

Article

Comparison of Mother's and Toddler's Characteristics Based On The Nutritional Status of The Toddler

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Abstract: Nutritional status in toddlers is one of the indicators used to describe the quality of toddler health. Toddlers' nutritional status is interpreted based on some indices, namely weight for age, length/height for age, and weight for length/height Z-score. The nutritional status of toddlers is affected by various factors, both maternal and child factors. Anaemia and chronic energy deficiency during pregnancy affect a toddler's nutrition status. Birth weight, exclusive breastfeeding, and complementary food may result in a toddler's nutrition status as well. This study aims to compare the mother's and toddler's characteristics based on the nutritional status of the toddler. This was an observational analytical cross-sectional study. All data for the analysis of this paper were obtained from observations of the toddlers, interviews with mothers, and recorded data from KIA book. Toddlers' weight and length/height were measured when the subject came to Posyandu. Questions about exclusive breastfeeding and complementary food were asked of mothers. Information about anaemia and chronic energy deficiency status was obtained from KIA book. This study used chi-square test to find evidence that, on 88 subjects, there is no difference in anaemia and chronic energy deficiency during pregnancy, birth weight, exclusive breastfeeding, and complementary food among all nutritional status indices

Keywords: Anaemia, Chronic energy deficiency, Complementary food, Exclusive breastfeeding, Nutritional status

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1. Introduction

Malnutrition is a global public health concern, particularly in developing countries. Malnutrition is reported as one of the most common health conditions suffered by children under five years. Malnutrition is associated with increase morbidity and mortality from infection^{1,2}. Malnutrition, during childhood, may result in linear growth inadequacy (stunting) or in accumulation of body mass insufficiency (wasting)³. Children who experienced undernourished in early life are more susceptible to illness, and may have greater risk in growth and developmental delays⁴.

Malnutrition is identified through nutritional status. Nutritional status in toddlers is one of the indicators used to describe the quality of toddler health. Toddlers' nutritional status is interpreted based on some indices, namely weight for age (WfA), length/height for age (L/HfA), and weight for length/height (WfL/H) Z-score⁵.

The nutritional status of toddlers is affected by various factors, both maternal and child factors. Anemia and chronic energy deficiency (CED) during pregnancy affect a toddler's nutrition status⁶. Risk of maternal and child mortality and morbidity was increasing due to severe anemia⁷. CED during pregnancy, as maternal MUAC less than 23 cm, can be consider for prediction of low birth weight (LBW)⁸.

Birth weight, exclusive breastfeeding, and complementary food and beverage may result in a toddler's nutrition status as well^{9,10}. Low birth weight (LBW) is acknowledged to be correlated with poor postnatal growth, notably during the first year of life¹¹. LBW children's growth remained below that of normal birth weight children⁹. Giving exclusive breastfeeding until 6 month-old and introduce complementary feed and beverage (CFB) at 6 month may well support children's growth and development¹⁰. This study aims to compare the mother's and toddler's characteristics based on the nutritional status of the toddler, which is data processing and analysis is carried out for each nutritional status of toddler.

2. Materials and Methods

This was an observational analytical cross-sectional study which is conducted in the Arjasa subdistrict, Jember district. This study was conducted in 4 integrated health services (Posyandu) in the Arjasa subdistrict, Jember district, namely Posyandu Manggis 10, Manggis 15, Manggis 18, and Manggis 42. These Posyandu were selected based on the data of Arjasa Public Health Service that indicate that these Posyandu have a high number of malnutrition toddlers. This study recruited participants from those who have a record book of mother and child (KIA book) and had given consent to participate. The inclusion criteria were having a child(ren) with age 1-5 years and living in the Arjasa subdistrict as a resident. The main exclusion was suffered from congenital diseases. This study involved 88 subjects who met the criteria.

