Prevalence of Underweight, Stunting, and Wasting in Under-five Children of Kuwiran Village, Madiun Regency, Indonesia: August 2022

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Abstract

In 2021, the prevalence of underweight cases in Indonesia is recorded at 17%, an increase of 0.7% compared to 16.3% in 2019. One of the risk factors of undernutrition especially in children is the early marriages of the parents. There is an increase in early marriages by 175 pairs in Madiun Regency, East Java in 2020. Anthropometric measurement is an important part of handling nutrition, growth, and development problems such as being underweight, stunted and wasted which is in line with the objectives of the *Indonesia Sehat* program in the *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN) 2020-2024 plan, namely improving the health and nutritional status of children.

This descriptive study focuses on the anthropometric results of children under five who performed routine examinations in the period of August 2022 in the integrated healthcare center or *Posyandu* of Kuwiran Village, Madiun Regency, East Java, Indonesia. This study obtained data from the integrated healthcare center records using total sampling, which obtained 41 subjects.

The results indicate that there is a 17.07% prevalence of underweight, 19.51% stunted, and 12.2% wasted from 41 under-five children who performed routine monthly measurements and check-ups at the integrated healthcare center of Kuwiran Village, Madiun Regency in the period of August 2022. The monthly prevalence of underweight and wasted children in Kuwiran Village alone is higher than the annual prevalence of underweight and wasted children in the Madiun Regency, East Java Province in 2021. However, the monthly prevalence of stunted children is lower than that of stunted children in East Java and Indonesia as a whole.

Keywords: anthropometry; under-five children; underweight; stunted; wasted; madiun regency; east java; indonesia

1. Introduction

In 2021, the prevalence of underweight cases in Indonesia is recorded at 17%, an increase of 0.7% compared to 16.3% in 2019 (Kemenkes, 2021). Early marriages are considered to be a cause of the increased risk of undernutrition (Cameron et al., 2021). The said matter is troubling since there was an increase in the occurrence of early marriages in the Madiun Regency as many as 175 pairs in 2020 (Saputra et al., 2021).

Anthropometry is the gold standard for non-invasive quantitative measurements to assess nutritional status in the pediatric population to assess general health, nutritional adequacy, growth, and development patterns (Casadei et al., 2021). Serial anthropometric measurements are used to monitor growth trends needed for

assessments such as WHZ (Weight-for-Age Z-score) and HAZ (Height-for-Age Z-score) with which obtained data can be followed up on handling nutritional and growth problems if found (Perumal et al., 2020). Moreover, an assessment of the nutritional status of under-five children is crucial since it is in line with the main target of the *Indonesia Sehat* program in the *Rencana Pembangunan Jangka Menengah Nasional* (RPJMN) 2020-2024 plan, namely improving the health and nutritional status of children (Kemenkes, 2021).

Based on the interview with the coordinator of Kuwiran Village's maternity center (*Polindes*) and a cadre of Kuwiran Village's integrated healthcare center (*Posyandu*), Madiun Regency, nutritional problems are still found but there was a lack of information on the cases of nutritional problems for August 2022. Based on the background stated above, the authors chose the title 'Prevalence of Underweight, Stunting, and Wasting in Under-five Children of Kuwiran Village, Madiun Regency, Indonesia: August 2022'.

2. Methods

2.1. Study type

This study is a descriptive research.

2.2. Study design

The study design chosen was a cross-sectional study using anthropometric data on the weight, height, and age of children under-five who came for routine check-ups at the integrated healthcare center (*Posyandu)* of Kuwiran Village, Madiun Regency in August 2022.

2.3. Study population and study sample

2.3.1. Study population

The study population consists of all children under-five who come for routine check-ups at the integrated healthcare center (*Posyandu)* of Kuwiran Village, Madiun Regency in August 2022.

2.3.2. Study sample

The study sample was children under-five who came for routine examinations, whose data were taken by total sampling, namely the technique of taking all samples that fulfilled the inclusion and exclusion criteria.

1. Inclusion criteria

    Children under-five with complete data, at least consisting of information about gender, age, weight, height, and nutritional status.

2. Exclusion criteria

    Children under-five with data stating that they do not agree with the use of the data.

2.3.3. Sample size

The sample size used in this study was all children under-five who came for routine check-ups at the integrated healthcare center (*Posyandu*) of Kuwiran Village, Madiun Regency in August 2022.

2.3.4. Sampling technique

The sampling technique used in this study is a non-random sampling technique.

2.4. Study variables and operational definition of variables

2.4.3. Study variable

The study variables are:

1. Age
2. Gender
3. Weight
4. Height
5. Nutritional status

2.4.4. Operational definition

The operational definitions are:

1. Age

Age is the age of the children under-five at the time of the routine examination in August 2022. It is secondary data obtained from integrated healthcare center (*Posyandu*) records. In the form of categorical data with a nominal data scale in units of months.

