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Breastfeeding and complementary food on nutritional status infants in Indonesia☆

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Abstract
Objective: Nutrition plays an important role in the human life cycle, more specifically for children aged 2 years because this is a period of golden children that determines the health status of their future children. The aim of this study was to analyze the nutritional status of children aged 0–23 months toward breastfeeding and complementary food status.
Methods: This study was an observational analytic study with a cross sectional study design carried out in Malili sub-district, East Luwu district, Indonesia. This research was conducted from April to June 2019, involving 4 Villages. The number of samples is 181 infants aged 0–23 months.
Results: This study obtained the status of thin children 13.3%, stunting 22.1%, and waste 16.6%. The frequency of non-breastfeeding mothers was 38.1% and those who received complementary food earlier were 43.5%. This study also showed an association between the stunting category with breastfeeding ($p < 0.05$) and there was a relationship between underweight categories with breastfeeding at the boundary value (p value = 0.08).
Conclusion: The nutritional status of stunting and underweight related to breastfeeding and the provision of Complementary food.

Introduction

Nutrition plays an important role in the human life cycle from the womb to the elderly, In 2015, globally there were 7.7% of wasting children, 24.5% were stunting and 15% were underweight on children under five years old.[1] Underweight and stunting are often associated with the effects of poor

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sanitation, lack of energy and the amount of nutrient intake and other infectious diseases, including the provision of complementary foods to children.[2] The results of stunting provide two effects, namely long-term and short-term effects, and this correlates with the high rate of morbidity and mortality in children both as a child and when they are large,[3] With regard to the problem of stunting, it is found to increase with age. Higher incidence of stunting is usually found after 2 years of age. It has been realized that the problem of stunting is a subject of chronic malnutrition.[4]

Previous studies have examined predictors of child malnutrition in low and middle income countries. Poverty and morbidity are closely related to child malnutrition through complex relationships. Other predictors of child malnutrition identified in the previous literature include parental education levels, with maternal education stronger than father's education, social deprivation, number of children in the household, and sources of drinking water.[5] The purpose of this study was to analyze the nutritional status of children aged 0–23 months with several independent variables (Gender, Age of Child, Parent Education Level, Parent Employment, Child Breastfeeding Status, Time of complementary food, and Child Birth Length).

Method

The study design used cross sectional with observational analytic methods. This research was conducted in April to June 2019 located in East Luwu District, South Sulawesi, Indonesia with 4 villages (Malili Village, Kore-korea Village, Baruga Village and Wewangriu Village). Cluster random sampling was 186 children aged 0–23 months. The variables used were Gender, Child's Age, Mother Education Level, Mother Occupation, Child's Breastfeeding Status, Time of Complementary food, and Children's Birth Length. Weight variable measure was the seca-scale and body length was microtoice, while the other variables were collected by the interview method conducted by graduate students. Determination of the nutritional status of *Z* score using the WHO Anthro2005 application and data were analyzed using the SPSS program using the chi-square and fisher exact tests on categorical data and independent *t*-test and Mann–Whitney tests on numerical data and also using Kruskal–Wallis test on variance data between age groups.

Results

The results of the study show that respondents who have permanent housing type are 50%, low education mothers were 44.2%, most household incomes were in the low category (61.3%). mothers who has given breastfeeding were 61.9% and also who provide complementary foods under 6 months that was 43.5% (Table 1).

In Table 2 shows the characteristics and nutritional status of children. The table shows the age categories of most children in the age group of 6–11 months and 12–17 months at 29.8%, while the length of birth category, children born short of 125 children (69.1%) while for birth weight an average of 3080 g is only one respondent below 2800 grams. On the nutritional status of the *Z* scored in categorical form, the WAZ category of children underweight was 24 (13.3%), the HAZ category with stunting children was 40 (22.1%) and the WHZ category of children with wasting was 29 (16.6%).

In Table 3 shows the bivariate analysis between the dependent variable and the independent variable using by categorical data. in the age group of children shows that 40% of stunting children are in the group 18–24 years with *p* value of 0.03. There are 27% of stunting men who were at borderline values ($p = 0.08$), complementary food < 6 months was

Table 1 Sosio-demographic characteristics of respondents.

