

The Relationship Between Developmental Stimulation and Toddler Development at Posyandu Melati 4 and 5, Dusun Dawuhan, Pamotan Village, Dampit District, Malang Regency

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ABSTRACT

Introduction: Developmental delays in children remain a significant public health concern both globally and nationally. One of the main contributing factors to developmental delays is the lack of adequate stimulation from parents, which affects the child's motor, language, cognitive, and social development. This study aims to determine the relationship between developmental stimulation and the developmental outcomes of toddlers at Posyandu Melati 4 and 5 in Dusun Dawuhan, Pamotan Village, Dampit District, Malang Regency.

Method: This research employed a cross-sectional correlational design involving 82 respondents selected through purposive sampling. The instruments used were stimulation questionnaires based on SDIDTK (2022) and the Developmental Pre-Screening Questionnaire (KPSP) to measure toddlers' development. Data were analyzed using the Chi-square test with a significance level of $p < 0,05$.

Results: The results showed a p-value of 0,001, indicating a significant relationship between developmental stimulation and toddler development.

Discussion: Toddlers who received adequate stimulation were more likely to exhibit normal developmental outcomes, whereas those with insufficient stimulation tended to show questionable or deviant development. This study highlights the importance of structured, consistent, and age-appropriate stimulation in supporting optimal child development, emphasizing the need to strengthen parental involvement and posyandu services in providing early developmental stimulation.

Introduction

Developmental delays are a public health concern (Wondmagegn et al., 2024). Delays in child development can occur due to limited stimulation and insufficient sensory input. To achieve optimal development, interaction between children and parents is essential. In particular, the stimulation provided has a positive impact on the child's overall development. To improve fine motor development, it is important for every child to receive regular and continuous stimulation from an early age and during every available opportunity (Yanti, 2020).

Although the importance of developmental stimulation has been widely recognized, in practice many parents still have limited knowledge and awareness regarding the provision of age-appropriate stimulation for their children. This condition may lead to delayed detection of developmental delays, as parents often fail to recognize key developmental milestones in toddlers (Arini et al., 2024).



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According to research conducted by the World Health Organization (WHO) in 2018, developmental problems in children have shown a significant increase. In the United States, the prevalence ranges from 12–16%, while in Argentina it reaches 20%, in Thailand 37.1%, and in Indonesia between 13–18% (Basic Health Research 2018). WHO reported that in 2016, the prevalence of developmental disorders among children under five years old in Indonesia reached 7,512.6 per 100,000 population, or approximately 7.51% (Ministry of Health of the Republic of Indonesia in Sari et al., 2022). Based on information from the 2012 East Java Health Profile, the coverage rate of health services for toddlers still did not meet the target—only 70.34% of the expected 83% set by the Provincial Health Office. In the same year, the Indonesian Pediatric Society (IDAI) of East Java examined 2,634 children aged 0 to 72 months. The findings revealed that 53% of the children had normal age-appropriate development, 13% were categorized as questionable (requiring further assessment), and 34% experienced developmental deviations. Of those developmental deviations, 10% were related to gross motor skills (such as walking and sitting), 30% to fine motor skills (such as writing and grasping), 44% to speech abilities, and 16% to socialization and independence.

Based on interviews with seven mothers who have children aged 0–5 years, as preliminary study in Posyandu Melati 4 and 5 in Dusun Dawuhan, it was found that 29% of the mothers provided stimulation daily, while 71% did so only occasionally. Of these, 29% gave daily stimulation without using mobile phones, whereas the remaining 71% consistently gave their children mobile phones. The problems observed in the children included difficulties in writing, delayed speech compared to peers, and a lack of understanding of other developmental tasks such as fine motor skills and socialization.

Stimulation plays an essential role in a child's growth and development process. Providing stimulation during the first three years of life, known as the golden age, has a highly significant impact on brain development and forms the foundation for the child's future (Irfani et al., 2025). Developmental stimulation is a method used to encourage and support a child's growth. This stimulation is primarily carried out by parents and other family members who care for the child at home. Forms of stimulation include play activities and social interactions with the child, which aim to enhance their abilities and independence. The type of stimulation provided must be adjusted to the child's developmental age (Ministry of Health of the Republic of Indonesia, 2022).

