How to Cite:
Kumar, M., Sharan, S., Kishore, S., Gupta, A. K., & Kumar, A. (2022). The prevalence of speech and language delay in children (0-3 years) and its associated risk factors in a tertiary care teaching hospital of Eastern India: A cross-sectional descriptive study. *International Journal of Health Sciences*, *6*(S6), 1778–1784. https://doi.org/10.53730/ijhs.v6nS6.9917

The prevalence of speech and language delay in children (0-3 years) and its associated risk factors in a tertiary care teaching hospital of Eastern India: A cross-sectional descriptive study

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***Abstract*---**Introduction: Speech and language development is an important indicator of a child's overall development and intellectual functioning. There is a large amount of data on the prevalence and risk factors of speech and language delay from the West, but relatively scanty data from India. Language Evaluation Scale Trivandrum (LEST) is a screening tool for use in outpatient clinics and communities for identifying language delay in toddlers. Materials and Methods: A descriptive study of the cross-sectional design was done on 350 children between 0- and 36-months attending outpatient and immunization clinics. A proforma with demographic details of parents, antenatal, and perinatal risk factors were completed. All caregivers

were asked for a home screening questionnaire to assess the home environment. Language delay was identified using the LEST scale. The association of language delay with antenatal, perinatal risk factors, socioeconomic status, and home environment were analyzed. Results: The prevalence of language delay was 7%. No association was found between language delay and type of family, place of residence, antenatal complications, perinatal complications, gestational age, birth weight, and socioeconomic status. A negative home environment and second birth order were significantly associated with language delay. Conclusions: The prevalence of language delay was 7%. A family with a hostile home environment and a second-born child had a significant delay in speech and language development.

***Keywords*---**prevalence, risk factor, home environment, speech and language delay, language evaluation scale trivandrum, LEST.

Introduction

Language is a means of communication and has two components; expressive and receptive. Speech and language development is an important indicator of a child's overall development and intellectual functioning [1]. It has been seen that if left untreated, speech and language delay in preschool children can lead to the persistence of problems in about 40-60% of them and they are also at a higher risk for social, behavioral, emotional, and cognitive problems in the later years of their lives [2]. Early identification and then providing early intervention services to these children who are at risk for language and other developmental problems, can ameliorate the impact of early risk Considerably [3]. Several population-based studies have recommended that screening toddlers for language delays reduce the number of children who require special education, which leads to improved language performance [4, 5, 6]. Yet another reason for early detection of speech delay is that in a significant number of these children, delay in speech acquisition is secondary to hearing impairment [7], which should be addressed early for better outcomes.

Various screening tools are available like Early Language Milestone Scale and Receptive Expressive Emergent Language Scale (REELS). But they are cumbersome to use in day-to-day pediatric OPD practice and for mass screening for language delay at the community level by field workers [8]. Language Evaluation Scale Trivandrum (LEST) is developed by Child Development Center, Trivandrum as a screening tool for the identification of children with language delay between 0-3 years and 3-6 years [9]. This can be used by a health worker in a community or well-baby clinic easily. Given the importance of early identification of language delay, this cross-sectional descriptive study was planned at Indira Gandhi Institute of medical services which is a super-specialist medical teaching hospital and referral center for patients from Bihar, neighboring states (West Bengal, Utter Pradesh, and Orissa) and Nepal to know the prevalence and risk factors for early language delay and associated risk factors.

Materials and Methods

This cross-sectional descriptive study was conducted at the pediatric outpatient department (OPD) of a tertiary care teaching hospital in the capital city of Bihar state from June 2020 to July 2021 after obtaining approval from the Institutional ethics committee. Written informed consent was obtained from the primary caregiver before the enrolment of the children. The sample size was calculated by taking the prevalence of speech delay to be 27% [5]. The sample size was calculated as 310 by attempting to get the maximum sample size and keeping the degree of variability at 5% and 95% confidence intervals. The final sample size for this study will be taken as 350. Inclusion Criteria of this study were Children less than 3 years of age attending general Pediatrics OPD and immunization clinic at Indira Gandhi Institute of Medical Sciences, Patna. Children with chronic neurological disorders, hearing impairment, and who are known cases of developmental delays in more than one domain were excluded from the study. The participants in the study were subjected to screening using the Language evaluation scale Trivandrum (LEST 0-3). 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

