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Parental Verbal Stimulation as a Key Factor Influencing Early Language Development in Infants

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ABSTRACT

Language ability is a crucial aspect of child development, yet language delay remains a common issue both globally and nationally, including in the Tanon Primary Health Center area. This study aimed to analyze the relationship between parental verbal stimulation and language development in infants aged 6–12 months. An analytic observational study with a cross-sectional design was conducted in May–June 2025, involving 41 parents and their infants selected through proportionate stratified random sampling. Data were collected using a validated verbal stimulation questionnaire (α = 0.767) and expert-validated language development observation sheets (validity score = 0.8295). Results showed that parental verbal stimulation was categorized as good (48.78%), fair (43.9%), and poor (7.32%). Infant language development outcomes were very well developed (36.59%), as expected (26.83%), emerging (21.95%), and not yet developed (14.63%). Spearman Rank correlation indicated a significant association between parental verbal stimulation and infant language development (p = 0.02). The findings highlight the importance of consistent early verbal stimulation supported by healthcare workers through education and counseling at community health posts (Posyandu) to prevent language delay.

INTRODUCTION

Early childhood (0–8 years) is a golden period for the development of basic skills in children, including cognitive, social, and language aspects [(1)]. The early years of life are an ideal time to provide stimulation that meets developmental needs [(2)]. One important form of stimulation is language. Appropriate language stimulation can accelerate speaking ability, strengthen auditory perception, and improve children's language comprehension [(3)].

Language development delays are a concern both globally and nationally. The prevalence of expressive language delay in children under two years of age reaches 11.8%, while receptive language delay accounts for 6.29%. Among children over two years old, these figures increase to 24.5% for expressive delay and 14.1% for receptive delay [(4)]. Several regions report incidence rates ranging from 5–10%, and in certain conditions, the rate may reach 24% [(5)] [(6)] This problem is further exacerbated by the low coverage of early childhood developmental screening, which has only reached 82.3%, below the national target of 85% [(7)].

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Verbal stimulation is one form of environmental interaction that influences children's language acquisition. The number of words a child hears each day has been shown to be one factor affecting language ability. However, the quantity of words alone is not the sole determinant. The quality of interaction, social background, and individual child characteristics also play important roles in the process of language acquisition [8].

The social interactionist theory proposed by Vygotsky emphasizes that children's language development occurs through social interaction with adults, particularly within the context of the zone of proximal development. At this stage, adults act as facilitators who help children surpass their current abilities through appropriate social support. Language is acquired by children through concrete experiences such as daily communication, play, and meaningful shared activities [9]. This approach highlights that language is not merely an internal ability but a social construct shaped by environmental responses.

Communication patterns such as talking to children, responding to babbling, as well as using facial expressions and intonation, have been identified as forms of stimulation that support language development [10]. The relationship between parental verbal stimulation and language development in infants aged 6–12 months needs to be further examined in primary health care settings to support promotive and preventive interventions. Tanon Community Health Center was chosen as the research site because data from the Kediri District Health Office in 2023 showed that speech and language developmental deviations ranked first with 30 cases (0.03%), of which 18 children (0.67%) were in the working area of Tanon Community Health Center. This makes it a representative location for studying the influence of parental verbal stimulation on infant language development. Therefore, this study aims to analyze the relationship between parental verbal stimulation and language development in infants aged 6–12 months at Tanon Community Health Center.

METHOD

This study was an analytic observational research with a cross-sectional design conducted in the working area of Tanon Community Health Center, Kediri Regency, during May–June 2025. A total of 41 mothers and their infants aged 6–12 months were selected from a population of 67 pairs using proportionate stratified random sampling. Inclusion criteria included parents who provided written informed consent to participate, infants who were directly cared for by parents capable of providing information about daily verbal stimulation, and parents who were able to communicate effectively. Exclusion criteria included infants with medical conditions such as hearing impairment, severe developmental delay, or other diagnosed disorders, as well as infants or parents currently participating in a similar study.The instruments used consisted of a verbal stimulation questionnaire that had been tested for validity ($r > 0.374$) and reliability ($\alpha = 0.767$), as well as a language development observation sheet validated by experts with a validity score of 0.8295. Data were analyzed using the Spearman Rank test. This study received ethical approval from the Health Research Ethics Committee of the Health Polytechnic, Ministry of Health Malang, with reference number DP.04.03/F.XXI.30/00641/2025.

