

## Research Article



## Differences of Toddler Obesity Based on Exclusive Breastfeeding History in Tegalrejo Health Center, Yogyakarta

Suci Musvita Ayu <sup>1,\*</sup>, Arini Mayang Fa'uni <sup>1</sup>

<sup>1</sup> Faculty of Public Health, Ahmad Dahlan University, Yogyakarta, Indonesia

\* **Correspondence:** suci.ayu@ikm.uad.ac.id. Phone: +6285261614043

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### ABSTRACT

**Background:** Obesity is a global problem and continues to affect low and middle-income countries, mainly urban areas. In Indonesia, the obesity rate of children was 11.5% and was ranked 21st in the world by 2016. Even according to WHO, the number of obese children will continue to increase every year. Several studies have shown that a history of exclusive breastfeeding can reduce the risk of obesity in toddlers. This study aimed to determine the differences in the obesity status of children under five based on a history of exclusive breastfeeding in the Tegalrejo Health Center, Yogyakarta City.

**Method:** This research employed an analytical observational study with a case-control design. The research sample consisted of 34 toddlers aged 6-24 months, calculated using the difference of two proportions: 17 cases of obese children under five and 17 controls under five who were not obese. A questionnaire was used to collect the data. A Chi-square test was used to analyse the data.

**Results:** There were children under five without exclusive breastfeeding in the group of as many as 41.7% and 29.4% in the control group. 52,9% of children in the case group had exclusive breastfeeding, and 70% in the control group. The bivariate analysis showed no difference in the obesity status of children under five based on a history of exclusive breastfeeding with a value of  $p = 0.480$  and  $OR = 2.133$  (95% CI = 0.519-8.751).

**Conclusion:** There was no difference in the obesity status of children under five based on a history of exclusive breastfeeding, but children without a history of exclusive breastfeeding were 2.133 times more likely to have obesity than children with exclusive breastfeeding.

**Keywords:** Obesity; Toddler; Exclusive Breastfeeding

### INTRODUCTION

Obesity is a serious global problem and continues to affect low and middle-income countries, mainly urban areas. The World Health Organization states that in 2015 there were 24 million children who were overweight, this number increased by 31 million from 2000. Trends show that the number will continue to grow that predicted 70 million in 2025 (1). The obesity rate in children in Indonesia is 11.5% and is ranked 21st in the world (2). Data from the Nutrition Status Monitoring notes that 1.6% of children aged 0-59 months are overweight, with the highest prevalence in Jakarta and Bali (3.3%) and Papua (2.7%)(3).

The results of Nutritional Status Monitoring in Yogyakarta Province (DIY) from 2013 to 2015 show that overweight toddlers (bodyweight per age) in 2014 were 5.84%, decreasing to 3.81% (2015) and 3.11% (2016) and fell to 2.80 (2017). Observations in August 2018 explained that 164 toddlers aged 0-24 months are overweight or obese out of the 5,595 number of toddlers spread across 18 Puskesmas Yogyakarta City (4).

Children with obesity have a 1.8 times higher risk to be adult with obesity (5). Obesity in children impacts decreased learning achievement and psychosocial effects, such as lack of self-confidence and social withdrawal (6). Several factors contribute to obesity in children, including heredity or genetics, food supply, physical activity, feeding histories such as breastfeeding, birth weight, and parental obesity (5).

Exclusive breastfeeding is an act of giving breast milk to babies without giving fluids or other foods from birth to 6 months of age (7). The WHO recommended exclusive breastfeeding for six months and continued until two years of age due to the benefit of maintaining the baby's health and survival. It is because babies who are exclusively breastfed have a better immune system than babies who are not. Babies rarely attack from disease and avoid nutritional problems than babies who are not given exclusive breastfeeding. Lack of breast milk intake results in an imbalance in the baby's dietary needs. The inequality of nutritional fulfilment in infants will harm the quality of human resources, which can be seen from the obstruction of infants' optimal growth and development (8). Breastfeeding can also prevent obesity in children because breastfed babies can regulate energy intake concerning the internal response to satiety. The insulin and hormone leptin levels are more balanced in babies who are given breast milk to prevent obesity (5).

