

Influence of *Grandparenting* at Risk on Obesity in Toddlers in Urban Areas: A Socio- Ecological Analysis

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Abstract

Indonesia is facing the burden of double malnutrition, with an increasing prevalence of obesity in toddlers in urban areas, which overlaps with the phenomenon of grandparenting consequences. The purpose of this study was to analyze the influence of grandparenting on the risk of obesity in toddlers in Bengkulu City. The design used was a sequential explanatory mixed-methods design with 50 respondents. Phase quantitative and 15 informants phase Qualitative. Parenting patterns were measured using the G-PSDQ, and nutritional status was assessed using the WHO BB/HB z-score, which was analyzed using Multiple Logistic Regression and Thematic Analysis. Results: Prevalence of obesity reached 58% with a permissive parenting style (66%). Multivariate analysis shows that permissive parenting increases the risk of obesity 8.4 times (OR=8.4; 95%CI: 2.1-35.0; p=0.003), and screen time >2 hours/day increases the risk 6.3-fold (OR=6.3; 95%CI: 1.5-27.3; p=0.015). Findings from qualitative research reveal perceptions of "fat is healthy," emotional feeding practices, and the use of gadgets as a feeding strategy. Conclusion: The permissive parenting style of grandparents is a determinant of toddler obesity, mediated by excessive screen time. Interventions on obesity must involve grandparents through educational programs on nutrition, including those for the elderly, to change cultural perceptions and feeding practices.

Kata kunci: Grandparenting pattern ; toddler obesity ; screen time; feeding practice; literacy nutrition.

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INTRODUCTION

Indonesia is transitioning to a complex epidemiology, where the burden of double malnutrition (double burden of malnutrition) has become an urgent public health challenge. On one side, the government is still struggling solve the problem of stunting, but on the other hand, the prevalence of obesity in children aged early in urban areas shows an alarming spike (Ayunina et al., 2024; UNICEF et al., 2024). Latest Basic Health Research and survey data show that obesity in

toddlers is no longer just a problem of aesthetics, but rather an early manifestation of metabolic disorders that can trigger Non-communicable diseases (NCDs) in the future (Sina & Ellina, 2025). This phenomenon is closely related to the transformation of family structures in large cities, where economic pressure and career demands push for greater maternal workforce participation. Consequences of this dynamic are a shift not quite enough to answer parenting from the core parent to the caregiver secondary, with grandparents holding a dominant role as the primary informal caregiver (Harjadinta & Susanty, 2025; Haryanto & Kinasih, 2024).

Practice traditional parenting, implemented by grandparents, in a modern reality with obesogenic environments. Grandparents often carry the cultural perception that fat children are healthy children and express love and affection through overfeeding or sweet foods. In urban areas where physical movement is limited and access to ultra-processed foods is facilitated, this permissive parenting style may create a chronic calorie surplus in toddlers. This problem is exacerbated by low literacy and poor nutrition among the older generation and by the obstacles that psychological parents face in correcting their own parenting style (Ramadhani et al., 2023; Rangka et al., 2024).

Previous research has been extensive in highlighting connection parenting patterns with nutritional status, but the majority of studies in Indonesia are still concentrated on *stunting* or nutrition (Nuridin et al., 2023; Solichah et al., 2022). Studies on childhood obesity are beginning to develop, but often focus on school- age children or adolescents (Rifqi et al., 2025; Santika et al., 2025; Wansyaputri et al., 2023). In fact, research on toddlerhood is far more crucial and urgent, both physiologically and behaviorally. The toddler phase is a critical period for the formation of permanent eating habits *and* a determining factor in the occurrence of early adiposity rebound—an early spike in the body mass index curve that is the strongest predictor of obesity in adulthood. Global metadata analysis Lau et al (2020) has confirmed that grandparent care increases the risk of childhood obesity by up to 30%, but empirical studies examining specific mechanisms, such as the interaction between feeding and *screen time* in the toddler population in the urban context of Indonesia, are still limited (Putri & Humayrah, 2024).