Variable	*N* (%)
Household	
House type category	
Wood	27 (14.9)
Permanent	91 (50.3)
Semi-permanent	63 (34.3)
Family	
Mother education category	
Low education	80 (44.2)
Higher education	101 (55.8)
Mother work category	
Work	27 (14.9)
Does not work	154 (85.1)
IDR family income	
Low	111 (61.3)
High	70 (38.7)
Breastfeeding	
Not	69 (38.1)
Yes	112 (61.9)
Complementary food	
<6 months	79 (43.5)
≥6 months	102 (56.4)

Table 2 Nutritional characteristics of children.

Nutritional status	*N* (%)
Birth weight gram (mean ± SD)	3080 ± 380
Child's age	
Age 0–5 months	48 (26.5)
Ages 6–11 months	54 (29.8)
Age 12–17 months	54 (29.8)
Age 18–24 months	25 (13.8)
Birth length (cm)	
Short birth	125 (69.1)
Normal birth	56 (30.9)
WAZ	
Underweight	24 (13.3)
Normal	157 (86.7)
HAZ	
Stunting	40 (22.1)
Normal	141 (77.9)
WHZ	
Wasting	29 (16.6)
Normal	152 (83.4)

Table 3 Bivariate analysis using on categorical data.

Variable	WAZ (%)		*P* value	HAZ (%)		*P* value
	Normal	Underweight		Normal	Stunting	
Child's age						
0–5 mo	45 (93.8)	3 (6.2)	0.41	43 (89.6)	5 (10.4)	0.03
6–11 mo	46 (85.2)	8 (14.8)		41 (75.9)	13 (24.1)	
12–17 mo	45 (83.3)	9 (16.7)		42 (77.8)	12 (22.2)	
18–23 mo	21 (84)	4 (16.0)		15 (60)	10 (40)	
Sex						
Man	73 (83.9)	14 (16.1)	0.28	63 (72.4)	23 (27.6)	0.08
Women	84 (89.4)	10 (10.6)		78 (77.9)	40 (22.1)	
Mother's education						
Low	67 (83.3)	13 (16.3)	0.29	59 (73.8)	21 (26.3)	0.23
High	90 (89.1)	11 (10.9)		82 (81.2)	19 (18.8)	
Mother's job						
Work	136 (88.3)	18 (11.7)	0.21	21 (77.8)	6 (22.2)	0.98
Doesn't work	21 (77.8)	6 (3.6)		120 (77.9)	34 (22.2)	
Family income						
Low	97 (87.4)	14 (12.6)	0.74	89 (80.2)	22 (19.8)	0.35
High	60 (85.7)	10 (14.3)		52 (74.3)	18 (25.7)	
Breastfeeding						
Not	56 (81.2)	13 (18.8)	0.08	50 (72.5)	19 (27.5)	0.16
Yes	101 (90.2)	11 (9.8)		91 (81.3)	21 (18.8)	
Complementary food						
<6 mo	85 (83.8)	17 (16.7)	0.12	74 (72.5)	28 (27.5)	0.04
≥6 mo	72 (91.1)	7 (10.5)		67 (61.5)	12 (15.2)	
Length of birth						
Short	105 (84)	20 (16)	0.10	95 (76)	30 (24)	0.35
Normal	52 (92.9)	4 (13.3)		46 (82.1)	10 (22.1)	

* Fisher exact test.

27.5% with a *p* Value of 0.04 and mothers who did not breastfeed at 18.8% in children who were underweight (borderline value = 0.08).

In Table 4 presents a bivariate analysis using on numerical data. In the HAZ group, the average score for the age group of children 18–23 months was −2.44, male sex was −1.55 (p value < 0.05) and complementary food under 6 months was −1.47 (borderline value = 0.07). As for the WAZ group, the average score for the children aged 12–17 months were −1.10, the male gender was −0.72 and group of children who did not get breastfeeding were −0.90 (p value < 0.00).