Children who receive adequate stimulation develop more rapidly than those who receive minimal or no stimulation at all. Children who are sufficiently stimulated demonstrate better brain function, which can be measured at the age of 12, compared to those who receive less stimulation. With proper stimulation, it is expected that in adulthood, children will not only possess high intellectual intelligence (IQ) but also strong emotional intelligence (EQ) and moral–spiritual intelligence (SQ) (Soetjiningsih, 2015).

The lack of regular stimulation in toddlers can lead to difficulties in speech and language development. When these abilities are delayed or impaired, it may disrupt the toddler's interaction with their social environment and reduce their willingness to develop their inherent potential. Furthermore, children in this age group who experience language difficulties and do not receive appropriate intervention may develop poor speech abilities, challenges in early reading skills such as decoding, and abnormal behaviors in later years. Delays in speech and language development after the age of two have more serious long-term consequences compared to toddlers who do not have a history of speech and language developmental disorders in the subsequent 4 to 5 years (Wardani et al., 2022).

The lack of parental encouragement can result in children experiencing difficulties, or even an inability, in performing daily tasks. Developmental disorders in early childhood are characterized by delayed motor skills, slow maturation of nerve cells, low intelligence, and



delayed social responses (Jesica, 2023). A delay in one developmental domain may affect other domains as well. Motor development delays can lead to impairments in movement abilities, speech, language, social interaction, emotional regulation, and cognitive development (Jesica, 2023).

Parents and families, as those who interact directly with children, play a crucial role in shaping the early stages of development and establishing the fundamental foundation for enhancing physical abilities and various aspects of intelligence to achieve optimal progress. On the other hand, when children begin to engage with broader environments such as the community and society in which they live the role of the environment becomes more focused on shaping the child's character and personality, both in interactions with peers and as they encounter new experiences. What children observe and do in their daily activities has a significant influence on their development. As members of the family, community, and environment, it is essential that we model positive behaviors for children, as they tend to imitate and adopt whatever they observe around them. Comprehensive literacy development in children greatly influences the basic reading abilities of preschool-aged children (Wahida et al., 2025). To further support child development, structured play-based interventions that integrate literacy activities with family involvement can be implemented, such as daily reading sessions and interactive storytelling. Community-based workshops may be utilized to train parents in responsive caregiving techniques aimed at fostering secure attachment and emotional regulation. In addition, age-appropriate digital literacy tools, such as educational applications monitored by families, can provide supplementary stimulation while minimizing the risks associated with excessive screen exposure.

Stimulation provided by parents should be carried out consistently to support a child's development. Parents play an important role in preventing developmental disorders through early detection by bringing their children to health facilities for developmental assessments using the KPSP tool. The role of parents, particularly mothers, is crucial for the child's developmental progress; mothers must be able to recognize any abnormalities in their children to ensure that appropriate stimulation can be given promptly. In addition to the role of the family, the child's surrounding environment also significantly influences their development, especially the environments closest to them. When a mother provides adequate stimulation, the child tends to feel happier and more independent; conversely, insufficient stimulation may cause the child to become overly dependent and less motivated (Hinderayani, 2023).

Based on the background described above, the researcher aims to further examine the relationship between the provision of developmental stimulation and the developmental outcomes of toddlers at Posyandu Melati 4 and 5 in Dusun Dawuhan, Pamotan Village.

Methods

This study employed a quantitative method with a correlational approach using a cross-sectional research design. The study was conducted on September 1, 2025, at Posyandu Melati 4 and 5 in Dawuhan Hamlet. The population consisted of mothers and their toddlers who attended posyandu activities at Posyandu Melati 4 and 5 in Dawuhan Hamlet, Pamotan Village, Dampit District, Malang Regency, totaling 102 respondents. The sampling technique used was purposive sampling, and the sample size was determined using the Slovin formula, resulting in a total of 82 respondents. The instruments used in this study included a demographic data questionnaire, a questionnaire to assess parental stimulation practices, and a questionnaire to measure toddlers' developmental status.