2. Gender

Gender is the type of gender of the children under-five at the time of the routine examination in August 2022. It is secondary data obtained from integrated healthcare center (*Posyandu*) records. In the form of categorical data with a nominal data scale, then categorized into:

   a) Male
   b) Female

3. Weight

Weight is the body weight of children under-five at the time of the routine examination in August 2022. It is secondary data from integrated healthcare center (*Posyandu*) records. In the form of categorical data with nominal data scale in kilogram (kg) units.

4. Height

Height is the body height   children under-five at the time of the routine examination in August 2022. It is secondary data obtained from integrated healthcare center (*Posyandu*) records. In the form of categorical data with nominal data scale in centimetre (cm) units.

5. Nutritional status

Nutritional status is the nutritional status of children under-five at the time of the routine examination in August 2022. It is secondary data obtained from integrated healthcare center (*Posyandu*) records. In the form of categorical data with a nominal data scale, then categorized into:

- a) Weight-for-Age
  - a. Severely underweight (z-score of < -3 SD)
  - b. Underweight (z-score of -3 SD until < -2 SD)
  - c. Normal (z-score of -2 SD until +1 SD)
  - d. Risk of overweight (z-score of > +1 SD)
- b) Height-for-Age
  - a. Severely stunted (z-score of < -3 SD)
  - b. Stunted (z-score of -3 SD until < -2 SD)
  - c. Normal (z-score of -2 SD until +3 SD)
  - d. Tall (z-score of > +3 SD)
- c) Weight-for-Height
  - a. Severely wasted (z-score of < -3 SD)
  - b. Wasted (z-score of -3 SD until < -2 SD)
  - c. Normal (z-score of -2 SD until +1 SD)
  - d. Possible risk of overweight (z-score of >+1 SD until +2 SD)
  - e. Overweight (z-score of >+2 SD until +3 SD)
  - f. Obese (z-score of > +3 SD)

2.4. Study instrument

The instrument used in this study was the integrated healthcare center (*Posyandu)* records of routine check-ups for children under-five in August 2022.

2.5. Study site and study period

2.5.1. Study site

This study was conducted in the integrated healthcare center (*Posyandu*) of Kuwiran Village, Madiun Regency, East Java, Indonesia.

2.5.2. Study period

This study was conducted in August 2022.

2.6. Data collection

The stages of data collection are as follows:
1. Visitation to the integrated healthcare center (*Posyandu*) for children under-five and record storage room.
2. Collection of the integrated healthcare center (*Posyandu*) records for the routine check-ups of children under-five.
3. Collection of data on the identity of children under-five in the form of initials, gender, and age.
4. Collection of data on the weight of children under-five.
5. Collection of data on the height of children under-five.
6. Collection of data on the nutritional status of children under five.
7. Processing and analyzing the data obtained.

2.7. Data processing and data analysis

2.7.1. Data processing

The data that has been collected is then carried out in data processing stages which include coding, entry, and cleaning.
1. Coding
   This stage is in the form of giving a certain code to each variable to facilitate data entry and analysis.
2. Data entry
   Stages of entering data from the integrated healthcare center (*Posyandu*) records into a laptop/computer using software (Microsoft Office).
3. Data cleaning
   The process of cleaning data from possible errors during analysis so that repairs can be made immediately.
Furthermore, the data are grouped based on the research variables.

2.7.2. Data analysis

Descriptive data analysis. The data that has been grouped based on the variables are presented in the form of a frequency distribution table.

3. Result and Discussion

Table 1. Study Subject Characteristics

Variable	N	%	Range Min.	Max.	Mean	Mode
Gender						
Male	18	43.90				
Female	23	56.10				
Age (month)						
0-11	9	21.95	2	56	24.41±16.03	16

12-23		13	31.71				
24-35		7	17.07				
36-47		8	19.51				
48-59		4	9.76				
Weight (kg)							
≤5		2	4.88				
5<x≤10		21	51.22		4.2	15.5	10.22±3.33	9
10<x≤15		14	34.15				
15<x≤20		4	9.76				
Nutritional status (weight-for-age)							
Underweight	Severely underweight	0	0	17.07			
	Underweight	7	17.07				
Normal		34	82.93				
Risk of overweight		0	0				
Nutritional status (height-for-age)							
Stunted	Severely stunted	1	11.11	19.51			
	Stunted	7	17.07				
Normal		33	80.49				
Tall		0	0				
Nutritional status (weight-for-height)							
Wasted	Severely wasted	3	7.32	12.2			
	Wasted	2	4.88				
Normal		35	85.37				
Possible risk of overweight		0	0				
Overweight		0	0				
Obese		1	2.44				
Total		**41**	**100**				