Exclusive breastfeeding coverage worldwide was only around 36% during 2007-2014 (9). This number indicates that globally the number of children that getting breastfeed is still low. Based on data from the United Nations Children's Fund (UNICEF) in 2012, only 39% of babies under six months are exclusively breastfed worldwide. This number is stable in 2015 - only 40% success of exclusive breastfeeding worldwide (10). China, one of the countries with a large population globally, has a success rate of exclusive breastfeeding of 28%.

In Indonesia, the coverage of infants receiving exclusive breastfeeding is 61.33%. This number has exceeded the 2017 Strategic Plan target of 44%. The highest percentage of complete breastfeeding coverage was found in West Nusa Tenggara at 87.35%, while the lowest rate was in Papua at 15.32%. Five provinces have not reached the 2017 Strategic Plan target, namely Riau Islands province 44.42%, North Sulawesi 36.93%, Banten 35.87%, West Papua 24.65% and Papua 15.32% (11). While in Yogyakarta Province, where this research was conducted, exclusive breastfeeding coverage 0-6 months in Kulon Progo district 77.00%, Bantul 74.27%, Gunungkidul 66.75%, Sleman 82.62%, Yogyakarta City 66.13% with an average total coverage of exclusive breastfeeding in Yogyakarta Province was 74.90% (4). According to this data, Yogyakarta City had the lowest breastfeeding coverage. One health centre that having the highest toddler obesity was Tegalrejo Health Centre.

The actual phenomenon in society is that mothers thought that obese toddlers are healthy because their children have sufficient food supply. Obesity will interfere with the development process of toddlers. Accordingly, assessing the differences in breastfeeding history and obesity is required to provide evidence to society about the importance of giving exclusive breastmilk to their babies.

## METHOD

This was an analytic observational study with a case-control design conducted in Tegalrejo Health Centre of Yogyakarta City from June to July 2019. We used data from the health centre that was Body Weight Standard to see under-fives children with obesity. This measurement uses a standard tool from the Indonesia Ministry of Health – Kartu Menuju Sehat (KMS) to know the birth weight and obesity status. A set of questionnaires was employed to know the history of breastfeeding refers to the Guttman scale.

This study population were all toddlers aged 6-24 month who checked their weight in Tegalrejo Health Centre from January 2018 - June 2019 (n=492). The sample was calculated using the Lemeshow formula and 17 children in each group – case and control. We selected children in each group purposively refer to our inclusion criteria – for case group children with z-score > 2 SD or obese and control group children with z-score < 2 SD or not obese. Data were analysed using the chi-square test with 95% confidence intervals.

## RESULTS

Table 1 shows that, in total, we recruited 34 respondents for both groups. The highest mother education was graduated from senior high school (76.5%). Most of the respondent (mother of the toddler) said they do not have a formal job or as housewives (79.4%). Almost half of the observed children in this research aged 19-24 months. More than 50% of the toddler observed were male. Nearly 60% of the toddler had birth weigh between 3.30-3.80 kg. Among the 34 children, more than 90% of them reported do not have disease history before this research.

