

## Original Research Article

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# A study of prevalence and factors associated with language delay among 0-3 year old children in a tertiary teaching hospital

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## ABSTRACT

**Background:** Speech and language are essential components of child development. Delay in language development leads to poor scholastic performance, learning disabilities and poor socialization. Language Evaluation Scale Trivandrum (LEST) is a screening tool for use in office and communities for identifying language delay.

**Methods:** A descriptive study of cross-sectional design was done in 350 children between 0 and 36 months attending well baby clinic. A proforma with demographic details of parents, antenatal, perinatal risk factors were completed. All mothers were asked to complete home screening questionnaire to assess home environment. Language delay was identified using LEST scale. The association of language delay with antenatal, perinatal risk factors, socio economic status and home environment were analyzed.

**Results:** The prevalence of language delay was 6%. No association was found between language delay and type of family, place of residence, antenatal complications, perinatal complications, gestational age, birth weight and socio-economic status. Negative home environment was significantly associated with language delay.

**Conclusions:** The prevalence of language delay was 6%. Negative home environment significantly affects speech and language development

**Keywords:** Home screening questionnaire, Home environment, Language delay, Language evaluation scale trivandrum

## INTRODUCTION

Language is a means of communication and speech is verbal production of language. Language has two components; expressive and receptive. Language development is a process in children starting in utero by hearing mother's voice. Expressive language development proceeds from gestures to vocalization of sounds to speaking words. Delay in language development affects socialization, reading and writing in children. Children with delayed language milestones are often having poor scholastic performance and learning disabilities. This may persist in adulthood leading to poor

job opportunities, behavioral problems and lack of socialization.

Various international studies found the prevalence of speech and language delay among children between 2.3 and 19%.<sup>1-5</sup> Various screening tools are available like Early Language Milestone Scale and Receptive Expressive Emergent Language Scale (REELS). But they are cumbersome to use in office practice.

Language development assessment is routinely not done during evaluation of child development because of non-availability of easy screening tools. Language Evaluation Scale Trivandrum (LEST) is developed by Child

Development Center, Trivandrum as a screening tool for identification of children with language delay between 0-3 years and 3-6 years. This can be used by a health worker in field level or well baby clinic easily. Early identification can help starting therapy early, thus giving good outcome.

## METHODS

This descriptive study of cross-sectional design was done in well baby clinic of Annapoorna Medical college hospital in Salem, Tamilnadu during June 2019 to November 2019. A sample of 350 infants and children between 0 and 36 months of age were enrolled consecutively.

### **Inclusion criteria**

Children attending well baby clinic for growth and development assessment and immunization.

### **Exclusion criteria**

Children with severe illness, chronic disorders like congenital heart diseases, hemolytic anemias, renal disorders, etc. and delay in other domains like gross motor, fine motor and social milestones were excluded.

After getting informed consent from parents, a proforma consisting of socio demographic details like age, sex, birth order is filled. Details relating to gestational age, birth weight, postnatal problems were collected. Maternal and paternal age, education, occupation, place of residence and type of family details were also noted. Socio-economic class was graded using Modified Kuppuswamy Scale.

Parents were asked to mark responses in home screening questionnaire. Home screening questionnaire consists of 30 questions related to child's home environment, activities and parenteral interaction which helps to evaluate the quality of family environment promoting child development. A score of  $\geq 20$  is considered as positive home environment and  $\leq 19$  is considered as negative home environment.<sup>6</sup> All 350 children were assessed for language development using Language Evaluation Scale Trivandrum (0-3 years), developed by Child Development Center, Trivandrum.

LEST interpretation is done as follows:

- Normal - All items done
- Questionable - One item not done
- Suspect - Two items not done
- Delay - Three or more items not done

Children who cannot do two or more items were considered as having delayed speech and language development.

The prevalence of language delay was calculated and its association with various socio-demographic, perinatal and socio-economic factors were assessed. The strength of association of language delay with poor home environment was also calculated using Chi-square test.

## RESULTS

Among 350 children assessed for language delay, 202 (57.7%) were male and 148 (42.3%) were female.

Half of the study population were infants below one year of age. This was due to frequent visits for immunization under one year of age. Children in the rest of age group was almost similarly distributed (Table 1).

**Table 1: Age distribution of study subjects.**

Age group	No. of children (%)
0 - 6 months	89(25.4%)
7 - 12 months	86(24.6%)
13 - 18 months	46(13.1%)
19 - 24 months	42(12%)
25 - 30 months	51(14.6%)
31 - 36 months	36(10.3%)
Total	350 (100)

All 350 children were evaluated for language delay using LEST. Majority of children (80%) had no language delay. 14% of children could not do one item and hence classified as questionable delay. 6% of children could not complete two and more items.

Inability to complete two or more items were considered as language delay and hence prevalence of language delay in this study population was 6% (Table 2).

