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MATERNAL KNOWLEDGE OF EARLY STIMULATION AND DEVELOPMENTAL SCREENING OUTCOMES AMONG STUNTED AND NON-STUNTED TODDLERS

PENGETAHUAN IBU TENTANG STIMULASI DINI DAN HASIL SKRINING PERKEMBANGAN PADA BALITA STUNTING DAN NON-STUNTING

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Abstract

Early childhood development is influenced by nutrition, health, caregiving, and opportunities for age-appropriate stimulation (World Health Organization, 2020). This study examined the association between maternal knowledge of early stimulation and developmental screening outcomes and compared developmental outcomes between stunted and non-stunted toddlers. A quantitative analytic study with a cross-sectional design was conducted among 125 mother–toddler pairs in the working area of Balaiselasa Public Health Center, Pesisir Selatan Regency, Indonesia. Maternal knowledge was assessed using a structured questionnaire, developmental status was screened using the Kuesioner Pra Skrining Perkembangan (KPSP), and stunting was determined from length/height-for-age according to age and sex. Data were analyzed using descriptive statistics and Pearson's Chi-Square test. Moderate maternal knowledge was found in 59 mothers (47.2%). Developmental screening outcomes were appropriate in 68 toddlers (54.4%), questionable in 48 (38.4%), and deviant in 9 (7.2%). Maternal knowledge was associated with developmental screening outcomes (χ^2=10.187; df=4; p=0.037; Cramer's V=0.202). Stunting status was also associated with developmental category (χ^2=6.279; df=2; p=0.043). Because some expected cell counts were below five, the chi-square findings should be confirmed using an exact or Monte Carlo test. The findings support integrated maternal education, developmental screening, growth monitoring, and nutritional follow-up in primary health services.

Keywords : Maternal Knowledge, Early Stimulation, Developmental Screening, Toddlers, Stunting.

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Abstrak

Perkembangan anak usia dini dipengaruhi oleh gizi, kesehatan, pengasuhan, dan kesempatan untuk mendapatkan stimulasi yang sesuai dengan usia (World Health Organization, 2020). Penelitian ini mengkaji hubungan antara pengetahuan ibu mengenai stimulasi dini dengan hasil skrining perkembangan, serta membandingkan hasil perkembangan antara balita yang mengalami stunting dan yang tidak. Studi analitik kuantitatif dengan desain cross-sectional dilakukan terhadap 125 pasangan ibu dan balita di wilayah kerja Puskesmas Balaiselasa, Kabupaten Pesisir Selatan, Indonesia. Pengetahuan ibu dinilai menggunakan kuesioner terstruktur, status perkembangan diskrining menggunakan Kuesioner Pra Skrining Perkembangan (KPSP), dan status stunting ditentukan berdasarkan indeks panjang/tinggi badan menurut umur serta jenis kelamin. Data dianalisis menggunakan statistik deskriptif dan uji Chi-Square Pearson. Tingkat pengetahuan ibu yang tergolong sedang ditemukan pada 59 ibu (47,2%). Hasil skrining perkembangan menunjukkan kategori sesuai pada 68 balita (54,4%), meragukan pada 48 balita (38,4%), dan menyimpang pada 9 balita (7,2%). Pengetahuan ibu terbukti berhubungan dengan hasil skrining perkembangan (χ^2=10,187; df=4; p=0,037; Cramer's V=0,202). Status stunting juga berhubungan dengan kategori perkembangan (χ^2=6,279; df=2; p=0,043). Mengingat terdapat jumlah sel harapan (expected cell counts) yang kurang dari lima, temuan *chi-square* ini perlu dikonfirmasi menggunakan uji eksak atau uji Monte Carlo. Temuan ini mendukung pelaksanaan edukasi ibu, skrining perkembangan, pemantauan pertumbuhan, dan tindak lanjut gizi secara terintegrasi dalam layanan kesehatan primer.

Kata Kunci : Pengetahuan Ibu, Stimulasi Dini, Skrining Perkembangan, Balita, Stunting.

1. INTRODUCTION

Early childhood is a critical period in which rapid changes occur in motor, language, cognitive, social, and emotional abilities. Development is shaped by nutritional status, health, caregiving, interaction, safety, and opportunities for learning. Responsive caregiving and early learning opportunities are important components of nurturing care (World Health Organization, 2020).

Age-appropriate stimulation provides opportunities to move, play, explore, and interact with caregivers. Maternal knowledge is a potentially modifiable factor that may support stimulation practices (Christiari et al., 2013; Kusparlina & Ardhianingtyas, 2020). However, knowledge does not necessarily translate into practice because implementation is influenced by time, confidence, family support, child health, and the home environment.

Stunting is impaired linear growth assessed using length or height-for-age. It may coexist with nutritional, health, and environmental challenges that affect child development (World Health Organization, 2020; Primasari et al., 2023). Therefore, growth monitoring should be integrated with developmental screening.

Previous studies have reported associations between maternal knowledge of stimulation and child development (Christiari et al., 2013; Hapsari et al., 2024), as well as between stunting and developmental vulnerability (Kartika et al., 2020; Izza et al., 2024; Primasari et al., 2023). This study aimed to examine the association between maternal knowledge of early stimulation and developmental screening outcomes and to compare developmental categories between stunted and non-stunted toddlers.

