali had the lowest, at 3.2%. For the severely wasting category, Maluku had the highest prevalence (6.9%), while Java and Bali had the lowest (0.5%). When these two categories are combined, Papua is the region with the highest prevalence, reaching 20.4%.

These data indicate that areas with better access to health services and infrastructure tend to have lower wasting rates. Conversely, areas with limited access to health services and less than-optimal parenting patterns tend to experience higher wasting rates. The high prevalence of wasting and severely wasting in Papua and Maluku reflects the problems of food security, limited health services, and a lack of understanding of appropriate parenting patterns in meeting children's nutritional needs. On the other hand, areas with low prevalence such as Java and Bali show better effectiveness of nutrition interventions.

Based on data from the 2023 Indonesian Health Survey (IHS), the prevalence of wasting at the national level was recorded at 6.6%, while the prevalence of severely wasting reached 2.6%. According to WHO standards, this figure is still in the serious category, where a wasting prevalence of between 10-14% is classified as a serious problem, while a figure above 15% is considered a critical condition.

Table 4. Relationship between weight status and frequency with the prevalence of saverely wasting and wasting among toddlers in Indonesia

Weighing Status and Frequency	Prevalence Severely Wasting	Prevalence Wasting	Prevalence of Saverely wasting + wasting
The Proportions are Unweighed			
Beta	0.07	0.06	0.13
Constant	1.68	6.28	7.96
Correlation Coefficient (r)	0.58	0.35	0.47
p-value	0.00	0.02	0.00
The proportion of Body Weight Weighing < 8 times			
Beta	0.02	0.02	0.04
Constant	2.39	6.85	9.25
Correlation Coefficient (r)	0.16	0.09	1.13
p-value	0.33	0.55	0.43
Proportion of Body Weight Weighing ≥ 8 times			
Beta	-0.05	-0.04	-0.09
Constant	5.86	9.72	15.5
Correlation Coefficient (r)	0.43	0.26	0.34
p-value	0.00	0.11	0.03

The results of data analysis in Table 4 show that never being weighed is related to the prevalence of saverly wasting (p-value 0.00), the prevalence of wasting (p-value 0.02) and the prevalence of saverly wasting + wasting (p-value 0.00). Weighing < 8 times was not related to the prevalence of severe wasting (p-value 0.33), the prevalence of wasting (p-value 0.55) and the prevalence of severe wasting + wasting (p-value 0.43). Weighing > 8 times is associated with the prevalence of severe wasting (p-value 0.00), weighing > 8 times is

not associated with the prevalence of wasting (p-value 0.11) and weighing > 8 times is associated with the prevalence of extremely wasting + wasting (p-value 0.03).

Weight Distribution

This study revealed a gap in the distribution of weighing services in various regions in Indonesia. Papua is the region with the highest percentage of unweighed toddlers (67.6%) and has the lowest number of weighing more than 8 times (13.5%). In contrast, Java and Bali recorded the highest number of toddlers weighing (96.2%) and the largest proportion of weighing more than 8 times (73.8%).

This difference shows that access to health services is still a problem. challenges in several regions, especially Papua and Maluku. Geographical constraints, limited health infrastructure, and low public awareness are thought to be the main factors in the low frequency of weighing in these areas. Meanwhile, areas with high weighing coverage, such as Java and Bali, generally have more adequate health facilities and more active education programs in raising awareness of the importance of monitoring nutritional status.

Prevalence of Nutritional Status

The prevalence rates of wasting and severely wasting vary across regions in Indonesia. Papua recorded the highest wasting rate, at 14.2%, while Java and Bali had the lowest, at 3.2%. For the severely wasting category, Maluku had the highest prevalence (6.9%), while Java and Bali had the lowest (0.5%). When these two categories are combined, Papua is the region with the highest prevalence, reaching 20.4%.

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Based on data from the 2023 Indonesian Health Survey (IHS), the prevalence of wasting at the national level was recorded at 6.6%, while the prevalence of severely wasting reached 2.6%. According to WHO standards, this figure is still in the serious category, where a wasting prevalence of between 10-14% is classified as a serious problem, while a figure above 15% is considered a critical condition.

Relationship between Body Weight and Nutritional Status

The results of statistical analysis revealed a significant relationship between the frequency of weighing and the prevalence of wasting (p=0.011) and severely wasting (p=0.001). Toddlers who were never weighed tended to have a higher risk of wasting and severely wasting. Conversely, toddlers who were weighed more than 8 times a year tended to have a lower prevalence of wasting.

The frequency of weighing plays a role in the early detection of nutritional problems. However, this study also highlighted the importance of additional interventions such as supplementary feeding and nutrition education. The findings show that some areas with high weighing coverage still have significant wasting rates.