**Table 1. Characteristics of Toddler Obesity Status data**

Variable	Case		Control		Total	Percentage
	N	%	n	%		
<b>Mother's Education</b>						
Graduated from elementary school	2	11.8	0	0.0	2	5.9
Graduated from junior high school	2	11.8	2	11.8	4	11.8
Graduated from senior high school	12	70.6	14	82.4	26	76.5
Graduated from diploma three or bachelor	1	5.9	1	5.9	2	5.9
<b>Mother's occupation</b>						
Housewife	12	70.6	15	88.2	27	79.4
Freelancer	2	11.8	0	0.0	2	5.9
Employees	2	11.8	2	11.8	4	11.8
Labour	1	5.9	0	0.0	1	2.9
<b>Toddlers age in month</b>						
6-12 months	0	0.0	14	82.4	14	41.2
13-18 months	4	23.5	0	0.0	4	11.8
19-24 months	13	76.5	3	17.6	16	47.1
<b>Toddler Sex</b>						
Male	9	52.9	9	52.9	18	52.9
Female	8	47.1	8	47.1	16	47.1
<b>Toddler Birth body weight (kg)</b>						
2.50 - 2.80	3	17.6	2	11.8	5	14.7
2.90 - 3.20	2	11.8	5	29.4	7	20.6
3.30 - 3.80	11	64.7	9	52.9	20	58.8
3.90 - 4.30	1	5.9	1	5.9	2	5.9
<b>Toddler Disease History</b>						
Yes	1	5.9	0	0.0	1	2.9
No	16	94.1	17	100	33	97.1

Table 2 reports the number of children under five with obesity and non-obesity status has the same number, namely 17 (50%), because we used a 1:1 comparison between case and control. Among the children observed (n = 34), more than 60% reported exclusive breastfeeding, and the rest were not.

**Table 2. Univariate Results of Toddler Obesity Status and Exclusive Breastfeeding History**

Variable	N	%
<b>Toddler Obesity Status</b>		
Obesity	17	50.0
No Obesity	17	50.0
<b>Exclusive breastfeeding history</b>		
Yes	21	61.8
No	13	38.2

Table 3 explains that more than half (52.9%) of a toddler with exclusive breastfeeding were in obese status, and 70.6% of a toddler who received exclusive breastfeeding were in not obese status. From the Odds Ratio calculation, the OR value is 2.13 or > 1 with a Confident Interval (CI) of 0.51 - 8.75; this shows that children with a history of not exclusively breastfed have a 2.13 times risk of being obese compared to toddlers with exclusive breastfeeding history.

**Table 3. Differences in Toddler Obesity Status based on Exclusive Breastfeeding History**

History of Exclusive Breastfeeding	Obesity Status				OR	95% CI	P-Value
	Obesity		Not obese				
	n	%	n	%			
Not	8	47.1	5	29.4	2.13	0.51-8.75	0.480
Yes	9	52.9	14	70.6			

However, from statistical test between the history of exclusive breastfeeding and the obesity status of children under five using the Chi-Square test in Table 3, there was no significant association between the obesity status of children under five based on a history of exclusive breastfeeding.

## DISCUSSION

In this research, we found that children without exclusive breastfed have a 2.13 times risk of being obese compared to toddlers with exclusive breastfeeding history, even though it was not significantly associated. Our finding was not in line with the results of research conducted by Ginting, who reported a significant relationship between exclusive breastfeeding and obesity in children under five. Toddlers who are not exclusively breastfed have a greater risk of obesity (12). Most likely, the statistical results obtained are not significant because our sample involved was small.

Information from the cadre was different among the village cadre in Tegalrejo. In Kricak Village, which is part of the Tegalrejo working area, reported that generally, the breastfeeding coverage in this health centre is sufficient because most of the parents are educated. Still, most of them not working in the formal sector and stay at home. Accordingly, they have proper time to breastfeed their children. Our result is consistent with the research conducted by Sarlis and Cindy, which shows that there is no significant relationship between exclusive breastfeeding and the normal and abnormal nutritional status of toddlers (13). This is, of course, in contrast

to the data obtained from Riskesdes 2018 that the number of babies who receive exclusive breastfeeding in Indonesia is only 37.3% of 1,100 babies (14). While in Bener village, a cadre reported that exclusive breastfeeding coverage in their place was low. This happens because of the mother's lack of knowledge about the importance of giving exclusive breastfeeding to the baby. Besides, the child's parents are also busy with daily work activities (15).