2. RESEARCH METHOD

This quantitative analytic study used a cross-sectional design. It was conducted in Limau Sundai, Pelangai Gadang Village, within the working area of Balaiselasa Public Health Center, Pesisir Selatan Regency, Indonesia. The population consisted of 182 mothers with toddlers, and 125 mother–toddler pairs were included in the analysis.

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Maternal knowledge was measured using a structured questionnaire and categorized as poor, moderate, or good. Developmental status was screened using the age-specific KPSP and categorized as deviant, questionable, or appropriate. KPSP findings were interpreted as screening outcomes rather than definitive diagnoses, consistent with the Indonesian developmental screening framework (Kementerian Kesehatan Republik Indonesia, 2022).

Stunting was determined from length/height-for-age according to age and sex. A child was classified as stunted when the length/height-for-age Z-score was below −2 standard deviations based on WHO growth standards (World Health Organization, 2020). Univariate analysis described frequencies and percentages. Pearson's Chi-Square test was used at a 5% significance level, and Cramer's V described association strength. Because several expected counts were below five, the Pearson results should be confirmed using Fisher–Freeman–Halton exact test or Monte Carlo simulation.

3. RESULT AND DISCCUSSION

Maternal knowledge and developmental screening outcomes

Variable	Category	n	%
Maternal knowledge	Poor	13	10.4
	Moderate	59	47.2
	Good	53	42.4
	Total	125	100.0
Developmental screening	Deviant	9	7.2
	Questionable	48	38.4
	Appropriate	68	54.4
	Total	125	100.0

Moderate knowledge was the most common category, comprising 59 mothers (47.2%). Practical reinforcement is still needed regarding age-specific activities, warning signs, and follow-up schedules. Educational interventions can improve maternal knowledge and support stimulation practices (Faridah et al., 2024). Developmental screening was appropriate in 68 toddlers (54.4%), while 57 toddlers (45.6%) had questionable or deviant outcomes. Repeated screening is important because KPSP is a screening instrument rather than a definitive diagnosis (Kementerian Kesehatan Republik Indonesia, 2022).

Association between maternal knowledge and developmental screening outcomes

Maternal knowledge	Deviant	Questionable	Appropriate	Total
Poor	1	1	11	13
Moderate	7	24	28	59
Good	1	23	29	53
Total	9	48	68	125

Pearson's Chi-Square indicated an association between maternal knowledge and developmental screening outcomes (χ^2=10.187; df=4; p=0.037). Cramer's V was 0.202, indicating a weak association. Similar relationships have been reported in studies of maternal stimulation knowledge and child development (Christiari et al., 2013; Hapsari et al., 2024). The pattern in this dataset was not a simple linear gradient and should be interpreted cautiously because the poor-knowledge group was small and development is multifactorial.

Developmental screening outcomes by stunting status

Developmental outcome	Stunted n (%)	Non-stunted n (%)	Total
Deviant	3 (8.8)	6 (6.6)	9
Questionable	7 (20.6)	41 (45.1)	48
Appropriate	24 (70.6)	44 (48.4)	68
Total	34 (100.0)	91 (100.0)	125

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Thirty-four toddlers (27.2%) were stunted and 91 (72.8%) were non-stunted. Developmental categories differed significantly by stunting status (χ^2=6.279; df=2; p=0.043). Previous studies have also reported associations between stunting and developmental outcomes (Kartika et al., 2020; Izza et al., 2024; Primasari et al., 2023). The higher proportion of appropriate outcomes among stunted toddlers should not be interpreted as a protective effect of stunting because the distribution may reflect sample variation or unmeasured factors.

DISCUSSION

The findings support maternal education as one component of developmental promotion, but the weak effect size indicates that knowledge alone is insufficient. Practical stimulation, caregiver confidence, family support, and the home environment should be included in service planning (Faridah et al., 2024).

The association between stunting and developmental screening outcomes supports integrated growth and developmental monitoring. Nevertheless, the cross-sectional design does not establish temporal direction or causality. The unexpected descriptive pattern further indicates possible confounding and the need for longitudinal and multivariable studies.

For midwives and primary-care workers, the findings support a pathway combining growth monitoring, KPSP screening, practical stimulation counselling, nutritional assessment, and individualized follow-up. This integrated approach reflects the WHO nurturing-care framework (World Health Organization, 2020).

Limitations include the absence of direct measurement of stimulation practice and lack of adjustment for prematurity, chronic illness, dietary intake, socioeconomic status, parenting practices, and home environment. Low expected frequencies also require confirmation using an appropriate exact or simulation-based test.

4. CONCLUSION

Moderate maternal knowledge of early stimulation was found in 47.2% of mothers. Developmental screening outcomes were appropriate in 54.4% of toddlers, questionable in 38.4%, and deviant in 7.2%. Maternal knowledge and stunting status were statistically associated with developmental screening categories; however, the findings should be interpreted as associations rather than causal effects. Integrated maternal education, developmental screening, growth monitoring, nutritional counselling, and follow-up are recommended in primary health services.

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