**Original Research Article**

# PREVALENCE AND RISK FACTORS OF SPEECH AND LANGUAGE DELAY AMONG 0–3-YEAR-OLD CHILDREN ATTENDING A WELL-BABY CLINIC IN A TERTIARY CARE HOSPITAL

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## ABSTRACT

**Background:** Early childhood speech and language development is critical for later cognitive, academic, and social functioning.[1] Identifying children at risk for speech and language delay enables timely intervention. **Objective:** To estimate the prevalence of speech and language delay and to identify associated risk factors among children aged 0–3 years attending a well-baby clinic at a tertiary care hospital.

**Materials and Methods:** A cross-sectional study was conducted among 70 children (0–3 years) attending the well-baby clinic at SVRR Government General Hospital, Tirupati. The Language Evaluation Scale Trivandrum (LEST 0–3) was used for screening[2]. Antenatal, natal, postnatal, medical, family, and environmental risk factors were analyzed. Chi-square/Fisher's exact tests and multivariate logistic regression were applied.

**Results:** Prevalence of speech and language delay was 21.4%. Significant risk factors included: not breastfed within 1 hour of birth (p=0.034), bag and mask resuscitation at birth (p=0.034), NICU admission ≥5 days (p<0.001), neonatal hyperbilirubinemia (p=0.009), altered sensorium (p=0.029), motor delay (p=0.029), first birth order (p=0.043), low maternal education (<10th std, p=0.019), family history of fluency disorder (p=0.043), screen time >2 hours/day (p<0.001), and inadequate stimulation (p<0.001). On multivariate regression, none of the risk factors retained significance, suggesting multifactorial causation.

**Conclusion:** Prevalence of speech and language delay was higher than community reports. Both biological and environmental factors contributed. Early screening using tools like LEST (0–3), parental guidance, and early intervention are essential.

**Keywords:** Speech delay, language development, LEST, child development, risk factors.

## INTRODUCTION

Speech and language are fundamental milestones of child development. Delays can adversely affect cognition, academic performance, and social skills.[1] The first three years are critical for neurodevelopment, making early identification crucial. While international prevalence estimates of speech and language delay range from 2–19%.[3,4,5] Indian reports vary between 4.5–16%.[3,5] Data on risk factors in Indian tertiary-care settings remain limited.[6,7,8] This study aims to estimate prevalence and identify associated risk factors of speech and language delay in 0–3-year-old children using the validated LEST (0–3) tool.[2]

## MATERIALS AND METHODS

**Study Design & Setting:** A Cross-sectional descriptive study was conducted between April 2021–March 2022 at SVRR Government General Hospital, Tirupati, a tertiary care hospital in South India.

Sample size: 70 children (calculated using 4.5% prevalence, allowable error 5%).[5]

Inclusion Criteria**:** All 0–3-year-old children attending the well-baby clinic.

**Exclusion Criteria:** Parents unwilling to provide consent.

**Tool:** LEST (0–3), considering ≥2 item delay as positive.

All the children included in the study are screened for speech and language delay using LEST (0-3). A detailed history was taken.

**Statistical Analysis:** Descriptive statistics, Chi-square/Fisher's exact tests, and binary logistic regression.[6]

## RESULTS

Of 70 children, 15 (21.4%) were LEST-positive. Male preponderance (80%) was observed, though not statistically significant.
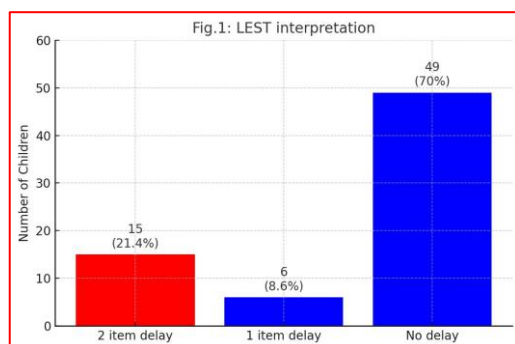


**Figure 1: LEST interpretation**

Prevalence of speech and language delay (LEST positive) was 21.4%. (figure 1)
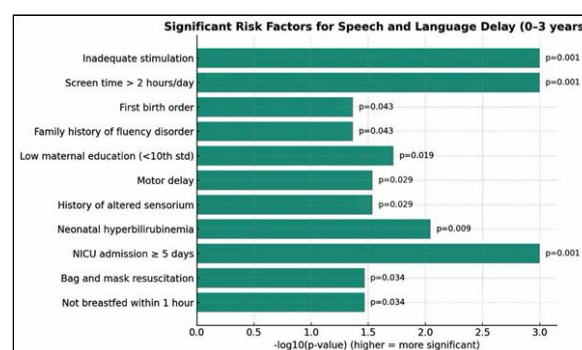


**Figure 2: Significant Risk Factors for Speech and Language Delay (0–3 Years) – Based on p-values**

Figure 2 showing horizontal bar chart with the x-axis representing –log10(p-value) of all significant risk factors, with bar length representing their statistical significance. Factors with longer bars are more strongly associated with speech and language delay. Significant risk factors for speech and language delay included: not breastfed within 1 hour[7] (p=0.034), bag and mask resuscitation[8] (p=0.034), NICU admission ≥5 days (p<0.001), neonatal hyperbilirubinemia,[6] (p=0.009), history of altered sensorium (p=0.029), motor delay,[6] (p=0.029), low maternal education,[9] (p=0.019), inadequate stimulation[10] (p<0.001), screen time >2 hrs/day[11] (p<0.001), first birth order,[12] (p=0.043), family history of fluency disorder,[13] (p=0.043). On multivariate regression, none retained independent significance.[8,14]

