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Analysis of Early Detection of Growth and Development in Toddlers at Simpang Gambir Health Center, Mandailing District

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ABSTRACT

Background & Objective: Toddlerhood is a golden period that significantly influences a child's future growth and development. One key effort to detect developmental delays is through the Early Detection and Intervention for Growth and Development (SDIDTK) program. Low program coverage in certain areas, including the Simpang Gambir Community Health Center, calls for an evaluation of its implementation. **Method:** This study used a quantitative approach with a descriptive-analytic design. A total of 30 toddlers registered at the Simpang Gambir Health Center were selected as samples. Data were analyzed using univariate and bivariate methods with the chi-square test to assess the relationship between birth weight, nutritional status, family income, and parental education with developmental status. **Result:** Most toddlers (24 out of 30, or 80%) demonstrated development appropriate to their age. Bivariate analysis revealed no significant relationship between birth weight (p = 0.169), nutritional status (p = 0.169), or family income (p = 0.531) and developmental status. However, parental education showed a near-significant association (p = 0.059), indicating its likely impact on toddler development. **Conclusion:** Most toddlers showed appropriate development. Although birth weight, nutrition, and income were not significantly related, parental education likely influences developmental outcomes and should be a focus of future interventions.

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Introduction

The period under five years of age is considered a "critical" or "golden" period due to the rapid development of a child's brain (Black et al., 2017; Chamidah, 2013; Diana, 2010; Grantham-McGregor et al., 2007). During this stage, proper stimulation and guidance from parents—especially mothers—are crucial to ensure optimal development and prevent delays (Sutiari & Wulandari, 2011). Growth and development between ages 0 to 5 should be closely monitored to detect any early deviations and allow prompt intervention (Nutrisiani, 2010; Walker et al., 2011).

Parental knowledge significantly impacts child development. Tools such as the Developmental Pre-Screening Questionnaire (KPSP) are used to assess a child's progress (NDPM, 2015; Ministry of Health of the Republic of Indonesia, 2017). At the community level, Posyandu plays a key role in supporting early detection through routine health checks, including height and weight measurements (Media Karya Kesehatan, 2018; World Health Organization, 2020).

One government initiative in this effort is the SDIDTK program, which combines stimulation, early detection, and intervention for toddlers and preschoolers. In West Sumatra, coverage increased from 62.1% in 2018 to 68.2% in 2020. However, in Sijunjung Regency, coverage declined to 55.89% in 2021 (Health Office of Sijunjung Regency, 2021).

Despite these efforts, developmental issues remain a concern in Indonesia. Riskesdas (2013) reported a 1.7% rise in malnutrition, with 16% of toddlers experiencing motor development delays, and 1% suffering from delayed speech and low cognitive abilities—problems strongly associated with malnutrition and stunting (Fauziah et al., 2020). Data from the Ministry of Health shows that in 2010, the prevalence of malnutrition among toddlers was 17.9%, with severe malnutrition at 4.9%. The target to reduce malnutrition to 3.6% by 2015 was not achieved, as malnutrition prevalence increased to 19.6% in 2013 (Kesehetan, 2016). A local survey in Simpang Gambir revealed that while some mothers understood toddler development, others had limited awareness.

This study aims to examine the relationship between maternal knowledge and attitudes and toddler development, as well as associations with birth weight, nutritional status, parental income, and education. The findings are expected to inform local health policies and guide community-based interventions. This study was conducted to analyze these factors and their association with toddler development outcomes.

Objective

The study was conducted in the working area of the Simpang Gambir Community Health Center to analyze the relationship between maternal knowledge, attitudes, birth weight, nutritional status, parental income, and education with toddler development, as part of evaluating the early detection program managed under midwifery care. The results aim to provide guidance for health practitioners and support educational efforts related to early childhood growth monitoring.

Method

This quantitative study used a cross-sectional design and was conducted at Simpang Gambir Community Health Center, Mandailing Natal Regency, starting in December 2024 (Hastono, 2017). The population consisted of 48 toddlers registered at the health center. A sample of 30 toddlers was selected using accidental sampling, a non-probability technique, based on the sample size formula by (Notoatmodjo, 2018).

The main instrument was a structured questionnaire developed by the researchers and validated through expert judgment. Validity was assessed through content validation by supervisors and public health experts. Reliability testing was conducted using Cronbach's alpha, with a coefficient of $\geqslant 0.70$ considered acceptable. The questionnaire measured maternal knowledge and attitudes regarding child development.

Secondary data were obtained from medical records, including SDIDTK participation data, birth weight, nutritional status, parental income, and education level. Data on toddler development status were classified as "appropriate" or "not appropriate" based on the Kuesioner Pra Skrining Perkembangan (KPSP) results. A score meeting the developmental milestones for age was categorized as "appropriate," while any delay in milestones was classified as "not appropriate."

Additional data were gathered through limited field observations and brief interviews with selected mothers to complement the quantitative findings. However, these were exploratory in nature and not analyzed statistically.

Data processing included editing, coding, entry into SPSS, and tabulation into frequency tables. Univariate analysis was used to describe each variable, such as development status, birth weight, nutrition, income, and education. Bivariate analysis using the Chi-square test examined the association between independent variables (maternal knowledge, attitude, birth weight, nutritional status, income, and education) and the dependent variable (child development status), with a significance level of $\alpha = 0.05$.