Based on the mother responses to the questionnaire, it was known that all toddlers with a history of not exclusive breastfeeding are toddlers who are fed formula or additional milk. This was because the toddler's mother considers that breast milk alone is not enough for their nutrition. During the first six months of a baby's life, exclusive breastfeeding has been recommended by UNICEF and WHO as a key to important child's survival (16). Breast milk is the most important source of energy and nutrition for children aged 6-24 months. Breast milk meets more than half of the energy needs of children aged 6-12 months and one-third of children aged 12-24 months. Breast milk is also an essential nutrient source in the healing process when a child is sick (14).

Breast milk reduces the risk of being overweight and obese by 10% compared to formula milk (14). Children with a history of not exclusive breastfeeding or children who are given formula milk can become obese. Toddlers who consume formula milk before six months have a 6.19 times greater risk of being overweight. This is because the provision of formula milk with a high protein content early in life can modulate the concentration of the hormone Insulin-like Growth Factor-1 (IGF-1). The hormone IGF1 regulates growth and regulates the development of fatty tissue through endocrine pathways. High protein intake such as branched-chain amino acids (BCAAs) or bound-chain amino acids increases the secretion of insulin and IGF1, which impacts increasing preadipocyte differentiation and increasing the number of adipocytes in the child's body (17). This study's results were supported by research conducted previously, which said that infants and toddlers identified as obese were primarily identified as consuming formula milk (41.9%). However, giving formula milk is not automatically considered a trigger for obesity in infants and toddlers because other factors are found to influence, such as consuming junk food (18).

The age characteristics showed that the toddler with the highest obesity was the 19–24-month age group with a percentage of 76.5%. Previous research states that the older the child needs more intake that will affect the children weight. The gender characteristics showed that the toddler with the highest obesity was male, with a percentage of 52.9%. This is because men need more energy and protein intake than women, and men's body surface area is more expansive than women (19).

The findings from the observations show that obese toddlers have obese mothers. One of the toddlers was advised to diet by the health centre because his weight was increasing continuously. This toddler received exclusive breastfeeding, but it was suspected that his obesity is an inheritor of his parents. It is in line with Sudiawan's research, on the nutritional status of the mother, the p-value is 0.009 or 0.9% <5% with an OR (odds ratio) of 2.322, which shows that children who have a history of overweight or obese mothers have a 2.3 times greater risk of being overweight or obese compared to respondents who do not have a history of fat mothers (20).

Obesity is a health dilemma. Obesity can cause a variety of physical and psychological problems. When obesity in childhood continues into adulthood, it can lead to various diseases such as hypertension during adolescence, hyperlipidaemia, atherosclerosis, coronary heart disease, malignant hypertension in adults, diabetes and Pickwickian Syndrome (21). Accordingly, preventing obesity is much better than treating obesity. Prevention should be as early as possible, starting in infancy, namely by giving breast milk. Kartu Menuju Sehat (KMS) is needed to monitor children's growth to know any directional deviations from their weight. Children as early as possible are introduced to physical activity, either through playing or sports (21).

As a developing country and has a diverse population background, to deal with obesity cases in Indonesia, the government has compiled the National Asian Movement Plan for the Archipelago Movement to Reduce Obesity Rates (RAN-GENTAS) (22). Besides, many Indonesian government policies have been made to tackle obesity in Indonesia, one of which is in the school sector. For example, such as assessing the nutritional status of new children entering school, school health program, public health education programs through KADARSI (nutrition-conscious families), development of general health-based obesity management and control programs, obesity prevention and control policies at the school and health centre levels, and school canteen development (23).

## CONCLUSION

In summary, from this research, we know that there is no difference in the obesity status of children under five based on the history of exclusive breastfeeding in the working area of the Tegalrejo Health Center, Yogyakarta City, with a  $p = 0.480$  and an Odds Ratio of 2.133.

## Authors 'Contribution

All researchers contribute to research design from surveys, data collection, data analysis, and research reports preparation.

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## Conflict of interest

There are no conflicts of interest.

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