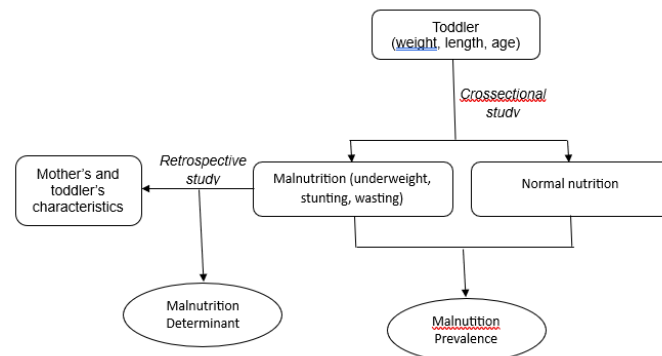


Figure 1. Research method

Maternal anemia is defined as a hemoglobin concentration (Hb) <11 g/L¹². Maternal chronic energy deficiency (CED) is defined as middle upper arm circumference <23,5 cm⁸. Birth weight is the body weight of a baby at its birth. It was categorized as low birth weight (LBW) as a birth weight <2500 gram, and normal birth weight (NBW) as a birth weight ≥2500 gram¹³. Breastfeeding is defined as breast milk consumption for the first six months of a baby's life. It was categorized as exclusive breastfeeding (EB) as the baby only consuming breast milk with no additional food or drinks for the first six months and non-exclusive breastfeeding (NEB) as the baby consuming additional food or drinks for the first six months¹⁴. Complementary food and beverage was defined as what age the baby got its first food and or beverage. It was categorized as early complementary food and beverage (ECFB) when the baby got its first food and or beverage at <6 months, and otherwise as normal complementary food and beverage (NCFB)¹⁵.

The nutritional status of the toddler was determined by weight and height and was classified according to Regulation of the Minister of Health of the Republic of Indonesia No. 2 the Year 2020 about Children Anthropometry standard. Weight for age <-3 SD was classified as severely underweight, -3 SD to <- 2 SD was classified as underweight, -2 SD to +1 SD was classified as normal, and > +1 SD was classified as a possible risk of overweight. Length/height for age <-3 SD was classified as severely stunted, - 3 SD sd <- 2 SD was classified as stunted, -2 SD sd +3 SD was classified as normal, and > +3 SD was classified as tall. Weight for length/height <-3 SD was classified as severely wasted, - 3 SD

sd < - 2 SD was classified as wasted, -2 SD sd +1 SD was classified as normal, > + 1 SD sd + 2 SD was classified as possible risk of overweight, > + 2 SD sd + 3 SD was classified as overweight, and > + 3 SD was classified as obese⁵.

Toddlers' weight and length/height were measured when the subject came to Posyandu. Questions about exclusive breastfeeding and complementary food and beverage were asked of mothers. Information about birth weight, anemia and chronic energy deficiency status was obtained from the data of local midwife and those written in the record book of mother and child (KIA book).

Toddlers' weight and length/height were measured when the subject came to Posyandu. Questions about exclusive breastfeeding and complementary food and beverage were asked of mothers. Information about birth weight, anemia and chronic energy deficiency status was obtained from the data of local midwife and those written in the record book of mother and child (KIA book). Data analysis used chi square test to compare the mother's and toddler's characteristics based on the nutritional status of the toddler.

3. Results and Discussion

A total of 88 participants were involved in this study, however not all participants had complete data. Data on maternal anemia dan CED status were owned by 83 and 76 participants, respectively. Data on BF and FB status were owned by 73 and 71 participants. Data on birthweight and the nutritional status of the children were owned by 86 and 84 participants, respectively.

3.1. Mothers' characteristics

The mean age of mother during pregnancy and childbirth was 25.58 years (17-42). They did not finish school until high school and above. The result shows the 34.1% of the participants had elementary school, 11.4% and 41% of the participants had junior and senior high school, respectively, while the rest (13.5%) did not attend the formal education.

Table 1 shows the maternal anemia and CED status at the time of early pregnancy. The majority mother had normal Hb level (68.2%) and did not experienced CED (64.8%), as indicated by MUAC >23.5 cm.