Results

Univariat Analysis

Univariate analysis was conducted to describe each variable related to toddler development in the SDIDTK program.

TABLE 1. Characteristics of Toddlers at Simpang Gambir Community Health Center (n = 30)

No	Variable	Category	n	%
1	Development Status	Appropriate	24	80.0
		Not Appropriate	6	20.0
2	Gender	Male	18	60.0
		Female	12	40.0
3	Birth Weight	LBW	4	13.3
		Not LBW	26	86.7
4	Nutritional Status	Normal	26	86.7
		Not Normal	4	13.3
5	Parental Income	Low	13	43.3
		High	17	56.7
6	Parental Education	Low	14	46.7
		High	16	53.3

Most toddlers (80%) exhibited development appropriate for their age. Male toddlers made up 60% of the sample. The majority had normal birth weight (86.7%) and normal nutritional status (86.7%). More than half of the respondents came from families with high income (56.7%) and high parental education (53.3%).

Bivariate Analysis

The results of this analysis will be discussed in relation to relevant theories and findings from previous studies (Hastono, 2017). Bivariate analysis using the chi-square test was conducted to examine the relationship between independent variables and toddler developmental status.

TABLE 2. Relationship Between Independent Variables and Toddler Development (n = 30)

No	Variable	Not Appropriate	Appropriate	p-value
1	Birth Weight	4 (50%)	2 (50%)	0.169
	Not LBW	2 (15.3%)	22 (84.7%)	
2	Nutritional Status	4 (15.3%)	22 (84.7%)	0.169
	Not Normal	2 (50%)	2 (50%)	
3	Parental Income	3 (23%)	10 (77%)	0.531
	High	3 (17.7%)	14 (82.3%)	
4	Parental Education	5 (35.8%)	9 (64.2%)	0.059
	High	1 (6.25%)	15 (93.75%)	

All variables had p-values > 0.05, indicating no statistically significant relationship with toddler development. Specifically:

- Birth weight: p = 0.169. Among LBW toddlers, 50% showed delayed development, but this was not statistically significant.
- Nutritional status: p = 0.169. Although half of the malnourished toddlers showed delays, the relationship was not significant.
- Parental income: p = 0.531. A slightly higher proportion of children from low-income families had delays, but the difference was negligible.
- Parental education: p = 0.059. This variable approached statistical significance, suggesting a potential influence on toddler development, consistent with previous studies

Discussion

Toddlerhood is a critical period in child development due to rapid growth in cognitive, emotional, social, and motor domains (Grantham-McGregor et al., 2007; Black et al., 2017). This study found that 80% of toddlers had appropriate development, while 20% experienced delays. Several influencing factors—such as birth weight, nutrition, parental income, and education—were analyzed for their association with developmental status.

Birth Weight

Although LBW is commonly linked to developmental risks (Walker et al., 2011), this study found no significant relationship (p = 0.169). Interestingly, 50% of toddlers with LBW still demonstrated appropriate development. This may be due to compensatory care at home or adequate postnatal nutrition. On the other hand, four

toddlers with normal birth weight (15.3%) experienced delays, possibly influenced by factors such as inadequate stimulation or parenting style. These findings indicate that LBW alone may not determine developmental outcomes in the absence of other risk factors.

Nutritional Status

Nutrition is vital for brain and physical development. While Lindawati (2013) noted that malnourished children are 5.7 times more likely to experience delays, this study found no significant relationship between nutritional status and development ($p = 0.169$). Surprisingly, 50% of children with poor nutrition still had appropriate development. This could suggest that other protective factors (e.g., parental attention, play stimulation) compensated for poor nutrition. However, it also highlights the need to assess how "nutritional status" was measured—possibly only through anthropometry, without dietary intake analysis.

Parental Income

Parental income, while often seen as a determinant of access to health resources and learning materials (WHO, 2020), did not show a significant relationship in this study ($p = 0.531$). This may be because some low-income families prioritize their children's needs despite financial limitations. Additionally, health service access through government programs like Posyandu may help reduce income-related disparities. Thus, income alone may not fully explain developmental variations without considering how families allocate resources.

Parental Education

Parental education, especially maternal, approached statistical significance ($p = 0.059$), aligning with Hattacharya et al. (2017), who found that children of less-educated parents are five times more likely to face developmental delays. Although one child from a highly educated parent showed delays, contextual factors—such as working parents' limited time or inadequate interaction—may play a role. Education enhances awareness of child development, health, and nutrition, making it a key area for targeted intervention.

Recommendations

The study suggests that parental education deserves focus in early childhood interventions. While other variables were not statistically significant, they remain important in practical terms. Future studies should use larger samples, consider interaction effects between variables (e.g., nutrition × income), and explore qualitative aspects such as parenting practices. Health promotion programs should prioritize educational counseling and empower mothers through community-based interventions.

Conclusion

This study found that 80% of toddlers at Simpang Gambir Community Health Center demonstrated appropriate development, while 20% did not. Birth weight and nutritional status showed no significant association with development ($p = 0.169$), nor

did parental income (p = 0.531). However, parental education—particularly maternal—showed a near-significant association (p = 0.059), suggesting its crucial role in child development.

These findings highlight the need for targeted educational interventions for parents, especially mothers, to support early childhood development. Further studies should include larger sample sizes and explore additional environmental and genetic factors to better understand the determinants of toddler development.

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