Grandparenting Pattern, which is operationalized through the dimensions of demandingness and responsiveness, as well as specific feeding practices (Maemunah & Mariyani, 2023; Marchianti et al., 2024). The dependent variable is the Risk of Toddler Obesity, measured by anthropometric indicators of weight/height (z-scores). Intermediary and confounding variables analyzed include added sugar intake, Aila et al (2023) screen time duration, and child development. Hasibuan & Sitorus (2024), as well as parents' perceptions of the physical environment that supports activities (Mansur & Budiarti, 2023).

Grandparents' excessive affection for grandchildren (Toxic Love) in the intergenerational nutrition transition, but, unlike a purely quantitative approach, this study integrates analysis of parenting behavior with urban obesogenic environmental factors (such as the availability of fast food and limited play space) and the role of grandmothers. This study also offers a new perspective: obesity interventions cannot target only mothers; they must also reform the role of grandparents from a source of risk to an agent of change.

The national health narrative is heavily dominated by the issue of *stunting*, resulting in a lack of awareness of the issue of toddler obesity stemming from the parenting patterns of grandparents. Existing studies often generalize about the impact of non-parental care, even though the emotional and authority dynamics between grandmothers and daycare settings have very different effects on children's eating behaviors. Practically, this research is urgent to prevent an explosion of cases of degenerative diseases at a young age in the future, which will burden the national health insurance system. Scientifically, these findings will enrich the literature on public health nutrition by providing empirical evidence for the need for nutrition education modules that are elderly-inclusive.

Based on the findings, the main objective of this study was to analyze the influence of Grandparenting parenting patterns on the risk of obesity in toddlers in urban areas. Specifically, the study aimed to identify the dominant feeding style grandparents use, analyze the correlation between the duration of grandparenting care and increases in toddlers' BMI z-scores, and evaluate the mediating roles of screen time and sweet food consumption patterns in this relationship.

RESEARCH METHODOLOGY

Research Design

This research applies the mixed methods approach with a Sequential Explanatory design (Sequential Explanatory). Rationalization election. This design is based on the need to measure not just the magnitude of obesity risk (quantitative), but also to dissect the sociocultural background (qualitative). In accordance with Creswell's framework, the research was conducted in two phases. sequential the first phase is a quantitative survey to test connection variables and obtain generalization, followed by a second phase in the form of a qualitative study to explain why these statistics occur, especially related to the phenomenon of " love" Darling toxic " in feeding by grandparents.

Location and Time of Research

Bengkulu City, which was purposively chosen because it represents areas with the highest prevalence of toddler obesity and a dense, obesogenic environmental characteristic (Ayunina et al.,

2024). Field data collection was conducted for 6 months (January – June 2024), covering the variation seasons to minimize physical activity bias due to weather (Maddren et al., 2025)

Phase One: Quantitative

Research Objectives

The population is working mothers whose toddlers (aged 24–59 months) are primarily cared for by grandmothers for at least 8 hours per day on weekdays. The sample was conducted using the Purposive Sampling technique in the Posyandu area. selected to capture households that specifically meet the inclusion criteria. The sample size involved as many as 50 respondents. Use of size. This sample (n=50) is recognized as a limitation in this study because risk introduces bias and reduces statistical power in multivariate analysis (Multiple Logistic Regression). Although this amount is assessed as adequate as a foundation study, the initial exploratory weakness in the statistics is compensated for through deepening triangulation of qualitative data in the next phase.

Instrument Data Collection

Data collection was carried out through a survey using standardized, adapted, and tested instruments for validity and reliability in the Indonesian context. Grandparenting patterns were measured using the Grandparenting Parenting Style & Dimensions Questionnaire (G-PSDQ), which has been shown to be reliable (Cronbach's alpha = 0.85). This questionnaire identifies parenting styles (authoritative, authoritarian, and permissive) and feeding practices. The nutritional status of toddlers is measured anthropometrically (weight-for-height/BB-TB) and converted into a z-score based on WHO standards. Confounding variables such as sugar intake, screen time duration, and physical activity were measured using the Semi-Quantitative Food Frequency Questionnaire (SQ-FFQ) and other questionnaires. structured.