In the data collection process, the researcher identified prospective respondents who met the inclusion criteria, namely mothers with toddlers aged 0–3 years residing in Posyandu Melati



4 and 5, Dawuhan Hamlet, Pamotan Village, Dampit District, Malang Regency. As the initial number of eligible respondents was insufficient, additional data collection was carried out through a door-to-door approach to maximize the sample size. Subsequently, the researcher distributed the questionnaires to the respondents and provided guidance during the completion process. Data analysis in this study was performed using the Chi-square statistical test.

The instruments used in this study consisted of the Stimulation, Early Detection, and Early Intervention of Child Development Questionnaire (SDIDTK) and the Developmental Pre-screening Questionnaire (KPSP). The SDIDTK was utilized to assess the stimulation provided by parents, covering fine motor, gross motor, socialization, speech, and language aspects. Each item in the SDIDTK was scored according to the standardized guidelines, after which the total score was categorized into *good stimulation* and *poor stimulation*.

Meanwhile, the KPSP was used to assess the child's developmental status according to their age group. The KPSP consists of 9–10 questions that must be answered by the parent based on the child's observed abilities. Each "yes" response is scored as 1 and each "no" response as 0. The total score is then classified into three categories normal development, doubtful development, and developmental deviation following the standardized KPSP guidelines.

Results

Table 1 General Characteristics of Mothers with Toddlers at Posyandu Melati 4 and 5, Dusun Dawuhan, Pamotan Village

Demographic Characteristics	Frequency (n)	Percentage (%)
Number of Children		
1. One child	38	46,3%
2. Two children	37	45,1%
3. Three children	7	8,5%
Total	82	100%
Occupation		
1. Housewife	81	98%
2. Teacher	1	1,2%
Total	82	100%
Delivery-Related Problems		
1. Umbilical cord wrapped around the leg	1	1,2%
2. Pre-eclampsia	2	2,4%
3. Delayed estimated due date (EDD)	14	17,1%
4. Caesarean section	1	1,2%
5. Amniotic fluid intoxication	63	76,8%
6. None	82	100%
Total		
Income		
1. < 2.000.000 (< Minimum Wage)	57	69,5%
2. ≥ 2.000.000 (≥ Minimum Wage)	25	30,5%
Total	82	100%



Based on Table 1, it can be observed that nearly half of the mothers of toddlers have one child, totaling 38 individuals (46%). Almost all mothers work as housewives, totaling 81 individuals (98%). Most mothers of toddlers did not experience complications during childbirth, totaling 63 individuals (76.8%). Additionally, the majority of mothers have an income of less than 2,000,000 IDR, totaling 57 individuals (69.5%).

Table 2 General Characteristics of Toddlers at Posyandu Melati 4 and 5, Dusun Dawuhan

Demographic Characteristics	Frequency (n)	Percentage (%)
Child's Age		
1. Neonate (0–1 month)	2	2,4%
2. Infant (>1–12 months)	23	28%
3. Toddler (> 12 – 36 months)	57	69,5%
Total	82	100%
Gender		
1. Male	43	52,4%
2. Female	39	47,6%
Total	82	100%
Child Caregiver		
1. Mother	69	84,1%
2. Grandmother	13	15,9%
Total	82	100%
History of Illness		
1. Skin Rash	2	2,4%
2. Cold/Cough	6	7,3%
3. None	74	90,2%
Total	82	100%
Congenital Abnormalities		
1. Present	1	1,2%
2. Absent	81	98,8%
Total	82	100%

Based on Table 2, it is shown that a small proportion of children were neonates aged 0–1 month, totaling 2 children (2.4%). Nearly half were aged >1–12 months, with 23 children (28%), while the majority were aged >12–36 months, totaling 57 children (69.5%). Most of the children were male, totaling 43 (52.4%), while females accounted for 39 children (47.6%). Almost all children were cared for by their mothers, totaling 69 (84.1%). Furthermore, almost all children had no history of illness, amounting to 74 (90.2%), and nearly all children did not have congenital abnormalities, totaling 81 children (98.8%).