Table 1. Maternal characteristics

Characteristics	n	%
Maternal anemia, n = 83		
Anemic	23	26,1
Non-anemic	60	68,2
Maternal chronic energy deficiency, n = 76		
CED	19	21,6
Non-CED	57	64,8

3.2. Toddlers' characteristics

Based on Table 2, it is known that not all participants gave exclusive breastfeeding to their children. The prevalence of exclusive breastfeeding in this studi was greater than those who were not exclusively breastfeed (68.2%). The unsuccessfulness of exclusive breastfeeding is closely related to the practice of early complementary feeding. In this study 13% children had their CFB earlier (less than 6-month-old). Table 3 shows that more babies born with normal birth weight (81.8%). Majority of the children under five had normal nutrition status on each nutritional status index, 73.9%, 54.61%, dan 79.5% respectively on WfA, L/HfA dan WfL/H.

Table 2. Breastfeeding and complementary food and beverage status

Characteristics	n	%
Exclusive breastfeeding, n = 73		
Non-EB	13	14,8
EB	60	68,2
Complementary food and beverage, n = 71		
ECFB	12	13,6
NCFB	59	67

Table 3 shows that more babies born with normal birth weight (81.8%). Majority of the children under five had normal nutrition status on each nutritional status index, 73.9%, 54.61%, dan 79.5% respectively on WfA, L/HfA dan WfL/H.

Table 3. Birth weight and nutritional status of children

Characteristics	n	%
Birth weight, n = 86		
LBW	13	14,8
NBW	60	68,2
Nutrition Status, n = 84		
Weight for age,		
Severely underweight	6	6,8
Underweight	11	12,5
Normal	65	73,9
Possible risk of overweight	2	2,3
Length for age		
Severely stunted	11	12,5
Stunted	19	21,6
Normal	54	61,4
Tall	0	0
Weight for length		
Severely wasted	5	5,7
Wasted	5	5,7
Normal	70	79,5
Possible risk of overweight	1	1,1
Overweight	1	1,1
Obese	2	2,3

3.3. Comparison of mother's characteristic

Table 4 shows that, in each nutritional status indices, there was no difference in maternal anemia ($p=0.312$, $p=0.312$, dan $p=0.310$ for WfA, L/HfA dan WfL/H, respectively).

Table 4. Comparison of maternal anemia, CED, EB, CFB, and BW

	Maternal anemia (n=80)			Maternal Chronic Energy Deficiency (n=74)			Exclusive breastfeeding (n=71)			Complementary food and beverage (n=69)			Birth weight (n=82)		
	Anemic	Non-anemic	p	CED	Non-CED	p	Non-EB	EB	p	ECFB	NCFB	p	LBW	NBW	p
Weight for age, n (%)															
Severely underweight	1 (4.3)	4 (7.0)		2 (11.1)	4 (7.1)		1 (7.7)	2 (3.4)		1 (8.3)	2 (3.5)		0 (0.0)	5 (7.2)	
Underweight	2 (8.7)	8 (14.0)		2 (11.1)	7 (12.5)		3 (23.1)	7 (12.1)		2 (16.7)	7 (12.3)		4 (30.8)	7 (10.1)	
Normal	19 (82.6)	44 (77.2)	0.312	14 (77.8)	43 (76.8)	0.525	8 (61.5)	48 (82.2)	0.184	8 (66.7)	47 (82.5)	0.345	8 (61.5)	56 (81.2)	0.224
Possible risk of overweight	1 (4.3)	1 (1.8)		0 (0.0)	2 (3.6)		1 (7.7)	1 (1.7)		1 (8.3)	1 (1.8)		1 (7.7)	1 (1.4)	
Length for age, n (%)															
Severely stunted	3 (13.0)	7 (12.3)		3 (16.7)	6 (10.7)		1 (7.7)	6 (10.3)		1 (8.3)	6 (10.5)		2 (15.4)	8 (11.6)	
Stunted	7 (30.4)	11 (19.3)	0.312	5 (27.8)	12 (21.4)	0.250	5 (38.5)	13 (22.4)	0.273	5 (41.7)	13 (22.8)	0.221	5 (38.5)	14 (20.3)	0.116
Normal	13 (56.5)	39 (68.4)		10 (55.6)	38 (67.9)		7 (53.8)	39 (67.2)		6 (50.0)	38 (66.7)		6 (46.2)	47 (68.1)	
Tall	0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)		0 (0.0)	0 (0.0)	
Weight for length, n (%)															
Severely wasted	2 (8.7)	3 (5.3)		3 (16.7)	2 (3.6)		1 (7.7)	2 (3.4)		1 (8.3)	2 (3.5)		0 (0.0)	5 (7.2)	
Wasted	2 (8.7)	3 (5.3)		1 (5.6)	3 (5.4)		1 (7.7)	4 (6.9)		0 (0.0)	4 (7.0)		2 (15.4)	3 (4.3)	
Normal	18 (78.3)	48 (84.2)	0.31	14 (77.8)	48 (85.7)	0.319	10 (76.9)	49 (84.5)	0.452	10 (83.3)	48 (84.2)	0.649	10 (76.9)	58 (84.1)	0.497
Possible risk of overweight	0 (0.0)	1 (1.8)		0 (0.0)	1 (1.8)		0 (0.0)	1 (1.7)		0 (0.0)	1 (1.8)		0 (0.0)	1 (1.4)	
Overweight	0 (0.0)	1 (1.8)		0 (0.0)	0 (0.0)		0 (0.0)	1 (1.7)		0 (0.0)	1 (1.8)		0 (0.0)	1 (1.4)	
Obese	1 (4.3)	1 (1.8)		0 (0.0)	2 (3.6)		1 (7.7)	1 (1.7)		1 (8.3)	1 (1.8)		1 (7.7)	1 (1.4)	