Data analysis

Analysis using statistical software. Univariate analysis describes the characteristics of the sample. Bivariate analysis (e.g., Chi-Square test) is performed to test the initial relationship between variables. Next, a multivariate analysis using multiple logistic regression was used to identify the dominant risk factors for obesity while controlling for confounding variables.

Second Phase: Qualitative

Participants and Sampling Techniques

Participants were qualitatively recruited from respondents. The first phase used the Maximum Variation Sampling technique. Researchers selected 12 informants (grandmothers and mothers) who represented extreme cases (obese toddlers), severe with permissive parenting, and unique cases (normal toddlers with grandmother's parenting), to get contrasting perspectives.

Procedure Data Collection

Data collected through in-depth interviews and observation, participatory in the respondent's home during mealtimes. Guidelines interview compiled based on the Health Belief Model to explore: Grandmothers' cultural perceptions regarding body posture ("fat is healthy" vs medical), dynamics negotiation or conflict (co-parenting conflict) between mother and grandmother regarding meal rules, reasons behind the use of gadgets (screen time) during feeding.

Qualitative Data Analysis

Recording interview transcribed verbatim and analyzed using Thematic Analysis (Braun & Clarke). The coding process was carried out to identify emerging themes, such as "Food as a Love Language" or "Physical Barriers in the Elderly." Data validity was maintained through source triangulation (comparing grandmothers' and mothers' statements) and member checking.

Data Integration (Mixing)

Based on the Sequential Explanatory design, integration is carried out at the final stage of interpretation. Findings statistics (eg, height correlation permissive parenting with obesity) will be "explained" by the narrative qualitative (for example: feeling "unwilling" grandmother refused request for grandchildren). The results of this integration are presented in a joint display that juxtaposes numerical statistics with relevant interview quotes, providing a holistic overview of obesity among toddlers under a grandmother's care.

RESULTS AND DISCUSSION

RESULTS

The first step in understanding landscape problems in the field was to perform univariate analysis to map the demographic and health status profiles of research subjects. This mapping is crucial for identifying trends common among working mothers who provide care for grandmothers, as well as for identifying the critical prevalence of nutritional problems at the research location. The following data present the frequency distribution, which serves as the basis for further analysis and correlation.

Table 1. Frequency Distribution Characteristics Respondents and Nutritional Status

Variables	Category	<i>f</i>	%
Nutritional Status of Toddlers (BB/TB Indicator)	Good Nutrition	21	42
	Obesity	29	58

Grandmother- Dominant Parenting Style	Democratic (Authoritative)	5	10
	Authoritarian	12	24
	Permissive (Indulgent)	33	66
Screen Time Duration	Low (< 1 hour/ day)	15	30
	High (> 1 hour/ day)	35	70
Grandmother's Education	Elementary (Elementary/Middle School)	30	60
	Intermediate /High	20	40

The data in Table 1 reveal a rather worrying reality where the majority of toddlers in the sample (58%) are obese, exceeding the number of toddlers with good nutrition. This finding continues along with the domination of the Grandparenting parenting style, which is permissive, applied by 66% of respondents. The high number This permissive parenting style is most likely influenced by the grandmother's educational background which is dominated by elementary school (elementary/junior high school) at 60%, which may have implications for low literacy modern nutrition, in addition, the high screen time duration (>1 hour/ day) in 70% of toddlers indicates a significant change in activity patterns in children cared for by grandmothers.