Table 3 Developmental Stimulation Provided to Toddlers at Posyandu Melati 4 and 5 Dusun Dawuhan

Provision of Developmental Stimulation	Frequency (n)	Percentage (%)	Mean	Median
Good	55	67,1%		
Insufficient	27	32,9%	1,33	1,00
Total	82	100%		

Based on Table 3, it is shown that among the 82 respondents, the majority 55 toddlers (67.1%)—received developmental stimulation categorized as good, whereas nearly one-third 27 toddlers (32.9%)—were categorized as receiving insufficient stimulation.

Table 4 Developmental Status of Toddlers at Posyandu Melati 4 and 5, Dusun Dawuhan

Child Development	Frequency (n)	Percentage (%)	Mean	Median
Normal	33	40,2%		
Questionable	37	35,1%	1,74	2,00
Deviations	12	14,69%		
Total	82	100%		

Based on Table 4, it is known that nearly half of the children demonstrated normal development, totaling 33 children (40.2%). Likewise, almost half of the children showed questionable development, amounting to 37 children (35.1%). A small proportion of the children exhibited developmental deviations, totaling 12 children (14.69%).

Table 5 Relationship Between the Provision of Developmental Stimulation and Development in Toddlers

Provision of Developmental Stimulation	Development in Toddlers						Total		Chi-square Test
	Child Development								
	Normal		Questionable		Deviations		N	%	
	N	%	N	%	N	%	N	%	
Good	29	52,7	22	40	4	7,3	55	100	P=0,001 (P<0,05)
Insufficient	4	14,8	15	55,6	8	29,6	27	100	
Total	33	40.2	37	45.1	12	14.6	82	100	

Based on Table 5, the Pearson Chi-Square value of 0.001 ($p < 0.05$) indicates a significant relationship between the provision of developmental stimulation and developmental outcomes among toddlers at Posyandu Melati 4 and 5 in Dusun Dawuhan. Toddlers who received adequate developmental stimulation were more likely to exhibit normal development, with 29 children (52.7%), compared to only 4 children (14.8%) in the group that received insufficient stimulation. Meanwhile, in the group with insufficient stimulation, the proportions of children with questionable development (15 children; 55.6%) and developmental deviations (8 children; 29.6%) were higher than those in the group that received good stimulation.

Discussion

Provision of Developmental Stimulation

The findings of this study indicate that nearly half of parents at Posyandu Melati 4 and 5 provide insufficient developmental stimulation to their children, with 27 toddlers (32.9%) categorized as receiving inadequate stimulation. Appropriate stimulation plays a crucial role in supporting optimal child development. During early childhood, there is a critical period in which children require proper stimulation to maximize their developmental potential. Stimulation is intended to enhance a child's abilities and support them in achieving developmental milestones appropriate for their age (Yuliana, 2024). A major factor contributing to developmental delays among toddlers is the limited knowledge mothers have regarding early stimulation, resulting in suboptimal fulfillment of the basic needs required for effective stimulation. In many cases, mothers provide stimulation without guidance from healthcare professionals, which leads to less effective outcomes. Toddlers will grow and develop properly when provided with appropriate stimulation, as it helps ensure timely and optimal developmental progress (Pariyem *et al.*, 2021). Insufficient stimulation can negatively impact toddlers' cognitive, motor, and socio-emotional development. Experts emphasize that early stimulation is essential for unlocking a child's developmental potential during the golden period of growth, and therefore should be carried out routinely through various engaging and developmentally appropriate activities. Parental education and support from healthcare providers are crucial to ensure that stimulation is delivered accurately and effectively, thereby preventing developmental delays that may have long-term consequences. Thus, the active involvement of parents in providing stimulation and following guidance from healthcare professionals plays a significant role in ensuring successful growth and development in toddlers.