Regularly weighing children under five is an effective preventative measure to reduce the incidence of severe wasting or severe malnutrition. Through regular weighing activities, ideally every month the child's growth can be monitored continuously and more precisely. This monitoring makes it easier to identify growth disorders early, such as weight loss or weight that does not increase according to the growth curve. (Asri & Nooraeni, 2021)

Early detection allows for quicker nutritional intervention, so that the child's condition does not progress to severe malnutrition. These intervention measures can include counseling parents about balanced eating patterns, monitoring children's nutritional intake, as well as providing supplements or referrals to health facilities if needed. (Ardiansyah & Simbolon, 2018)

Apart from that, regular weighing also increases parents' understanding of the importance of monitoring children's growth. Parents' active involvement in this process makes them more sensitive to early symptoms of nutritional disorders, which can ultimately encourage improvements in the child's overall nutritional status (Ariesta et al., 2023)

Social and Economic Influences on Wasting in Toddlers in Indonesia

Social and Economic Influences on Wasting in Toddlers in Indonesia Social and economic factors play an important role in determining the prevalence of wasting and severe wasting in toddlers in Indonesia. Aspects such as family economic conditions, maternal education level, and access to health services are the main factors that influence children's nutritional status. Families with low economic levels often face difficulties in meeting nutritious food needs, which contributes to an increased risk of malnutrition. Previous studies have shown that toddlers from low-income families are more vulnerable to wasting due to limited access to nutritious food and adequate health facilities (Sari, 2022).

In addition, the mother's education level also greatly influences the parenting pattern and fulfillment of children's nutrition. Mothers with higher education tend to have a better understanding of children's nutritional needs and the importance of monitoring growth. Conversely, mothers with lower education levels tend to be less aware of the importance of regular weighing and providing a balanced diet, which contributes to high wasting rates in toddlers (Saptarini et al., 2021).

Access to health services is also a major challenge, especially for people in remote and isolated areas such as Papua and Maluku. Limited infrastructure, lack of health workers, and long distances to healthcare facilities are major obstacles to routine monitoring of toddler growth. As a result, the coverage of weighing in these areas is still low, making it difficult to detect wasting early. Therefore, a more effective strategy is needed to expand the reach of health services in areas with a high prevalence of wasting(Hanifah et al., 2019).

Nutrition Intervention and Wasting Prevention Program

To reduce wasting rates in toddlers, the Indonesian government has implemented various efforts, including specific and sensitive nutrition intervention programs. Specific nutrition interventions include providing additional food for toddlers at risk of wasting, education about balanced nutrition, and providing nutritional supplements such as vitamin A and iron. This program has been implemented through Posyandu, Puskesmas, and other health institutions, but its coverage still needs to be expanded, especially in areas with high wasting rates (Agiwahyuanto & Ernawati, 2021).

Nutrition-sensitive interventions that include improving sanitation and access to clean water also play a role in reducing wasting rates. Poor sanitation conditions and limited access to clean water increase the risk of gastrointestinal infections, which can lead to weight loss and increase the likelihood of wasting. Therefore, improving sanitation infrastructure and the availability of clean water are key factors in efforts to prevent wasting in Indonesia (Dewi & Rozi, 2021).

In addition, increasing public awareness of the importance of routinely monitoring toddler weight also needs to be strengthened. Health campaigns through mass media, training of health cadres at the village level, and socialization in the community can help increase public participation in monitoring

toddler growth. With increased public awareness, it is hoped that the number of toddlers weighing can increase so that wasting can be detected earlier and handled more effectively (Assyfa et al., 2023).

Challenges in Handling Wasting

Although various programs have been implemented, there are still a number of challenges in addressing wasting in Indonesia. One of the main challenges is the limited budget for public health programs, especially in supporting national monitoring of toddler growth. Limited funds often lead to a lack of health workers and inadequate healthcare facilities in remote areas. Therefore, a larger allocation of funds is needed to strengthen nutritional monitoring and wasting intervention programs.

Another challenge is the low level of community participation in nutrition monitoring programs. Factors such as lack of awareness, low levels of education, and cultural influences that consider weighing as something less important contribute to this problem. To overcome this, a more intensive community-based approach and the involvement of community leaders in socializing the importance of nutrition monitoring are needed.

In addition, changes in people's consumption patterns are also a challenge in preventing wasting. The increasing consumption of instant foods that are low in nutrition and the lack of access to healthy foods in some areas have led to an unbalanced diet. Therefore, education about healthy eating patterns needs to be further encouraged, both through school and community programs.

Implications and Recommendations

This study emphasizes the importance of expanding the scope of weighing to detect nutritional problems early. Therefore, access to health services needs to be improved so that they are more easily accessible to the community. This effort is very important, especially in areas with high wasting rates such as Papua and Maluku (Nurhayani et al., 2023).

Some steps that can be taken include increasing access to health services, nutrition education for the community, and specific nutrition interventions. In addition, improving data quality and monitoring is also needed to ensure the effectiveness of nutrition programs. With these efforts, it is hoped that the wasting and severely wasting rates in toddlers in Indonesia can be reduced, thus supporting improvements in children's nutritional status nationally.

CONCLUSION

Conclusion This study shows that there is a significant relationship between the frequency of weighing and the prevalence of wasting and severe wasting in toddlers in Indonesia. Areas with low weighing coverage, such as Papua and Maluku, tend to have higher wasting rates compared to areas with better-weighing coverage, such as Java and Bali. In addition, although the frequency of weighing plays a role in the early detection of nutritional problems, additional interventions, such as providing additional food and nutrition education, are still needed to significantly reduce the prevalence of wasting.

To reduce wasting and severely wasting rates, efforts are needed to improve access to health services, especially in areas with low-weight coverage. Nutrition education programs for the community must be strengthened to raise awareness of the importance of monitoring the nutritional status of toddlers. In addition, policies are needed that support specific nutritional interventions and improvements in the monitoring and recording system for nutritional data to ensure the effectiveness of the programs implemented.

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CONFLICT OF INTEREST

All authors declared that there was no conflict of interest.

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