Grandparenting Patterns and Risk of Obesity

How to pattern foster care	Nutritional status				Total	<i>p</i>	OR (95% CI)
	Good		Obesity				
	n	%	n	%			
Permissive	5	15.2	28	84	100	0.001	84(2.1-33.2)
Non -Permissive (		76.5		23.5	100		
Authoritative+Authoritative)	13		4				
Total	6	21.4	22	78.6	100		
Total	18		32		50		

Analysis results. The bivariate analysis in Table 2 shows a very sharp and statistically significant disparity (p=0.001). Toddlers who are cared for with a permissive parenting style had significantly higher proportions of obesity (84%) compared to those raised with a non- permissive pattern (23.5%). *The Odds Ratio* (OR) value of 8.4 confirms that toddlers exposed to permissive parenting from grandmothers have an 8.4 times greater risk of obesity compared to toddlers who were raised with stricter discipline. This figure indicates that the " laxity " of the rules imposed by grandmothers is not just a preference for love and darling, but rather a factor that seriously affects

health risks. To visualize the gap in nutritional status described in the analysis tabulation, a cross-sectional analysis is presented in the following graph. This visualization aims to highlight the contrast in the proportion of obese individuals by the parenting pattern category applied by grandparents.

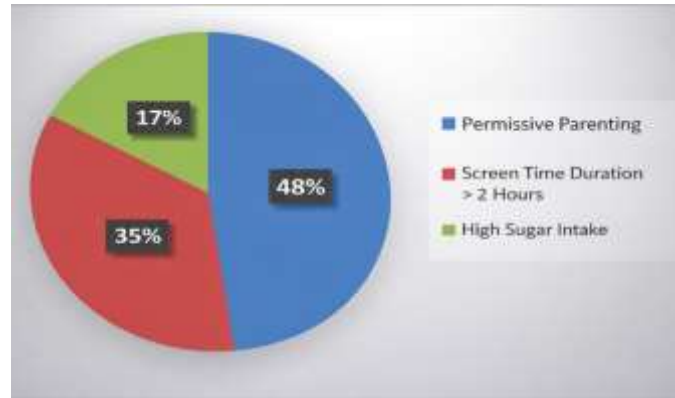


Figure 1. Graph Comparison of Toddler Nutritional Status Based on Grandmother's Parenting Pattern

The graph above clearly shows the dominance of obesity in the permissive parenting group, which is in stark contrast to the other parenting groups. This visualization reinforces findings that the all-round approach to care, allowing what is often thought of as love Darling, is precisely linearly correlated with the accumulation of overweight in toddlers. Given that obesity is a multifactorial problem, analyzing bivariate data alone is not sufficient to draw solid conclusions. Therefore, the analysis was conducted using a two-step multiple logistic regression model. This step was taken to determine whether the influence of permissive parenting remains dominant when confounding factors, such as screen time and sugar intake, are included in the equation.

Table 3. Results of Multiple Logistic Regression Analysis Influence *Grandparenting* at Risk Obesity in Toddlers in Urban Areas

								95% CI for EXP(B)	
		B	SE	Wald	df	Sig.	Exp(B)	Lower	Upper
Step 1 a	Parenting Style (Permissive)	2.128	0.69	9,501	1	.002	8,401	2,172	32,501
	Constant	-1,504	0.52	8.35	1	.004	0.222		
Step 2 b	Parenting Style (Permissive)	2.15	0.718	8.96	1	.003	8,583	2.101	35.05

Screen Time (>2 Hours)	1.84	0.75	6,015	1	.015	6,294	1,451	27,302
Intake (High)	1.1	0.548	4.02	1	.045	3,003	1,024	8,805
Constant	-3.5	1.1	10.12	1	.001	0.03		

Table 3 shows the influence of toughness on permissive parenting as the main predictor. In Model 2, which included screen time and sugar intake variables, permissive parenting remained significant. The highest *Odds Ratio* ($\text{Exp}(B) = 8.583$), which means this variable is the strongest determinant. Interestingly, excessive screen time (>2 hours) has also been shown to be a significant risk factor, with a 6.2-fold increase in risk. This implies that intervention for obesity cannot only focus on diet, but also must reform the style of parenting and management of gadget use by grandmothers.

The qualitative phase aims to explain why permissive parenting is very dominant and strongly correlated with obesity. Based on the in-depth thematic analysis of the interview transcript with 12 informants (Grandmothers and Mothers), three main themes emerged: the main determinant of parenting behavior. Summary conclusion interview presented as follows:

Theme 1: The Perception of " Fat is Healthy" and Forms of Affection

Grandmothers tend to have the traditional cultural perception that a fat child signifies a well-cared-for and healthy child, contrary to the standards of modern medicine.