Based on the findings of the study, nearly all mothers in this research were housewives, totaling 81 participants (98%), and almost half demonstrated inadequate stimulation practices, with 27 mothers (33.3%). When mothers are occupied with household responsibilities or other activities, the time available for interaction and providing developmental stimulation to their children becomes significantly limited. This situation increases the likelihood that mothers may rely on gadgets as a distraction tool when they are unable to accompany their children directly (Juita *et al.*, 2025). Therefore, in efforts to manage gadget use, it is essential for parents to model appropriate digital behavior for their children (Sero *et al.*, 2024). Although housewives often face demanding household duties, it remains crucial to allocate dedicated time and attention to support children's development through adequate stimulation. Relying on gadgets as a convenient solution may be practical; however, without proper supervision and clear limitations, it has the potential to hinder children's social, motor, and cognitive development.

Nearly half of the parents had an income of less than 2,000,000 IDR (below the regional minimum wage), with 26 individuals (45.6%) demonstrating inadequate stimulation practices. These economic limitations affect the availability of educational toys and adequate play spaces, making children more vulnerable to developmental delays due to insufficient stimulation during the critical early years of growth (Meylanda *et al.*, 2018). Limited parental income can serve as a major barrier to providing appropriate play facilities for children. This directly reduces the amount and quality of stimulation children receive during the golden period of development, which is essential for optimal motor, social, and cognitive growth in early childhood.

Most of the toddlers were cared for by their grandmothers, with 7 children (53.8%) receiving inadequate stimulation. The grandparenting pattern indicates that grandmothers, as primary caregivers, often provide warm and affectionate care but may be less firm in setting rules and delivering consistent stimulation. This condition can affect the development of children's independence and socio-emotional skills (Harahap *et al.*, 2024). Children cared for by



their grandmothers tend to receive strong emotional support; however, without appropriate boundaries and adequate stimulation, they may be at risk of difficulties in self-regulation and effective social interaction. Furthermore, limited knowledge among elderly caregivers regarding child developmental stages and age-appropriate stimulation may exacerbate this condition. Grandmothers, as primary caregivers, often rely on traditional caregiving practices that may not be fully aligned with the current developmental needs of children. Insufficient exposure to up-to-date information on developmental stimulation, combined with age-related physical limitations, may reduce the intensity and variety of stimulation activities provided to children. Therefore, educational approaches that involve the extended family, particularly primary caregivers such as grandmothers, through *posyandu* programs or home visits are necessary to ensure that developmental stimulation is delivered optimally and consistently. These efforts are expected to improve caregiving quality and support children's motor, social, and emotional development in a more comprehensive manner.

Child Development

Based on the study findings, nearly half of the toddlers exhibited questionable development, totaling 37 children (35.1%). Toddlers categorized as having questionable development were unable to properly perform gross motor skills (24.2%), fine motor skills (23.8%), speech and language (21.7%), and socialization (18.6%). Insufficient physical, verbal, and social stimulation from the family and social environment significantly contributes to delays in gross motor, fine motor, language, and social aspects, resulting in questionable developmental outcomes among toddlers (Nasitoh *et al.*, 2022). Therefore, the role of the family is crucial in providing structured and consistent stimulation to support optimal child development. Education for parents and caregivers regarding the importance of early stimulation is essential to prevent questionable development and to maximize a child's potential from the earliest stages of life.

Based on the study results, a small proportion of toddlers with developmental deviations, namely 12 children (14.69%), were unable to perform gross motor skills (60%), socialization skills (68.8%), expressive and receptive language skills (59%), and fine motor skills (26.5%) adequately. Insufficient stimulation in the domains of gross motor, fine motor, language, and socialization substantially affects a child's overall development. Gross motor skills involve the use of large muscle groups for activities such as running and jumping, whereas fine motor skills require the coordination of smaller muscles for tasks such as writing and grasping. Speech and language serve as essential tools for communication, and socialization encompasses the child's ability to interact effectively within their social environment (Rohmah, 2025). Therefore, it is crucial for parents, educators, and the surrounding environment to provide varied and consistent stimulation to support optimal growth and development in children.

