SHORT RESEARCH ARTICLE

The Non-Exclusive Breastfeeding and Preschool Children Obesity in Serang City, Banten

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DOI: 10.55489/njcm.161020255724

ABSTRACT

Background: Indonesia is currently experiencing a double burden of malnutrition, with a notable rise in childhood obesity. In Banten Province, the prevalence of obesity among children showed a consistent increase from 2016 to 2018. Exclusive breastfeeding has been identified as a potential protective factor against obesity. This study aimed to examine the relationship between exclusive breastfeeding history and obesity in children aged 4-6 years.

Methods: A cross-sectional survey was carried out involving 134 children from public and private kindergartens in Serang City, selected using a two-stage sampling technique. Data were gathered through questionnaires and anthropometric assessments, and analyzed with the chi-square test (α=0.05).

Results: The prevalence of obesity was 15.7%, while 81.3% of children had been exclusively breastfed. Children without exclusive breastfeeding were 7.8 times more likely to develop obesity (95% CI: 2.8-21.6; p=0.001).

Conclusion: Lack of exclusive breastfeeding significantly increases the risk of obesity in preschool-aged children. Strengthening exclusive breastfeeding practices and enhancing parental awareness are essential strategies for obesity prevention.

Keywords: Exclusive breastfeeding, Obesity, Preschool Children

ARTICLE INFO

Financial Support: None declared

Conflict of Interest: The authors have declared that no conflict of interests exists.

Received: 27-06-2025, **Accepted**: 09-09-2025, **Published**: 01-10-2025

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How to cite this article: Sari IM, Zounia YZ. The Non-Exclusive Breastfeeding and Preschool Children Obesity in Serang City, Banten. Natl J Community Med 2025;16(10):1017-1020. DOI: 10.55489/njcm.161020255724

www.njcmindia.com | pISSN: 0976-3325 | eISSN: 2229-6816 | Published by Medsci Publications

INTRODUCTION

Childhood obesity is a growing global health challenge, with prevalence nearly tripling since 1975. In 2019, an estimated 38.2 million children under five were overweight or obese.[1,2] In Indonesia, 3.8% of toddlers were obese according to Basic Health Research 2018. In Banten Province, an increasing trend was also seen from 3.77% (2016) to 8.60% (2018). In Banten Province, obesity prevalence rose sharply from 3.77% (2016) to 8.60% (2018).[3]

Obesity, characterized by excessive body fat with measurements at or above the 95th percentile on growth charts, is associated with academic difficulties, reduced self-confidence, and increased risk of metabolic disorders later in life. Its development is influenced by multiple factors such as heredity, socioeconomic conditions, eating patterns, limited physical activity, and infant feeding practices. Exclusive breastfeeding (EBF) has been suggested to lower the likelihood of obesity, although research findings remain mixed. While several studies in Indonesia demonstrate a significant protective effect of EBF, others report no clear association with childhood obesity.[4-7] This study sought to investigate the association between non-exclusive breastfeeding and obesity among preschool-aged children in Serang City, with the aim of informing local prevention strategies.

METHODOLOGY

A cross-sectional study was carried out from March to June 2023 involving children aged 4-6 years enrolled in one public and one private kindergarten in Serang City. Schools were chosen through convenience sampling, while participants were selected using simple random sampling. Eligible subjects were children aged 4-6 years whose parents provided consent; those with deformities affecting anthropometric assessment were excluded. The final sample consisted of 134 children, with 67 from each school. Data collection included questionnaires covering breastfeeding history, formula feeding, maternal knowledge, education, occupation, family support, and children's physical activity, alongside anthropometric measurements (weight and height) obtained with calibrated instruments and plotted on CDC growth charts. Obesity was defined as BMI-for-age above the 95th percentile, while exclusive breastfeeding was defined as infants receiving only breast milk during the first six months, without additional liquids or solids except for prescribed medicines or supplements. Statistical analysis was performed using chi-square tests, with a significance level set at $p < 0.05$.

Approval of Institutional Ethical Review Board: Health Research Ethics Committee (No. 217/UN43. 20 KEPK/2023)

RESULTS

The participants had a median age of 5 years, with females comprising 53.8% of the sample. The prevalence of obesity was 15.7%. A history of exclusive breastfeeding was noted in 81.3% of children, whereas 18.7% had not been exclusively breastfed. Most children engaged in sufficient physical activity (91.8%) and the majority did not consume formula milk (81.3%). Among mothers, the predominant age group was 25-35 years, with 82.8% attaining university-level education. Nearly all mothers (97%) demonstrated good knowledge of breastfeeding, 59.7% were homemakers, and family support for breastfeeding was universally reported (Table 1).

Bivariate analysis revealed that children who were not exclusively breastfed had a 7.8-fold higher likelihood of obesity compared to those who were exclusively breastfed (95% CI: 2.8-21.6; p=0.001), as presented in Table 2.