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RESULT AND DISCUSSION

Frequency Distribution of General Characteristics

Table 1. Frequency Distribution of General Characteristics

Characteristics	f	%	M ± SD
Parental Age (years)	41	100	29.46 ± 8.57
Education			
1. High	1	2.44	
2. Medium	33	80.49	
3. Low	7	17.07	
Occupation			
1. Housewife	27	65.9	
2. Entrepreneur	14	34.1	
Household income			
1. <1million	3	7.32	
2. 1-3 million	33	80.49	
3. > 3 million	5	12.20	
Parity			
1. Primipara	19	46.34	
2. Multipara	22	53.66	
Infant Age (6-12 months)	41	100	9.38±2.132
Gender			
1. Male	15	35.59	
2. Female	26	63.41	
Gestational Age (weeks)	41	100	39.12 ± 2.204
Birth Weight (grams)	41	100	2990.85 ± 366.988

The participating parents had an average age of 29 years. The majority had a medium level of education (80.49%) and worked as housewives (65.9%). Most families had a monthly income ranging from IDR 1 to 3 million (80.49%). The number of children was almost evenly distributed between primiparas (46.34%) and multiparas (53.66%). The infants in this study had an average age of 9 months, were predominantly female (63.41%), were born at 39 weeks of gestation, and had an average birth weight of approximately 2,990 grams.

Although parental age does not directly influence children's language development scores, positive parenting practices such as being responsive, providing encouragement, and teaching new things have been shown to be closely associated with language development[11]. In addition, parental education level also affects the provision of verbal stimulation, as higher education is associated with a better understanding of infant developmental needs[12].

The majority of participants in this study were housewives (65.9%), with most having more than one child (53.66%), and the majority of families having a monthly income between IDR 1–3 million (80.49%). Parental occupation and the number of children may affect opportunities for verbal interaction with the child. Parents with more flexible time tend to have greater opportunities to provide verbal stimulation. Furthermore, socioeconomic conditions also play a role in shaping parenting styles and the level of support for children's language development [13].

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The relationship between verbal stimulation and language development is also supported by behavioral theory, which states that stimulation is influenced by parental knowledge, attitudes, and behaviors [14]. As a form of communication, verbal stimulation encourages infants' responses and adaptation, especially when consistently provided by parents. In this study, verbal stimulation was assessed based on frequency of speaking to the infant, attention and responsiveness to the infant, the use of new vocabulary, verbal interaction during play or daily activities, and the infant's involvement in conversation. Neurologically, this stimulation activates the brain particularly the left hemisphere responsible for language processing and helps establish neural connections involved in comprehension and language production [15]. These findings highlight the importance of early parental involvement to support optimal language development.

Frequency Distribution of Verbal Stimulation Categories

Table 2. Frequency Distribution of Verbal Stimulation Categories

Characteristics	f	%
1. Good	20	48.78
2. Fair	18	43.9
3. Poor	3	7.32

Table 2. shows that nearly half of the parents provided verbal stimulation in the "good" category (48.78%), followed by the "fair" category (43.9%), and only a few were classified as "poor" (7.32%). These data indicate that although most parents already provided good stimulation, there were still groups that provided only fair or even poor stimulation. This emphasizes the importance of consistently presenting results in both narrative and tabular forms, not only highlighting the "good" category but also showing the real variations in the field. Parents play a crucial role in supporting early language development through age-appropriate stimulation [16]. According to Vygotsky's theory, children learn language through responsive social interaction within the zone of proximal development, where parents help children understand language through simple and clear conversations [17]; [18].

Frequency Distribution of Infant Language Development Categories

Table 3. Frequency Distribution of Infant Language Development Categories

Characteristics	f	%
1. Not Yet Developed	6	14.63
2. Emerging Development	9	21.95
3. As Expected Development	11	26.83
4. Very Well Developed	15	36.59

Table 3 shows that most infants were in the "very well developed" category (36.59%), followed by "as expected development" (26.83%), "emerging development" (21.95%), and "not yet developed" (14.63%).

Participant characteristics are an important aspect of the analysis, as they may influence both the intensity of verbal stimulation and the outcomes of language development assessments. This study involved parents and infants aged 6–12 months, taking into account factors such as parental age,

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education, occupation, and income. These factors reflect the socioeconomic background, which in turn influences the practice of providing verbal stimulation. Analyzing these characteristics helps to assess the extent to which family conditions support infants' language development.

Based on Table 3, the majority of infants in this study were categorized as "very well developed" (36.59%). The average infant age was 9 months, with a predominance of females (63.41%). Theoretically, female infants tend to demonstrate more advanced language development, as the left hemisphere of the brain which governs language abilities is more active from birth [19]. However, findings from this study showed that more female infants were in the "not yet developed" category, suggesting that other factors beyond neurological aspects also influence language development.

Language development is neurologically influenced by the maturation of brain structures and functions, particularly pathways connecting the primary auditory cortex, Wernicke's area, and Broca's area. Wernicke's area is responsible for processing sounds, while Broca's area plans and produces speech. Cortical thickness in Wernicke's area has been shown to be positively associated with language comprehension [20]. Even at 6 months of age, the infant brain already responds to language by processing sounds, imitating intonation, and reacting when spoken to [21].