Discussion

Relationship between Stunting and complementary food

Based on the results of the chi-square test analysis using categorical data namely stunting (<−2 SD) and normal (Between −2 and 2 SD) shows that there is a relationship between complementary food and the incidence of stunting in children aged 0–24 months. These results indicate the number of stunting prevalence with children who get complementary food < 6 months is 27%, compared with those who stunting on complementary food ≥ 6 months is 15.2% so it can be concluded that there is a relationship between the incidence of stunting with complementary food in children 0–24 month (p value < 0.05). Likewise, analysis of the Mann–Whitney test showed a relationship of complementary food under the age of < 6 months with a mean *Z*-score of −1.47 (borderline value = 0.07). The results of this study are supported by previous research, that there is a relationship between the incidences of stunting with complementary food Under 6 months.[6] The Complementary food to children is needed to improve the nutritional status of children aged 6–24 months because stunting is a chronic nutritional problem that is not directly seen in growth of the child's height but takes a long time. The occurrence of stunting will occur in children approaching 24 months of age as in this study found there is a relationship between the incidence of stunting at the age of 18–24 years with a prevalence of 40% (p value < 0.03) in categorical data analysis and a mean *Z*-score of −2.44 (p value 0.000) on numerical data analysis. Complementary food should be done during the age of 6 months because at this age the infant's digestive and physical readiness to get food other than breast milk is sufficient as well as early complementary food will disrupt the quantity of breastfeeding.[7]

Table 4 Bivariate analysis using on numerical data.

Variable	N	HAZ Mean ± SD	P	WAZ Mean ± SD	P
Child's age					
0–5 mo	48	−1.24 ± 1.03	0.000*	0.52 ± 1.33	0.000*
6–11 mo	54	−0.57 ± 1.80		−0.27 ± 1.48	
12–17 mo	54	−1.42 ± 1.59		−1.10 ± 1.20	
18–23 mo	25	−2.44 ± 1.67		−1.06 ± 1.24	
Gender					
Male	87	−1.55 ± 1.58	0.021**	−0.72 ± 1.42	0.007**
Female	94	−0.99 ± 1.65		−0.13 ± 1.48	
Complementary food					
<6 mo	79	−1.47 ± 1.28	0.07**	0.05 ± 1.43	0.000***
≥6 mo	102	−1.09 ± 1.86		−0.77 ± 1.42	
Breastfeeding					
No	69	−1.51 ± 1.65	0.136**	−0.90 ± 1.35	0.000***
Yes	112	−1.10 ± 1.62		−0.11 ± 1.48	

* Kruskal–Wallis test.
** Mann Whitney test.
*** Independent t test.

Relationship between underweight and breastfeeding

Based on the results of the chi-square test analysis using categorical data namely underweight (<−2 SD) and normal (between −2 and 2 SD) shows that there is a relationship between breastfeeding and the incidence of underweight in children aged 0–24 months. The results of this study indicate the number of underweight prevalence in children who are not breastfed is 18.8%, compared to the underweight who get breast milk which is 9.8% so it can be concluded that there is a relationship between the incidence of underweight with breastfeeding in children 0–24 months (borderline value = 0.07). Likewise, the analysis of the Mann–Whitney test showed an underweight relationship with breastfeeding with a mean *Z*-score of −0.90 (p value < 0.05), as was done by previous research.[8] Breastfeeding is needed by children aged 0–24 months to fulfill the nutrients needed by children. As it is known that breast milk is the only infant food that has all the nutrients contained therein so that when the infant does not get it then the nutrients needed by the infants are not fulfilled, in a long period of time there will be underweight. This is also corroborated by research conducted by Cut Novianti in Indonesia that children with no breastfeeding will be at risk of 0.21 times compared to those given breastfeeding at $p = 0.02$ for nutritional problems in children.[9] The incidence of underweight in this study was mostly obtained at the age of 12–17 months was 16.7% (p value = 0.41) used analysis of categorical data and there was a correlation between the incidence of underweight in children aged 12–17 months with mean −1.10 SD (p value < 0.05) in numerical data analysis, this is in line with previous studies conducted in Ethiopia.[10] Most of the community's understanding says that breastfeeding is only done at the age of 0–6 months because afterwards it will be given complementary food, even though it should still be given breastfeeding at the age of over 6 months while paying attention to the quality and quantity of children's complementary food until the age of 2 years. Some studies also say that when children over 6 months aged still need advanced breastfeeding to improve the nutritional status of children who are lacking when children are less than 6 months old but still given complementary food.[11]

Conclusion

Based on tests that use categorical and numerical data analysis, there is a relationship between stunting in children aged 0–24 months and complementary food Under 6 months and there is also a relationship between underweight events and breastfeeding in children aged 0–24 months. It was suggested for further research to see the long-term effects of children on breastfeeding above 2 years and the diversity of complementary food in determining the nutritional status of children.

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Conflict of interest

The authors declare no conflict of interest.

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