"If my grandchild is skinny, I feel sorry, like he's not being fed. If he's chubby, it's cute, a sign that he's healthy and that the milk is right for him. I'm happy when he eats a lot, and I often argue with my mother. The doctor said my child is obese, but according to his grandmother, it's normal. In fact, she's proud that her grandchild is the biggest at the Posyandu." (August 2024)

Theme 2: Emotional Feeding Practices and Indecisiveness (Permissiveness)

Permissive parenting manifests itself in a grandmother's inability to refuse her grandchildren's requests ("not having the heart"), often referred to as "Toxic Affection." Sweet foods are often used to express love or as a source of comfort.

He's a grandchild, so if he asks for ice cream or chocolate, I'll give him some. I'd feel sorry for him if he cried. While I'm still alive, I want to pamper him. Every time I come home from work, there's a package of snacks or sweet biscuits waiting. His grandmother said 'Let him be quiet', even though I had prepared the fruit." (August 2024)

Theme 3: Screen Time as a Feeding Strategy

Grandmothers use devices (screen time) as a tool to help the child eat (distracted feeding), which is done unconsciously to remove signals in children.

"It's hard if you don't give him a cell phone, he keeps running around. If you give him YouTube, he sits still, his mouth hanging open. So it's easy to feed him rice until he finishes it all." (August 2024)

Mixed methods research with a sequential explanatory design, the above statistical figures require contextual explanation. Why do grandmothers tend to be... permissive? And how does the screen time mechanism trigger obesity? The following data integration (Joint Display) juxtaposes findings statistics with narrative qualitative data from in-depth interviews, to dissect the phenomenon of "Toxic Affection", which is the background of those numbers.

Table 4. Findings Integration Matrix Quantitative and Qualitative

Findings Quantitative Statistics)	(Explanation Qualitative (Interview)	Integrative Conclusion
Dominance Permissive Parenting (66%)	of Grandmothers feel their role is to pamper, not discipline. There is a feeling of "not having the heart " to refuse. desire a grandchild.	The height of permissive parenting is caused by the perception of the grandmother's role as a distributor of love without limits (emotional).
Positive Correlation: Parenting & Obesity (OR=8.40)	The perception of "Fat = Healthy" leads to overeating. Grandmothers are proud when their grandchildren... use up a big portion.	Risk of obesity increases because grandmother's (traditional) health standards are different from those of modern society, leading to excessive calorie intake.
Correlation : Screen Time & Obesity (OR=6.29)	The use of gadgets is a pragmatic strategy to get children to sit still while eating (distracted eating).	Screen time is not just a passive activity; it is a tool for negotiating eating that can cause children to lose control of their sense of fullness.

Integration matrix in Table 4. The high OR for permissive parenting is apparently rooted in the emotional constraints of grandmothers who feel "unwilling" and the outdated cultural perception that "fat equals healthy." Another crucial finding is the role of screen time, which is not simply a passive activity but is strategically used by grandmothers as a negotiation tool (distracted eating) to encourage children to eat. This explains the biological mechanism by which children lose satiety signals due to device distractions, which ultimately leads to a calorie surplus and obesity.

DISCUSSION

The findings of this study strongly confirm that permissive grandparenting is a crucial determinant that substantially increases the risk of obesity in children under five in urban areas. The magnitude of this influence indicates that lax feeding practices are not simply variations in parenting styles, but rather a key catalyst driving the highest vulnerability to overnutrition in children. These results align with the findings of an international meta-analysis that reported that grandparental care

significantly contributes to an increased risk of childhood obesity, with the primary mechanisms being overfeeding practices and minimal restrictions on the consumption of high-calorie foods (Lau et al., 2020; Liu & Kim, 2025)

The qualitative analysis in this study successfully uncovered the emotional dimension underlying the high prevalence of permissive parenting among grandparents. The perception that "a fat child is a healthy child" and the use of food as an expression of affection reflect a conflict between traditional values and modern health standards. This phenomenon is not unique to Indonesia; it is consistently observed across developing countries undergoing rapid nutritional transitions. Studies of parenting styles and feeding practices have identified that parents or caregivers with a permissive style tend to ignore children's satiety signals, provide food as a reward or emotional comfort, and rarely establish consistent rules regarding the type and amount of food (Power et al., 2021; Schneider-Worthington et al., 2021; Vollmer & Baietto, 2017). In grandparental parenting, this emotional dimension is further complicated by the feeling of not having the heart to refuse grandchildren's requests and the desire to pamper them during the limited time they have together.