Table 1: Frequency Distribution Based on Mother and Child Characteristics

Characteristic	Participants (%)
Children	
Age (years) Median (min-max)	5 (4-6)
Gender	
Boy	62 (46.2)
Girl	72 (53.8)
Obesity	
Obesity	21 (15.7)
Not Obesity	113 (84.3)
History of Breastfeeding	
Exclusive breastfeeding	109 (81.3)
Non-exclusive breastfeeding	25 (18.7)
Physical Activity	
Adequate	123 (91.8)
Not Adequate	11 (8.2)
Formula Milk Consumption	
Given	25 (18.7)
Not Given	109 (81.3)
Mother	
Age	
< 25 years old	5 (3.7)
≥ 25 years old	129 (96.3)
Knowledge of breastfeeding	
Good	130 (97)
Not Good	4 (3)
Level of Education	
Elementary School/equal	3 (2.2)
Junior High School/equal	5 (3.7)
High School/equal	15 (11.3)
University/equal	111 (82.8)
Work Status	
Housewife's	80 (59.7)
Trader	3 (2.2)
Private Employee	9 (6.7)
Self-employed	12 (9)
Civil servant	30 (22.4)
Family support	
Support	134 (100)
Not Support	0 (0)

Table 2: History of Breastfeeding with Children's Obesity in Serang City (n = 134)

Breastfeeding	Obesity (%)	No Obesity (%)	Total (%)
Non-exclusive breastfeeding	11 (44)	14 (56)	25 (100)
Exclusive breast feeding	10 (9.2)	99 (90.8)	109 (100)

P value <0.001,
Odds Ratio (95% Confidence interval (7.8 (2.8-21.6)

DISCUSSION

Obesity typically arises from an imbalance between energy intake and expenditure, where caloric consumption exceeds the body's requirements. This balance is shaped by nutrients that provide energy such as carbohydrates, fats, and proteins.[8-10] Both internal factors, such as physiological regulation and metabolism, and external influences, including diet and lifestyle, play a role. Research suggests that approximately 70% of obesity risk is attributable to environmental factors, while genetic predisposition accounts for around 30%.[5,11]

In this study, obesity in children was measured based on the child's height and weight using a calibrated scale and then plotted on the CDC curve.[2,12] The study demonstrated that lack of exclusive breastfeeding was strongly associated with a higher risk of obesity in preschool children. The observed prevalence of 15.7% exceeded that of several earlier Indonesian studies, which may be partly explained by post-pandemic lifestyle shifts, including greater sedentary behaviour.[13,14]

Exclusive breastfeeding may reduce the risk of obesity through several pathways. Breast milk delivers nutrients tailored to infant growth, while formula generally contains higher energy density (77.6 kcal/100 ml compared to 63.9 kcal/100 ml in breast milk). Frequent or excessive formula feeding can lead to greater caloric intake and fat accumulation. Moreover, breastfed infants are thought to develop improved self-regulation of appetite and satiety.[15]

These results align with evidence from several cities that demonstrated a significant link between breastfeeding and lower obesity risk. In contrast, several international studies found no association, which may reflect variations in study methodology, population contexts, or uncontrolled confounding factors. Research from the Cincinnati Children's Hospital Medical Centre reported no association between breastfeeding and childhood obesity, and similar findings were noted in some Indonesian studies.[16,17] Nonetheless, exclusive breastfeeding is generally considered protective, with discrepancies in results likely influenced by methodological variations or unmeasured confounders.[2]

Common reasons for discontinuing exclusive breastfeeding include mothers' concerns about inadequate milk supply, social influences from peers or family, and the impact of formula marketing. Enhancing maternal knowledge and reinforcing family support are key strategies to promote successful breastfeeding practices.[18]

The study employed probability sampling and involved participants from both public and private schools, increasing its representativeness. However, dietary intake and parenting practices were not assessed, and some anthropometric measurements were difficult to obtain due to children's resistance.

CONCLUSION

Non-exclusive breastfeeding shows a strong link to higher obesity risk among preschoolers. Preventive strategies should highlight the importance of exclusive breastfeeding during the first six months, complemented by parental guidance on diet and physical activity. Ongoing education and supportive family involvement are essential to sustain optimal breastfeeding practices.

Acknowledgement: The researcher would like to thank the respondents, enumerators and all parties who have contributed to the implementation of this research

Individual Authors' Contributions: Conceptualization, data curation, formal analysis, methodology, project administration, and writing - original draft were performed by IMS and YZZ. Visualization and writing - review & editing were carried out by IMS.

Availability of Data: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Declaration of Non-use of Generative AI Tools: This article was prepared without the use of generative AI tools for content creation, analysis, or data generation. All findings and interpretations are based solely on the authors' independent work and expertise.