Biological factors such as gestational age and birth weight also affect language development. In this study, participants had an average gestational age of 39 weeks and an average birth weight of 2,900 grams. Infants born prematurely or with low birth weight tend to have immature brain volume and neural connectivity, placing them at higher risk for delayed language development [22]. These findings suggest that infants with higher gestational age and birth weight tend to have better language development scores, supporting the assumption that physical maturity at birth plays a critical role in neurological readiness for language stimulation.

Analysis of Verbal Stimulation and Language Development

Table 4. Analysis of Verbal Stimulation and Language Development

Verbal Stimulation	Language Development								*p-value**
	Not Yet Developed		Emerging Development		As Expected Development		Very Well Development		
	f	%	f	%	f	%	f	%	
Good	2	1	0	0	2	1	0	0	0.02
Fair	4	4	6	4	4	4	6	4	
Poor	0	4	9	7	0	4	9	7	

Table 4 shows a significant relationship between verbal stimulation and language development in infants aged 6–12 months (p = 0.02). This finding indicates that the better the verbal stimulation provided by parents, the more optimal the infant's language development.

In Table 4, the results of this study showed a significant relationship between verbal stimulation and infant language development (p = 0.02). This finding supports behavioral and social interactionist theories, which state that children's language develops through responsive interactions with parents [23]. However, the data also revealed that not all infants receiving good stimulation achieved optimal language development, suggesting the influence of other factors. Variables such as maternal education level, parental occupation, family income, number of children, exposure to gadgets, and infants' biological conditions were not analyzed in depth in this study, although these may act as confounding factors. Furthermore, the measurement of verbal stimulation relied on parental self-reports, which are prone to social desirability bias, as respondents may provide answers that align with what they think

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the researcher expects. This potential bias may affect the results, highlighting the need for future studies to employ data triangulation, such as direct observation or recordings of parent–infant interactions.

Research has shown that when infants babble and parents actively respond—such as by imitating or expanding on the infant's sounds—language skills can significantly improve [24]. This two-way interaction is a crucial foundation for language development. Other studies indicate that infants who are frequently engaged in conversation tend to have a larger vocabulary at 18 months, showing that consistent interaction and stimulation have a greater impact than simply the number of words heard [25].

Early verbal stimulation plays an important role in language development, school readiness, and children's emotional intelligence. Maternal stimulation initiated at 5 months of age has long-term effects on children's language abilities and academic achievement[26]. Another study found that sensitive interaction beginning at 3 months significantly influenced speech abilities between 18–30 months[27]. Improvements in early language skills are closely linked to literacy, emotional regulation, and learning readiness in early school years. Moreover, early interventions in verbal stimulation are also associated with children's socio-emotional well-being up to six years later [28].

Although parental verbal stimulation plays a significant role in children's language development, recent research suggests its effect may not be as strong as previously assumed. A meta-analysis of 71 studies involving 4,700 children concluded that the quantity of parental speech explained only 4–7% of variance in language abilities, with small to moderate effect sizes [29]. Other contributing factors include child age, the intensity and quality of interaction, socioeconomic status, and broader environmental influences. These findings emphasize the need for a more comprehensive approach to supporting children's language development.

This study also has a limitation regarding sample size, with only 41 infants. This relatively small number limits the generalizability of the findings. The limited sample size was due to the small population of infants aged 6–12 months in the Tanon Health Center working area. Nevertheless, this study remains important as it provides an initial picture of verbal stimulation patterns and language development within a local context.

The novelty of this study lies in its focus on the Tanon Health Center area, where data from the Kediri Health Office indicate that language development deviations are the most commonly reported child health issue. This local context adds value, showing how cultural, socioeconomic, and parental characteristics in Tanon influence verbal stimulation practices. For example, the predominance of housewives with secondary education may allow more interaction time, yet access to information on appropriate stimulation methods remains limited.

The practical implication of this study is the need for healthcare workers, especially midwives and community health volunteers (Posyandu cadres), to be actively involved in supporting verbal stimulation education. Language promotion programs can be integrated into monthly Posyandu activities, where parents are given concrete examples of how to talk to infants, respond to babbling, and enrich vocabulary through simple play. Such community-based interventions are essential to prevent early language delays.

CONCLUSION

The study in the Tanon Health Center working area revealed that most parents provided verbal stimulation in the "good" to "fair" categories, while a small proportion were still in the "poor" category. Infants showed varied language development outcomes, ranging from "not yet developed" to "very well developed." Correlation analysis confirmed a significant relationship between parental verbal stimulation and language development in infants aged 6–12 months.

However, limitations such as small sample size, uncontrolled confounding variables, and potential self-report bias should be considered in interpreting the results. The novelty of this study lies

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in its local focus on the Tanon Health Center, which has a relatively high prevalence of language development deviations, making it a valuable basis for promotive interventions at the primary care level. Verbal stimulation should be consistently provided by parents, supported by healthcare workers through education, counseling, and language stimulation programs at Posyandu, in order to prevent early language delays.

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