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The Relationship Between Maternal Employment Status and Speech Delay in Early Childhood: A Case-Control Study from a Private Pediatric Clinic in Malang, Indonesia

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Abstract

Speech delay is a common developmental concern in early childhood, affecting cognitive, social, and emotional domains. Maternal employment has been hypothesized to influence speech development, potentially due to reduced parent–child interaction. However, current evidence remains inconclusive, particularly in low- and middle-income countries. This study aimed to evaluate the association between maternal employment and speech delay in children aged 0–6 years in Malang, Indonesia. A case–control study was conducted from January to March 2025 at a private pediatric clinic in Malang City, Indonesia. A total of 60 children were recruited through consecutive sampling and categorized into two groups: 30 children with speech delay (cases) and 30 with typical speech development (controls). Maternal employment status and relevant sociodemographic data were collected using structured questionnaires. Speech development was assessed using the validated Kuesioner Pra Skrining Perkembangan (KPSP). Statistical analysis was performed using the Chi-square test, with significance set at $p < 0.05$. Of the total participants, 27 mothers (45.0%) were employed. Among children of employed mothers, 48.1% had speech delay, compared to 51.5% among children of non-employed mothers. The association between maternal employment and speech delay was not statistically significant ($\chi^2 = 0.07$; $p = 0.795$). No significant association was found between maternal employment and speech delay. These findings suggest that emphasis should shift from employment status to enhancing the quality of parent–child interaction and promoting early developmental support in diverse family contexts.

Keywords: *Speech Delay, Maternal Employment, Early Childhood Development.*

INTRODUCTION

Speech development during early childhood serves as a critical indicator of cognitive, emotional, and social growth (Andriyani et al., 2023). Impairments in this domain, particularly speech delay, can lead to long-term consequences including reduced academic achievement, behavioral problems, and impaired interpersonal communication in later life (Hobson et al., 2022; Sunderajan & Kanhere, 2019). Globally, the prevalence of speech delay among children aged 2 to 7 years is estimated to be around 19%, with reports suggesting increasing incidence in low- and middle-income countries (Liang et al., 2023). Meanwhile, in Indonesia, the prevalence of speech delay among preschool-

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aged children in 2023 reached 5–8%. This means that approximately 5–8 out of every 100 preschool children in Indonesia experience speech delay (Ministry of Health, 2025). This prevalence indicates that speech delay is a health issue that requires serious attention. (Tan et al., 2019).

Multiple factors contribute to the development of speech and language skills in children, ranging from biological determinants (e.g., prematurity, perinatal complications, and genetic predispositions) to environmental influences, such as parental education, home language exposure, and the quality of early interactions.(Choo et al., 2019; Conway et al., 2018; Sanjaya et al., 2018) Among these, the role of maternal employment has attracted increasing attention in recent years (Santiago et al., 2023). While employment may provide economic stability and improved maternal self-efficacy, it may also reduce the time and intensity of direct parent-child interactions, an essential component of early speech development.

Maternal employment has the potential to influence children's speech development through several interconnected mechanisms. On one hand, a mother's involvement in work-related activities may reduce the amount of direct interaction with her child, including opportunities to provide verbal stimulation such as talking, reading aloud, or engaging in interactive play activities known to play an important role in building vocabulary and early communication skills. Reduced shared time may also decrease the frequency of maternal responsiveness to the child's communicative signals, thereby hindering responsive language learning (Karomah & Khairiyah, 2025). However, these effects are not always negative, as several compensatory factors may offset potential reductions in stimulation. For example, the presence of high-quality alternative caregiving such as trained caregivers, educational daycare environments, or the involvement of grandparents can provide adequate language input. In addition, family social support and a working mother's ability to manage her time can help maintain the quality of interaction, even when the duration is more limited (Aulia et al., 2023).

Existing literature provides mixed evidence regarding the relationship between maternal employment and speech outcomes in children (Conway et al., 2018; Santiago et al., 2023; Zaib, Yaqoob, Iftikhar, Qureshi, & Rehman, 2022). Some studies have suggested that employed mothers may spend less time engaging in verbal stimulation activities such as reading or interactive play, potentially contributing to delayed language acquisition. Others argue that with adequate time management and supportive caregiving environments, working mothers can still foster optimal speech development in their children. However, few studies have directly assessed this relationship in Southeast Asian populations, where cultural norms, family structures, and access to early intervention services may differ substantially from Western contexts.