**Table 1: Prevalence of Speech and Language Delay**

| Screening inference | Frequency | Percentage |
|---|---|---|
| Normal | 49 | 70% |
| One item delay | 6 | 8.6% |
| Two item delay (LEST positive) | 15 | 21.4% |
| Total | 70 | |

**Table 2: Significant Risk Factors for Speech and Language Delay**

| Family based risk factors and LEST tool comparison based distribution of cases | | |
|---|---|---|
| **Family based risk factors** | **LEST positive (n,% within LEST positive)** | **p value** |
| Low paternal education (<10 std) | 11(73.3%) | 1.000 |
| Low maternal education (<10 std) | 13(86.7%) | 0.019 |
| Family history of fluency disorder | 2(13.3%) | 0.043 |
| Multilingual environment | 3(20%) | 0.163 |
| Low socioeconomic status | 15(100%) | 1.000 |

| Antenatal, natal, postnatal, medical risk factors and LEST tool comparison based distribution of cases | | |
|---|---|---|
| **Antenatal, natal, postnatal and other medical risk factors** | **LEST positive (n, % within LEST positive)** | **p value** |
| Not breastfed within 1 hour | 4 (26.7%) | 0.034 |
| Bag and mask resuscitation | 4(26.7%) | 0.034 |
| NICU admission (5 or more days) | 9(60%) | <0.001 |
| Preterm birth | 1(6.7%) | 0.678 |
| Neonatal hyperbilirubinemia | 9(60%) | 0.009 |

| | | |
|---|---|---|
| History of multiple convulsions | 3(20%) | 0.062 |
| History of postnatal stroke | 1(6.7%) | 0.214 |
| Craniofacial anomaly | 1(6.7%) | 0.385 |
| History of altered sensorium | 3(20%) | 0.029 |
| History of post neonatal infection | 2(13.3%) | 0.602 |
| Motor delay present | 3(20%) | 0.029 |
| **Environment based risk factors and LEST tool comparison based distribution of cases** | | |
| **Environment based risk factors** | **LEST positive(n,% within LEST positive)** | **p value** |
| Screen time > 2hours | 10(66.7%) | <0.001 |
| Inadequate stimulation | 13(86.7%) | <0.001 |

# DISCUSSION

The prevalence of speech and language delay in the present study was 21.4%, which is substantially higher than the rates reported in community-based studies from India and other countries (ranging from 4.5% to 16%). This difference may be explained by the hospital-based setting of our study, which inherently carries a higher likelihood of detecting children with developmental concerns. Such a trend has also been observed in other hospital-based studies.[3–6,12]

Perinatal factors emerged as significant contributors. NICU admission and neonatal jaundice were strongly associated with delayed language development, underscoring the vulnerability of high-risk neonates. Neonatal complications can disrupt early neurodevelopmental processes, and several studies have similarly highlighted the impact of adverse perinatal factors on subsequent speech and language outcomes.[6,15] These findings emphasize the need for routine developmental surveillance in infants with perinatal complications.

In addition to biological risks, environmental influences were also evident. Increased screen exposure was consistently associated with poorer language outcomes, as excessive screen time reduces caregiver–child interaction and impairs expressive and receptive language skills.[11] Likewise, inadequate stimulation at home was a strong risk factor, aligning with existing literature that stresses the importance of a linguistically rich environment for optimal language acquisition.[10]

Family-related factors like low maternal education has repeatedly been associated with delayed speech and language development[9,12,13], possibly due to reduced awareness of developmental milestones and limited engagement in language-promoting activities. Similarly, higher birth order was linked to increased risk [12], likely reflecting diluted parental attention and fewer one-on-one interactions. A positive family history of speech or language delay also heightened risk[6,13], suggesting a possible genetic predisposition or shared environmental influences.

These findings collectively reinforce the multifactorial etiology of speech and language delay, as supported by previous research (Sunderajan & Kanhere [8], Mondal et al[6], Campbell et al[9], Stanton-Chapman et al[14]). Importantly, when multiple significant factors were entered into the multivariate logistic regression model, none remained independently significant. This suggests that speech and language development is not determined by isolated risk factors but rather by the complex interplay of biological vulnerabilities, environmental exposures, and family influences. Interaction and collinearity among predictors likely explain the lack of independent associations, an observation reported in other studies as well [8,14].

Overall, the study underscores the necessity of holistic screening and early intervention strategies that address not only medical and perinatal risks but also modifiable environmental and family-related determinants. Public health efforts should focus on raising parental awareness about responsive communication, minimizing harmful exposures such as excessive screen time, and providing targeted support for high-risk infants and socioeconomically disadvantaged families.

# CONCLUSION

Speech and language delay was prevalent in one-fifth of children aged 0–3 years in this tertiary care setting. Significant associations were identified across perinatal, medical, family, and environmental domains.

**Implications**

- Use of LEST (Language Evaluation Scale Trivandrum) at well-baby clinics is practical for early detection of speech and language delay.[2]
- Parental counselling on breastfeeding, stimulation, and screen-time reduction is crucial.[10,11]
- Policy interventions should target maternal education and neonatal care follow-up[9,12] by integration of language screening tools into routine well-baby and immunization clinics can enhance early detection at the primary healthcare level.

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