In this study, 41 study subjects were obtained. In general, the research subjects were more female than male (23; 56.10%). Based on age, the study subjects were found with a fairly wide age range, from the youngest of two months and the oldest of 56 months, with an average age of 24.41±16.03 months with a mode of 16 months. Research subjects aged 12-23 months dominated this study (13; 31.71%). Based on body weight, the research subjects were found to have a fairly wide weight range, the lightest at 4.2 kg and the heaviest at 15.5 kg, with an average weight of 10.22±3.33 kg with a 9 kg mode. Research subjects with the body weight of 5<x≤10 Kg dominated this study (21; 51.22%). Based on the nutritional status of weight-for-age, there were 7 underweight children (17.07%). Based on the nutritional status of height-for-age, 8 children under-five were stunted (19.51%). Based on the nutritional status of weight-for-height, five children under-five were wasted (12.2%) and one child under-five was obese (2.44%).

In August 2022, Kuwiran Village had a high prevalence of underweight children under-five (7; 17.07%), higher than the prevalence of underweight children under-five in the Madiun Regency (15.1%), East Java Province (16.1%) to Indonesia (17 %) in 2021 (Kemenkes, 2021). The prevalence of wasted children under-

five (5; 12.2%) was higher than the wasted children under-five prevalence in Madiun Regency (5.1%), East Java Province (6.4%), to Indonesia (7.1%) (Kemenkes, 2021). The prevalence of obese children under five (1; 2.44%) was lower than in the province of East Java (5.4%) and Indonesia (3.8%) (Kemenkes, 2021). This is in line with what was reported by Rahmad (2016) who in his study examined the nutritional status between villages in Aceh vs. the city of Aceh, with the acquisition of underweight, wasted, and overweight to be (26.6% vs. 18%), (25% vs. 24%), and (3.67% vs. 7%) respectively. This tendency can be influenced by the high rate of early marriage which is known to increase the risk to children (Cameron et al., 2021). On the other hand, early marriage was also found to be higher in rural areas than in urban areas, due to the low level of education of local residents, family economic level, and family support factors (Hastuty, 2016). In addition, the lack of infrastructure, health facilities, health workers, unhealthy drinking water, poor sanitation, and inadequate housing are also factors that should be suspected as the cause of the high disparity between rural and urban areas (Kumar et al, 2019). This is supported by the findings of the authors who conducted interviews with several residents of Kuwiran Village who said that indeed in Kuwiran Village there were cases of early marriage, and also the low economic level where the majority of residents worked as farmers, breeders, with only two people who were known to work as civil servants in the village of Kuwiran.

The stunted prevalence (8; 19.51%) in Kuwiran Village, Madiun Regency for the period of August 2022 was higher than the stunted prevalence in Madiun Regency (15.9%), but still lower than the stunted prevalence in East Java (23.5%) and in Indonesia (24.4%) (Kemenkes, 2021). This is also contrary to that reported by Rahmad (2016) who obtained (22.33% vs 20.33%) between villages in Aceh and the city of Aceh. According to Nugroho (2020), the prevalence of stunted children under-five in rural areas should be higher, because there are differences in birth weight, maternal height, and economic conditions. However, exclusive breastfeeding and complementary feeding tend to be similar between rural and urban areas (Nugraha et al, 2020). This anomaly can also be caused by the lack of skills of the integrated health care center (*Posyandu*) staff in measuring the body length/height of children under-five, which is a new agenda in the Kuwiran Village, because the Kuwiran Village's integrated healthcare center (*Posyandu*) did not have a body length measuring device in the previous month, July. Based on the observations of authors at the integrated healthcare center (*Posyandu*) for children during the monthly routine check-up, the skill in question is, the measurement should be from head to heel, but in practice, it was measured from head to toe. This certainly increases the height/length of the children's bodies, so the stunted acquisition is quite low, compared to the urban average.

Table 2. Cross Tabulation between Age and Nutritional Status

Nutritional Status

| Age (month) | Weight-for-Age | | | | Height-for-Age | | | | Weight-for-Height | | | | |
| | Underweight | | Normal (N%) | Risk of overweight (N%) | Stunted | | Normal (N%) | Tall (N%) | Wasted | | Normal (N%) | Possible risk of overweight (N%) | Overweight (N%) |
	Severely underweight (N%)	Underweight (N%)			Severely stunted (N%)	Stunted (N%)			Severely wasted (N%)	Wasted (N%)			
0-11	0	3 (33.33)	6 (66.67)	0	1 (11.11)	1 (11.11)	7 (77.78)	0	2 (22.22)	1 (11.11)	5 (55.56)	0	0
12-23	0	1 (7.69)	12 (92.31)	0	0	3 (23.08)	10 (76.92)	0	0	0	13 (100)	0	0
24-35	0	2 (28.57)	5 (71.43)	0	0	0	7 (100)	0	1 (14.29)	0	6 (85.71)	0	0
36-47	0	1 (12.5)	7 (87.5)	0	0	2 (25)	6 (75)	0	0	0	8 (100)	0	0
48-59	0	0	4 (100)	0	0	1 (25)	3 (75)	0	0	1 (25)	3 (75)	0	0
Total	0	7	34	0	1	7	33	0	3	2	35	0	0