REFERENCES

1. World Health Organization (WHO). Obesity and overweight. 2025. [Accessed June 10, 2025] Available from: https://www.who.int/news-room/fact-sheets/detail/obesity-and-overweight.
2. Centers for Disease Control and Prevention. Childhood Obesity Facts. Obesity. 2024;24-26. [Accessed June 11, 2025] Available from: https://www.cdc.gov/obesity/childhood-obesity-facts/childhood-obesity-facts.html
3. UNICEF. Landscape Analysis of Overweight and Obesity in Indonesia. Unicef Indones. 2022;1-138. [Accessed June 12, 2025] Available from: https://www.unicef.org/indonesia/reports/landscape-analysis-overweight-and-obesity-indonesia.
4. Jebeile H, Kelly AS, O'Malley G, Baur LA. Obesity in children and adolescents: epidemiology, causes, assessment, and management. Lancet Diabetes Endocrinol. 2022 May;10(5):351-365. DOI: https://doi.org/10.1016/S2213-8587(22)00047-X. PMID: 35248172; PMCID: PMC9831747.
5. Choi MJ, Kang H, Choi J. Risk Factors for Obesity in Five-Year-

Old Children: Based on Korean National Health Insurance Service (NHIS) Data. Children (Basel). 2022 Feb 25;9(3):314. DOI: https://doi.org/10.3390/children9030314 PMid:35327686 PMCid:PMC8947730

6. Sanyaolu A, Okorie C, Qi X, Locke J, Rehman S. Childhood and Adolescent Obesity in the United States: A Public Health Concern. Glob Pediatr Health. 2019 Dec 1;6:2333794X19891305. DOI: https://doi.org/10.1177/2333794X19891305 PMid:31832491 PMCid:PMC6887808

7. Sari NYP, Kurniati AM, Anzar J, Oswari LD, Nita S, Adenina S. The Relationship of Fat Intake and Body Fat Percentage in Medical Students. Biomed J Indones. 2024;10(3):92-97. DOI: https://doi.org/10.32539/bji.v10i3.201

8. Yakovenko V, Henn L, Bettendorf M, Zelinska N, Soloviova G, Hoffmann GF, Grulich-Henn J. Risk Factors for Childhood Overweight and Obesity in Ukraine and Germany. J Clin Res Pediatr Endocrinol. 2019 Sep 3;11(3):247-252. DOI: https://doi.org/10.4274/jcrpe.galenos.2019.2018.0157 PMid:30630809 PMCid:PMC6745453

9. Lin X, Li H. Obesity: Epidemiology, Pathophysiology, and Therapeutics. Front Endocrinol (Lausanne). 2021 Sep 6;12:706978. DOI: https://doi.org/10.3389/fendo.2021.706978. PMID: 34552557 PMCID: PMC8450866

10. Singh A, Hardin BI, Keyes D. Epidemiologic and Etiologic Considerations of Obesity. 2025 Jan 22. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan. PMID: 36251852.

11. Masood B, Moorthy M. Causes of obesity: a review. Clin Med (Lond). 2023;23(4):284-291. DOI: https://doi.org/10.7861/clinmed.2023-0168 PMid:37524429 PMCid:PMC10541056

12. Casadei K, Kiel J. Anthropometric Measurement. 2022 Sep 26. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025 Jan. PMID: 30726000.

13. Syahri IM, Laksono AD, Fitria M, Rohmah N, Masruroh M, Ipa M. Exclusive breastfeeding among Indonesian working mothers: does early initiation of breastfeeding matter? BMC Public Health. 2024 May 3;24(1):1225. DOI: https://doi.org/10.1186/s12889-024-18619-2 PMid:38702668 PMCid:PMC11069251

14. Gayatri M. Exclusive Breastfeeding Practice in Indonesia: A Population-Based Study. Korean J Fam Med. 2021;42(5):395-402. DOI: https://doi.org/10.4082/kjfm.20.0131 PMid:34607416 PMCid:PMC8490177

15. Ross MG, Kavasery MP, Cervantes MK, Han G, Horta B, Coca KP, Costa SO, Desai M. High-Fat, High-Calorie Breast Milk in Women with Overweight or Obesity and Its Association with Maternal Serum Insulin Concentration and Triglycerides Levels. Children (Basel). 2024 Jan 23; 11(2): 141. DOI: https://doi.org/10.3390/children11020141 PMid:38397253 PMCid:PMC10887191

16. Latifah HI, Suyatno S, Asna AF. Factors of Child Growth Failure Based on the Composite Index of Anthropometric Failure in West Sulawesi Province. Amerta Nutr. 2024;8(1SP):1-8. DOI: https://doi.org/10.20473/amnt.v8i1SP.2024.1-8

17. Ma J, Qiao Y, Zhao P, Li W, Katzmarzyk PT, Chaput JP, et al. Breastfeeding and childhood obesity: A 12-country study. Matern Child Nutr. 2020 Jul;16(3):e12984. DOI: https://doi.org/10.1111/mcn.12984 PMid:32141229 PMCid:PMC7296809

18. Alabdullah AAS, ALshamy NM, Alzahrani LM, Safhi RA, Alrashed MT, Al-Mukhtalah LM, et al. Exploring factors that influence the knowledge and awareness of breastfeeding among Saudi mothers: a qualitative study. Front Nutr. 2025 ;12:1516686. DOI: https://doi.org/10.3389/fnut.2025.1516686 PMid:40110170 PMCid:PMC11919657