To address this gap, the present study aimed to evaluate the association between maternal employment status and the occurrence of speech delay in children aged 0 - 6 years. A case-control design was utilized in a private pediatric clinic in Malang, Indonesia, with speech development assessed using the validated *Kuesioner Pra Skrining Perkembangan* (KPSP). This study seeks to contribute regionally relevant evidence to the global discourse on maternal employment and child developmental outcomes.

METHOD

Study design and setting

This observational analytic study employed a case–control design to examine the association between maternal employment status and speech delay in children. The study was conducted at a private pediatric clinic in Malang City, East Java, Indonesia, between January and March 2025. The clinic is managed by a board-certified pediatrician with

subspecialty training in child development, and it serves a diverse urban population. A private pediatric clinic was chosen as the study location because it has more complete medical record systems, more stable service flow, and access to developmental assessments conducted directly by a pediatric specialist.

Operational Variables

Speech delay in this study was defined based on the results of the Developmental Pre-Screening Questionnaire (KPSP). A child was classified as having a speech delay if the KPSP assessment indicated a *Doubtful* or *Deviant* category in the language development domain. Conversely, a child was classified as having normal speech development if the KPSP results fell into the *Appropriate* category. This classification follows the official KPSP guidelines used nationally as a developmental screening tool in both primary healthcare and community settings.

Maternal employment status was defined as a condition in which the mother is engaged in formal or informal work for a minimum duration of three consecutive months following childbirth. This duration criterion was applied to ensure that employment status is relevant to caregiving patterns and mother–child interactions during the early developmental period.

Participant

The study population comprised children aged 0–6 years who visited the clinic during the study period. Participants were recruited through consecutive sampling. Children were allocated into two groups: the case group included children diagnosed with speech delay, and the control group consisted of age-matched children with normal speech development.

Eligibility criteria included: (1) age between 0 and 72 months, (2) accompanied by the biological mother, and (3) willingness of the mother to provide informed consent and complete the study questionnaire. Children were excluded if they had known neurological, genetic, or structural disorders affecting speech development, including Down syndrome, cerebral palsy, hearing impairment, or autism spectrum disorder.

To minimize age-related confounding bias, age matching was conducted by aligning the age range of children between the case and control groups. Each child with speech delay (case) was matched with a child without speech delay (control) with a maximum age difference of ±3 months. This approach was chosen to ensure that differences in language ability were not influenced by wide variations in developmental age.

Sample size determination

Sample size was calculated using a two-proportion formula for case-control studies, with a significance level of 5% and 80% power. Based on prior assumptions (75% maternal employment among cases vs. 35% among controls), the minimum sample required was 21 per group. A total of 60 children were enrolled, with 30 in the case group and 30 in the control group, meeting the required power threshold.(Egbuchulem, 2023)

Data collection

Data were obtained using structured questionnaires and developmental screening tools. Maternal employment status was assessed via direct self-report and categorized dichotomously as “working” or “not working,” defined as engagement in formal or informal employment for at least three consecutive months following childbirth. Additional data on child sex, age, birth history, maternal pregnancy complications, and gestational age were also collected.

Speech development was assessed using the KPSP, a validated Indonesian pre-screening questionnaire for early childhood development, widely used in clinical and community settings (Gusti Ayu Trisna Windiani et al., 2020). Based on KPSP scoring, children were classified as having speech delay if they scored in the "doubtful" or "deviant" range, and as normal if their scores fell within the expected developmental range. All developmental assessments were conducted by the principal investigator under the supervision of a pediatric specialist in child growth and development to ensure diagnostic accuracy.

Stastical analysis

All analyses were performed using SPSS version 27.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were calculated for all demographic and clinical variables. The Chi-square test was used to evaluate the association between maternal employment and speech delay. Statistical significance was set at $p < 0.05$.(Shen et al., 2022) No multivariate adjustment was performed, in line with the study's primary objective to assess a bivariate relationship. Bivariate analysis using the Chi-square test was selected because the primary aim of the study was to evaluate the direct relationship between maternal employment status and speech delay without simultaneously examining the influence of multiple confounding variables. The case–control study design with a limited sample size (n = 60) also did not provide sufficient analytical power for more complex multivariate analyses such as logistic regression. Therefore, the use of bivariate analysis was considered the most appropriate approach to answer the main research question, namely whether a simple association exists between the two categorical variables.