Based on the obtained data from the integrated healthcare center (*Posyandu*) of Kuwiran for the period of August 2022, among underweight patients, there were no severely underweight children under-five, but underweight children under-five predominated among those with a younger age of 0-11 months as many as three children (33.33%) compared with other age ranges, each of which is only around one to two children. Among the stunted children, a child was found to be severely stunted in the age range of 0-11 months. Stunting dominates in the 12-23 month age range as many as three children being stunted, compared to other age ranges ranging from one to two children. Among wasted children, it was found that the number of severely wasted children was bigger than just wasted children (3:2), two out of three severely wasted children predominated in the age range of 0-11 months. One obese child was also found in the age range of 0-11 months.

This is in line with a study conducted by Medhin (2010) in Ethiopia's rural area which found that the prevalence of undernutrition was generally high in babies at 6 months and 12 months of age. Ricardo (2021) also found a similar pattern and correlated the prevalence and pattern with economic status, where it was found in his study that low-income countries have a 3.8 times more risk of being overweight in children at the age of 0-11 months.

Table 2. Cross Tabulation between Gender and Nutritional Status

Nutritional Status

Gender	Weight-for-Age				Height-for-Age				Weight-for-Height				
	Underweight		Normal (N%)	Risk of overweight (N%)	Stunted		Normal (N%)	Tall (N%)	Wasted		Normal (N%)	Possible risk of overweight (N%)	Overwe (N%)
	Severely underweight (N%)	Underweight (N%)			Severely stunted (N%)	Stunted (N%)			Severely wasted (N%)	Wasted (N%)			
Male	0	4 (22.22)	14 (77.78)	0	0	5 (27.78)	13 (72.22)	0	1 (5.56)	1 (5.56)	16 (88.89)	0	0
Female	0	3 (13.04)	20 (86.96)	0	1 (4.35)	2 (8.70)	20 (86.96)	0	2 (8.70)	1 (4.35)	19 (82.61)	0	0
Total	0	7	34	0	1	7	33	0	3	2	35	0	0

Based on the obtained data from the integrated healthcare center (*Posyandu*) of Kuwiran for the period of August 2022, among underweight patients, undernutrition is dominated by children of the male gender compared to the female gender (4:3). Among stunted patients, one female child under-five was severely stunted, and stunted children were dominated by those of the male gender (5:2). Among wasted patients, severely wasted children were dominated by those of the female gender compared to the male gender (2:1). There was also an obese female child. Overall, children under-five who were underweight, stunted, wasted, and obese are dominated by those of the male gender with a ratio of 11:10. This is in line with the meta-analysis conducted by Thurstans (2020) which found that there was a tendency for the male gender to experience nutritional problems such as underweight, stunted, wasted and obese. The same case can be found with severe undernutrition problems such as being severely stunted and severely wasted, which are known to be less common in females than males (Ramli et al, 2009). The difference in the prevalence of severely stunted and severely wasted between the sexes of this study could be due to the very limited number of subjects in this study and the data only being taken in one month.

4. Conclusion

The results of this study conducted in the integrated healthcare center (*Posyandu*) in the Kuwiran Village, Madiun Regency, East Java towards the anthropometrical data of under-five children showed the prevalence of underweight as much as 17.07% (seven children), 19.51% stunted (eight children), 12.2% wasted (five children) and 2.44% obese (one child) out of the total of 41 under-five children in the monthly routine check-up in the period of August 2022. Of seven underweight children, no severely underweight child was found. Of eight stunted children, one severely stunted child was found. Lastly, of five wasted children, three severely wasted children were found.

5. Final Suggestion

This study uses the anthropometric results of study subjects in a period of one month in August. This is certainly different from the annual prevalence which is more often used in national data collection and can lead to differences in results or fluctuations. The high prevalence of underweight, stunted, and wasted findings in this study should be followed up by the health office, local government, and central government. That way, underweight, stunted, and wasted cases can be immediately resolved by experienced health workers so that they can treat these children they can contribute to reducing annual prevalence both at the Madiun Regency level, East Java Province level, to the National level in the future.

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