**Table 2: Prevalence of language delay by LEST scale.**

LEST interpretation	no. of children (%)
No delay - All items done	280(80%)
Questionable delay - one item not done	49(14%)
Suspect delay - two items not done	7(2%)
Delay - three or more items not done	14(4%)

Language delay was seen more in children above one year of age. Only 1.1% of infants below one year had suspicious delay. Inability to do one item in LEST scale was seen more in children less than 24 months than older age group probably because of normal variations in achieving milestones (Table 3). 238 (68%) children were from rural background and 112 (32%) were from urban areas. 203 (58%) children were living in nuclear family. Majority of mothers (67%) were of age group 21-30

years at childbirth. 10% were above 30 years and 21%

were 20 years and below.

**Table 3: Comparison of age and LEST interpretation.**

LEST	Age in months						Total
	0-6	7-12	13-18	19-24	25-30	31-36	
No delay	76(85.4%)	71(82.6%)	27(58.7%)	25(59.5%)	47(92.1%)	34(94.4%)	280
Questionable delay	12(13.5%)	14(16.3%)	13(28.3%)	10(23.8%)	-	-	49
Suspect delay	1(1.1%)	1(1.1%)	4(8.7%)	-	1(2%)	-	7
Delay	-	-	2(4.3%)	7(16.7%)	3(5.9%)	2(5.6%)	14
Total	89(100%)	86(100%)	46(100%)	42(100%)	51(100%)	36(100%)	350

Majority of study subjects (80.3%) were from lower middle and upper lower socio-economic status. There were no children in upper socio-economic status in the study group. Language delay was noticed in children belonging to all socio-economic status and there was no statistically significant association between socio-economic class and language delay (Table 4).

**Table 4: Comparison of LEST delay with socio-economic status.**

Socio-economic class	LEST delay	No delay	Total	p=0.11
Upper middle	5(23.8%)	55 (16.7%)	60 (17.1%)	
Lower middle	9(42.9%)	141 (42.9%)	150 (42.9%)	
Upper lower	5(23.8%)	126 (38.3%)	131 (37.4%)	
Lower	2(9.5%)	7 (2.1%)	9 (2.6%)	
	21	329	350	
	(100%)	(100%)	(100%)	

Only 88 (25.1%) mothers has antenatal problems, most common being anemia. 304 (86.9%) babies were born at term gestation. 46 (13.1%) were preterm and no child was born post term. 63 (18%) were low birth weight babies (<2499 grams). 224 (64%) were first born babies. Only 25 (7.1%) babies has neonatal admissions, rest had uneventful neonatal period.

No statistically significant association was observed between perinatal events and language delay.

Out of 350 responses from home screening questionnaire 289 (82.6%) had positive home environment. Children who could not do two or more items in LEST scale were considered to be having language delay. 13 (4.5%) children with positive home environment had language delay whereas 8 (13.1%) children with language delay had negative home environment (Table 5).

The association between home environment and language delay was found significant (p=0.01).

**Table 5: Comparison of LEST delay with home environment.**

LEST	Positive home environment	Negative home environment	Total
LEST Delay	13(4.5%)	8(13.1%)	21
LEST No delay	276(95.5%)	53(86.9%)	329
	289(100%)	61(100%)	350

## DISCUSSION

Language evaluation scale Trivandrum is a simple tool developed by Child Development Center, Trivandrum for identification of speech and language delay between 0-6 years. This tool is validated against the reference standard Receptive Expressive Emergent Language Scale.<sup>7</sup>

Two item delay was considered as LEST positive in this study, which is same as suggested by MKC Nair et al, in their study.<sup>7</sup>

The prevalence of speech and language delay is 6% in this study population. In a study at CDC, Trivandrum the prevalence was 4.5%.<sup>7</sup> In a similar study by Shiji et al, from Cochin, the prevalence was 5.5%.<sup>8</sup> The prevalence was 6.2% in a study from North India by Sidhu et al.<sup>9</sup>

Tomblin et al, found that 87% of children with articulation disorders were boys.<sup>10</sup> Choudhry et al, also found male gender as a risk factor for language delay.<sup>11</sup> But the present study did not find any association of gender with language delay. Nelson et al found that being a single child is a risk factor for language delay.<sup>12</sup> Abraham et al study found first born children at greater risk of language delay.<sup>13</sup> But the present study did not suggest any significant association between birth order or type of family. There was no association between

maternal education and socio-economic status of the family with language development. A similar observation was made by Mondal et al in Puducherry.<sup>14</sup>

No association was seen between antenatal complications in mothers, neonatal complications, gestational age and birth weight with language delay in this study. Mondal et al, also did not find any association in their study population.

Negative home environment was only factor that was significantly associated with language delay. Lack of stimulating environment in the home is an independent risk factor for speech and language delay. Poor home environment was the only significant environmental risk factor in the study by Mondal et al. The studies by Oxford et al, and Malhi et al, also found lack of stimulation at home as a risk factor for language delay.<sup>15,16</sup>

## CONCLUSION

The prevalence of language delay was 6%. 14% of children had questionable delay. Gender, socio-economic status and perinatal factors were not significantly associated with language delay. Negative home environment was a significant risk factor in this study. Routine development assessment can miss language delay. LEST is a simple tool to screen children with language delay and can be used in office practice. Home environment plays a significant role in language development.

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