Ethical considerations

The study received ethical clearance from the Health Research Ethics Committee of the Faculty of Medicine, Universitas Wijaya Kusuma Surabaya (Approval No: 32/SLE/FK/UWKS/2025). Written informed consent was obtained from all mothers prior to participation. All procedures were conducted in accordance with the ethical standards of the Declaration of Helsinki

RESULT

Table 1. Participant characteristics (N = 60)

Variable	Category	Case (n=30) (%)	Control (n=30) (%)	Total (n=60) (%)
Sex	Male	18 (60.0)	16 (53.3)	34 (56.7)
	Female	12 (40.0)	14 (46.7)	26 (43.3)
Age	> 24 months	27 (90.0)	29 (96.7)	56 (93.3)
	≤ 24 months	3 (10.0)	1 (3.3)	4 (6.7)
Maternal	Employed	13 (43.3)	14 (46.7)	27 (45.0)
Employment	Unemployed	17 (56.7)	16 (53.3)	33 (55.0)
Pregnancy	Yes	8 (26.7)	7 (23.3)	15 (25.0)
Complications	No	22 (73.3)	23 (76.7)	45 (75.0)
Prematurity	Preterm	1 (3.3)	0 (0.0)	1 (1.7)
	Aterm	29 (96.7)	30 (100.0)	59 (98.3)
Speech Delay	Yes	30 (100.0)	0 (0.0)	30 (50.0)
	No	0 (0.0)	30 (100.0)	30 (50.0)

Note: SD = standard of deviation.

Table 1 shows the comparison of baseline characteristics between the case and control groups, indicating that the distribution of sex is relatively balanced, with a slight predominance of males in both groups. Most participants in both groups were older than 24 months, suggesting that age differences as a potential confounding factor are minimal. The proportions of pregnancy complications and prematurity were also similar between the case and control groups, with pregnancy complications being slightly more common in the case group but with only a small difference. Maternal employment status, as one of the main variables in the study, also appeared relatively balanced across the two groups. Overall, the baseline characteristics of both groups demonstrate good homogeneity, indicating that any differences observed in the primary study variables are more likely to reflect true associations rather than being influenced by initial sample characteristics.

Table 2. Association between maternal employment and speech delay.

Maternal Employment	Speech Delay (n = 30)	Normal (n = 30)	Total
Employed	13 (48.1%)	14 (51.9%)	27
Unemployed	17 (51.5%)	16 (48.5%)	33
Total	30	30	60
Chi-square test			$p = 0.795$

Table 2 shows that the proportion of children with speech delay is relatively comparable between employed and non-employed mothers. Among employed mothers, 48.1% of children experienced speech delay, while the proportion was slightly higher at 51.5% among non-employed mothers. This difference is very small and statistically insignificant, as indicated by the Chi-square test (p = 0.795). These results suggest that maternal employment status does not have a significant association with the occurrence of speech delay in children within this study sample.

DISCUSSION

This study investigated the association between maternal employment status and speech delay in children aged 0 - 6 years using a case-control design at a private pediatric clinic in Malang, Indonesia. Although maternal employment has been hypothesized to influence child development through its impact on the amount and quality of parent–child interaction, our findings did not demonstrate a statistically significant association between maternal work status and speech delay ($p = 0.795$). This suggests that maternal employment alone may not serve as an independent risk factor for delayed speech development in early childhood.

Our findings align with several previous studies that have challenged the notion that maternal employment inherently increases developmental risk. For example, Laing & Bergelson (2019) reported no significant difference in vocabulary acquisition between toddlers of working and non-working mothers, provided that compensatory quality interaction was maintained. Similarly, Christianty & Partasari (2021) highlighted that working mothers with high parenting self-efficacy were able to maintain sufficient developmental stimulation, even with limited time. These results reinforce the growing consensus that the quality rather than the quantity of parent-child interaction may play a more decisive role in early language development.