Another important finding is the crucial role of screen time as a key mediator in the relationship between permissive parenting and obesity. Qualitative data suggests that grandparents use screens as a pragmatic strategy to encourage children to overeat, a practice known as distracted feeding. Physiologically, intense visual and auditory exposure from screens hijacks children's cognitive attention, disrupting neural communication between the digestive system and the brain. This cognitive distraction blunts the sensitivity of the hypothalamus's response to the hormone leptin (a satiety signal), allowing swallowing to occur mechanically without the child's awareness of satiety. This mechanism is supported by numerous studies showing that excessive screen exposure not only reduces physical activity but also triggers a chronic calorie surplus by disrupting children's internal appetite regulation (Fang et al., 2019; Haghjoo et al., 2022; Robinson et al., 2017). A recent meta-analysis even estimates that every additional 1 hour of screen time per day increases the risk of obesity by 13%, with a stronger effect on preschool-aged children who are still developing their eating patterns (Haghjoo et al., 2022). This pattern is exacerbated by the fact that grandparents, with limited natural physical energy at this age, often choose screen time as the easiest way to keep children calm.

The practical implications of these findings are particularly pressing given Indonesia's demographic shift, which has seen grandparents increasingly taking on the role of primary caregivers. Obesity intervention programs can no longer simply target biological parents; they must be specific approaches that address the home ecosystem and secondary caregivers. Specifically, the government,

through health agencies, needs to revise the Maternal and Child Health Handbook (MCH Handbook) by including a specific guideline for substitute caregivers (especially grandparents). This guideline should include standard portion sizes for toddlers and emphasize the dangers of devices during mealtimes. Furthermore, it is necessary to integrate elderly-inclusive grandparenting and nutritional literacy education modules into the Toddler Family Development (BKB) program or the Elderly Integrated Health Post (Posyandu Lansia) to ensure modern health standards can effectively counter traditional perceptions (Alhelal et al., 2024; Gökçay & Şahin, 2024; Pérez-Morales et al., 2021).

This study has several limitations that should be considered in interpreting the results. First, the cross-sectional design in the quantitative study limits the ability to determine a definitive cause-and-effect relationship. Second, the use of a small sample (n=50) resulted in a very wide Confidence Interval (CI) range in the multivariate analysis results. The width of this interval reflects the level of precision of the decline from the estimated risk, so the probability. These mathematical figures must be interpreted with caution as indicators of trend instead of absolute numbers. Third, this study has not explored the role of the father or caregiver, or other secondary factors that may influence the dynamics of parenting. Although the power mixed methods design has provided a deep understanding of the mechanisms of psychosocial factors that cannot be captured by purely quantitative studies. Future longitudinal research is needed to track how patterns of parenting by grandparents influence the long-term trajectory of child growth.

CONCLUSION

This research proves that the permissive Grandparenting parenting style is a risk factor. The main factor contributing to childhood obesity in urban areas is excessive screen time. strengthen this risk through a distracted feeding mechanism that dulls the physiological response to satiety in the child's nerves. The root of the problem lies in the outdated cultural perception that " fat is healthy", the practice of emotional feeding, and low literacy among nutrition grandparents. These findings urge concrete reform of first-line health care policies, including the insertion of guidance on secondary parenting in the KIA Book and strengthening education, nutrition, and inclusive elderly care through the BKB program and Elderly Posyandu. Intervention: This holistic approach is expected to reconstruct traditional and empowering perceptions of grandparents as agents who protect children's health behaviors at home.

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