Most toddlers aged >12–36 months experienced questionable development, totaling 30 children (52.6%). The toddler period is considered a golden phase in which children begin to develop various essential abilities, including gross and fine motor skills, language competence, and independence. Regular, structured, and age-appropriate stimulation plays a significant role in accelerating these developmental processes (Fauzani *et al.*, 2022). Questionable development in toddlers aged 12–36 months warrants serious attention, as this stage represents a critical window for growth. During this period, foundational skills such as motor abilities, language development, and independence progress rapidly, and consistent, targeted stimulation is essential to support optimal developmental outcomes.

Most of the children with questionable development were girls, totaling 21 individuals (53.8%). Questionable development may occur due to various factors, including limited parental stimulation, inconsistent parenting practices, and suboptimal nutritional status. This condition encompasses delays in speech and language, fine and gross motor skills, as well as socialization



and independence. The predominance of questionable development among female toddlers indicates that social factors and the family environment play a significant role in shaping their developmental outcomes (Kalfikasari *et al.*, 2024). The occurrence of questionable development in female toddlers highlights the importance of examining parenting patterns and the types of stimulation provided to young girls. Considering that the social and emotional development of girls is often influenced by family dynamics and environmental conditions, imbalanced or inadequate stimulation may lead to long-term developmental delays. Therefore, parents and caregivers must provide a supportive environment and ensure consistent stimulation to promote optimal development in female toddlers.

A small proportion of children with developmental deviation were boys, totaling 10 individuals (23.3%). Developmental deviations may manifest as delays in motor, cognitive, language, or socio-emotional domains. Male children tend to be more vulnerable to developmental disorders than females, which may be influenced by genetic factors, nutritional status, parenting patterns, and environmental conditions (Purwati *et al.*, 2024). Although the percentage of developmental deviation among boys is relatively lower compared to girls, this issue still warrants serious attention. Biologically and psychologically, boys may exhibit different vulnerabilities to developmental challenges, necessitating specific approaches and targeted interventions to support their optimal growth.

Of the 12 toddlers who experienced developmental deviations, two cases were identified, including one child with complications related to birth history. This toddler experienced umbilical cord entanglement around the foot and presented with genu varum (bowed legs). At 18 months of age, the child was unable to articulate three words, frequently cried when wanting something, spilled drinks when attempting to drink, was unable to clean up toys, frequently fell when walking forward, and demonstrated poor balance when attempting to walk backward for five steps. Umbilical cord entanglement during delivery is a condition that may disrupt the supply of nutrients and oxygen to the fetus, potentially leading to growth and developmental impairments in early childhood. A tightly wrapped umbilical cord can hinder neonatal adaptation, which may subsequently affect motor and cognitive development (Mustar, 2019). Developmental delays caused by umbilical cord entanglement at birth represent a critical issue that requires serious attention in midwifery and maternal health practice. Prompt and appropriate management during labor, followed by intensive postnatal monitoring, is essential to minimize the risk of developmental deviations in affected infants.

Nearly half of the toddlers cared for by their mothers experienced questionable development, totaling 33 children (47.8%). When mothers are occupied with household responsibilities or other work-related activities, the time available for interaction with their children becomes significantly limited. This situation increases the likelihood that mothers may rely on gadgets as a distraction when they are unable to directly supervise their children (Juita *et al.*, 2025). Excessive gadget use among toddlers can negatively affect various developmental domains, including language, socio-emotional, motor, and cognitive development. Nearly half of the toddlers with questionable development were affected by parenting practices characterized by excessive gadget exposure (Nurmayanti *et al.*, 2024). Questionable development among toddlers resulting from parenting patterns that involve frequent gadget use represents a serious concern in early childhood development. Gadgets provided without proper supervision and clear time limits can reduce the quality of parent-child interactions, which are crucial for cognitive, language, and socio-emotional stimulation. Therefore, parents must receive appropriate education and guidance on the importance of responsible gadget use, as well as strategies to balance technology with active, developmentally supportive stimulation to optimize children's growth and development.