3.4 Comparison of toddlers characteristics

There was no difference in terms of EB, CFB, and BW. The significance value of EB was $p=0.184$, $p=0.273$, dan $p=452$ for WfA, L/HfA dan WfL/H, respectively. The significance value of CFB were $p=0.345$, $p=0.221$, dan $p=649$ for WfA, L/HfA dan WfL/H, respectively. And the significance value of BW was $p=0.224$, $p=0.116$, dan $p=497$ for WfA, L/HfA dan WfL/H, respectively.

The practice of marriage at young age is still common in Arjasa sub district. As a result, many women to give birth to their first child in their teens. Adolescents are prone to anemia and CED^{12,16}. Pregnancy accompanied by anemia and CED have an adverse effect on the mother and fetus, and affect the growth of the child^{6,8,12}. Moreover, marriage at young age causes girls to drop out of formal school. This condition affect on their health practice especially their healthy nutritional practice¹⁷.

Even though the number of mothers with anemia is less than mother who do not experience anemia, this percentage is still being a moderate public health problem¹² [15]. In the same way, the number of CED is still higher than the target of Indonesian government for 2021¹⁸.

In this study, maternal anemia and CED did not affect on the nutritional status of children. It is because the number of mothers who experienced anemia and CED during pregnancy was small. Unless mothers were severely anemic, maternal anemia will not influence neonatal outcomes^{19,20}. In addition to anemia and CED, other maternal conditions such as food intake and weight gain during pregnancy have an effect to the nutritional status and growth of children as well^{21,22}.

Exclusive breastfeeding, early CFB, and birth weight are related to nutritional status of children in all indices (WfA, L/HfA dan WfL/H)^{9,14,10,13}. The practice of giving early CFB, in Arjasa, is still often performed for the reasons such as children look hungry, and as an advice from the elderly. Food ingredient that are often used as CFB are bananas, honey, and rice porridge.

In this study, there was no difference in EBF status, CFB status, and birth weight among all nutritional status because the percentage of children who do not received EBF and those who had LBW was small. In addition to these three factors, food intake and illness history of children also affect the nutritional status of children^{3,4,21,22,23}.

This study has some limitations. Anemia and CED status were obtained only at beginning of the pregnancy, there was no further examination of HB and MUAC during pregnancy. Other limitations are there were no examining for mother intake and weight gain during pregnancy, and children's food intake and illness history. With additional data on Hb and MUAC (at least once per trimester) may give information about in what trimester those factors affect nutritional status of children. The information of children's

food intake and illness history may give information about the relationship between each factor and the nutritional status of children.

4. Conclusions

This study finds evidence that, on 88 subjects, there is no difference in anaemia and chronic energy deficiency during pregnancy, birth weight, exclusive breastfeeding, and complementary food and beverage among all nutritional status indices.

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