In addition, several studies from low- and middle-income countries (LMICs) and the Asian region have reported that maternal employment status is not always the primary determinant of children's language development. Research conducted in Pakistan by Zaib, Yaqoob, Iftikhar, Qureshi, & aur Rehman (2022) shows that although employed mothers tend to have more limited interaction time, the presence of extended family

support and strong alternative caregiving practices, such as the involvement of grandmothers or household caregivers can compensate for reduced mother–child interaction. Another study from India by (Koshy et al., 2021) similarly found that the quality of the caregiving environment and patterns of home communication play a more significant role than maternal employment status in influencing children's language acquisition. These findings align with the results of the present study, which indicate that the proportion of speech delay is relatively similar between children of employed and non-employed mothers. Thus, it becomes increasingly evident that research and interventions should shift their focus from maternal employment status toward measuring the quality of interactions, including the frequency of responsive conversations, engagement in communicative play, and verbal stimulation at home. Future studies should incorporate measurable indicators of interaction quality to obtain a more accurate understanding of the mechanisms underlying children's language development.

The equal distribution of speech delay among children of both employed and non-employed mothers in our sample underscores the multifactorial nature of speech development. Neurodevelopmental outcomes are known to be influenced by an array of biological, psychosocial, and environmental determinants (Fan et al., 2021; Hoff et al., 2018). In our study, a substantial proportion of children with speech delay also had a history of prenatal complications, consistent with literature linking intrauterine stress and adverse perinatal events with later developmental impairments (Liang et al., 2023). Furthermore, although prematurity was rare in this sample, even a single case highlights the importance of screening for neurodevelopmental delay in this vulnerable group.

It is also possible that confounding variables not accounted for in our bivariate analysis may have attenuated any potential associations. For instance, maternal education, screen time exposure, quality of the caregiving environment, and presence of alternative caregivers (e.g., grandparents, nannies) are all known to affect speech and language development (Fan et al., 2021; Hoff et al., 2018). Additionally, the use of the KPSP, while validated and appropriate for community settings, may offer limited granularity compared to more comprehensive language assessment tools. Nevertheless, its standardized administration under pediatrician supervision ensures diagnostic reliability within the constraints of real-world clinical practice.

From a public health perspective, these findings highlight the importance of shifting the focus from maternal employment status to parenting quality, environmental stimulation, and the early identification of children at risk for developmental delays. Interventions should prioritize strengthening responsive communication, promoting early literacy activities, and reducing passive screen exposure for all families, regardless of maternal employment status. Policy-level support such as flexible working arrangements and programs that facilitate meaningful parent–child interaction may further help ensure developmental equity.

A key strength of this study is its balanced case–control design and the clinical supervision that ensured consistent assessment of speech development. However, several limitations must be acknowledged, including the relatively small sample size, cross-sectional nature of data collection, and the absence of adjustment for potential confounders. Important unmeasured variables such as maternal education, daycare quality, screen time patterns, and interactions with alternative caregivers could have influenced the observed association and may partially explain the nonsignificant findings. The use of a private clinic setting may also introduce selection bias, as participants may differ socioeconomically from the broader population. Future studies should therefore recruit more diverse samples, incorporate comprehensive confounder measurements, and employ multivariable or structural modeling approaches to more accurately delineate the

biological, social, and environmental determinants of speech delay in early childhood. Longitudinal cohort designs would further strengthen causal inference and illuminate developmental trajectories over time.

CONCLUSION AND SUGGESTIONS

This case-control study found no statistically significant association between maternal employment status and the occurrence of speech delay in children aged 0 - 6 years. The comparable prevalence of speech delay in children of both employed and non-employed mothers highlights the complexity of early language development, which is likely influenced by a constellation of biological, environmental, and caregiving factors.

These findings challenge the assumption that maternal employment alone poses a developmental risk and underscore the importance of focusing on the quality of parent–child interaction rather than employment status per se. Health promotion strategies should therefore emphasize responsive caregiving and early developmental stimulation across all family contexts, regardless of parental work conditions.

While this study contributes to the growing body of literature on early childhood development in low- and middle-income countries, further research with larger and more diverse samples, including longitudinal and multivariate analyses, is warranted to more precisely define the determinants of early speech and language outcomes.

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