The Relationship Between Developmental Stimulation and Development in Toddlers

Based on Table 5.5, the Pearson Chi-Square value of 0.001 ($p < 0.05$) indicates a significant relationship between the provision of developmental stimulation and developmental outcomes among toddlers at Posyandu Melati 4 and 5 in Dusun Dawuhan. Toddlers who received adequate developmental stimulation were more likely to exhibit normal development, totaling 29 children (52.7%), compared to only 4 children (14.8%) among those who received insufficient stimulation. Meanwhile, toddlers in the insufficient-stimulation group had higher proportions of questionable development 15 children (55.6%) and developmental deviation 8 children (29.6%) compared to those who received adequate stimulation.

Insufficient developmental stimulation in toddlers aged 0–3 years can inhibit cognitive, motor, and socio-emotional development. A lack of stimulation during this critical period may lead to developmental delays and limit a child's optimal potential. Conversely, targeted stimulation such as sensory play can enhance cognitive abilities, gross and fine motor skills, as well as social competencies (Melynda *et al.*, 2025). The lack of stimulation among toddlers aged 0–3 years represents a serious issue that requires immediate attention from parents, caregivers, and healthcare professionals. This age range constitutes the most fundamental phase for brain development and neurological functioning; therefore, insufficient stimulation not only increases the risk of delays across multiple developmental domains but may also have long-term consequences on a child's overall quality of life.

Children who receive adequate stimulation tend to demonstrate age-appropriate development, whereas those with insufficient stimulation are more likely to exhibit questionable or deviant developmental outcomes (Basid *et al.*, 2025). Appropriate and consistent early stimulation provided by mothers can significantly enhance both gross and fine motor abilities in children. Limited maternal knowledge regarding developmental stimulation increases the risk of delays or deviations in motor development. This is supported by research using a cross-sectional design, which demonstrated a significant association between maternal knowledge of stimulation and the fine motor development of children (Villina *et al.*, 2024). Therefore, parental particularly maternal education on early childhood stimulation should be a primary focus in efforts to improve overall child health and developmental outcomes. Furthermore, enhancing parents' capacity to understand the principles of developmental stimulation not only affects motor development but also contributes to children's cognitive, language, and socio-emotional development. Parents with adequate knowledge tend to be more responsive to their children's developmental needs and are better able to create a home environment rich in positive stimulation. High-quality interactions, such as playing together, engaging in active communication, and providing age-appropriate opportunities for exploration, can strengthen neural connections during critical periods of brain development. Therefore, promotive and preventive interventions through structured education, parenting counseling, and strengthening the role of primary health care services, such as *posyandu* and community health centers, are essential strategies to prevent developmental delays and improve children's long-term quality of life.

Research Limitations

The questionnaire used in this study has several limitations. Mothers' responses may not be entirely accurate, as they rely on memory and their interpretation of the questions. In addition, the questionnaire assesses stimulation and development based solely on maternal reports rather than direct observation, which may result in findings that differ from the actual conditions. Some mothers may also provide socially desirable responses that do not reflect their real practices, thereby affecting data accuracy. Variations in how respondents interpret the questions may further reduce the consistency of the results.



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Conclusion

Based on the results of the data analysis and discussion conducted in this study, the following conclusions can be drawn:

The provision of developmental stimulation at Posyandu Melati 4 and 5 in Dusun Dawuhan was suboptimal in nearly half of the children, with 27 toddlers (32.9%) receiving insufficient stimulation. Regarding developmental outcomes, nearly half of the toddlers 37 children (35.1%) showed questionable development, and a small proportion 12 children (14.69%) demonstrated developmental deviations. A significant relationship was found between the provision of developmental stimulation and developmental outcomes in toddlers at Posyandu Melati 4 and 5 in Dusun Dawuhan ($P = 0.001$; $p < 0.05$). Toddlers who received adequate developmental stimulation tended to exhibit a higher likelihood of normal development. Conversely, toddlers who received inadequate stimulation showed higher rates of questionable and deviant development compared to those who received adequate stimulation. These findings underscore the importance of parent education, limiting gadget use, and providing consistent age-appropriate stimulation. A supportive play environment and regular developmental monitoring are also essential to help children achieve optimal development.

Ethics approval and consent to participate

This study obtained ethical approval under the registration number KEPK-EC / 312 / IX / 2025 from the Health Research Ethics Committee of ITSK RS dr. Soepraoen Malang.

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