Demographic data related to Maternal and paternal age, education, occupation, place of residence and type of family, gestational age, birth weight, and postnatal problems were collected. The socio-economic class was graded using Modified Kuppuswamy Scale. Parents were asked to respond to a home screening questionnaire which consists of 30 questions. Questions were related to the child's home environment, activities, screen time, and parenteral interaction to evaluate the quality of the family environment which helps in child development. A score of ≥20 is considered a positive home environment and ≤19 is considered a negative home environment. All 350 children were assessed for language development using Language Evaluation Scale Trivandrum (0-3 years), developed by Child Development Center, Trivandrum. 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 sociodemographic, perinatal and socioeconomic factors was assessed. The strength of association of language delay with a poor home environment was also calculated using the Chi-square test where a p-value < 0.05 denotes a significant association.

Results

Among 350 children assessed for language delay, 196 (56.2%) were male and 154 (44%) were female. The majority of the study population was infants below one year of age from the immunization clinic. Children in the rest of the age group were almost similarly distributed (Table 1). All 350 children were evaluated for language delay using LEST. The majority of children 77% had no language delay. 16% of children could not do one item and hence classified as a questionable delay. Inability to complete two or more items was considered a language delay

and hence prevalence of language delay in this study population was 7% (Table 1). Language delay was seen in more than 8.4% of children above one year of age. Only 1.1% of infants below one year had a suspicious delay. Inability to do one item on the LEST scale was seen more in children less than 24 months than in the older age group probably because of normal variations in achieving milestones (Table 1).

208 (59%) children were from rural backgrounds and 142 (41%) were from urban areas. 192 (55%) children were living in a nuclear family. The majority of mothers (65%) were of the age group 21-30 years at childbirth. 9% were above 30 years and 24% were 20 years and below. The majority of study subjects (71%) were from lower-middle and upper-lower socioeconomic status. Language delay was noticed in children belonging to all socioeconomic statuses and there was no statistically significant association between socioeconomic class and language delay (Table 2). Only 118 (33.71%) mothers have antenatal problems, the most common being anemia followed by hypothyroidism 4 mothers had a history of gestational diabetes and only one had preeclampsia. 288 (82.2%) babies were born at term gestation. 60 (17.1%) were preterm and 2 children were born post-term. 88 (25%) were low birth weight babies (<2.5kg). 250 (71%) were first-born babies. Only 34 (9.7%) babies had neonatal admissions, the rest had an uneventful neonatal period. No statistically significant association was observed between perinatal events and language delay.

Language delay was found to be more prevalent (12.5%) among the second-born compared to (6%) seen in first-born children. The difference in the birth order of the children in the family with language delay was found to be statistically significant (p =0.03) [Table 3]. Out of 350 responses from a home screening questionnaire 236 (67.4%) had a positive home environment. among children with a positive home environment, 15 (6%) had language delay whereas 10 (9%) children with language delay had a negative home environment [Table 4]. The association between home environment and language delay was found significant (p=0.01).

Table 1
Age distribution and Prevalence of language delay by LEST scale of study subjects

Age group	Male	Female	No delay	Questionable delay	Suspect delay	Delay	No. of children (%)
0 - 6 months	35	26	70	9	1	-	80 (22.8%)
7 - 12 months	52	39	71	16	3	-	90 (25.71%)
13 - 18 months	41	37	25	12	3	5	45 (12.85%)
19 - 24 months	40	28	25	13	3	4	45 (12.85%)
25 - 30 months	21	18	45	1	1	3	50 (14.28%)
31 - 36 months	6	6	34	4	-	2	40 (11.42%)
Total	196 (56%)	154 (44%)	270 (77%)	55 (16%)	11 (3%)	14 (4%)	350 (100%)

Table 2
Comparison of LEST delay with socio-economic status

Socio-economic class	LEST delay	No delay	Total	p-value
Upper middle	7 (28%)	70 (22%)	77 (22%)	0.10
Lower middle	9 (36%)	101 (31%)	110 (31%)	
Upper lower	6 (24%)	133 (41%)	139 (40%)	
Lower	3 (12%)	21 (6%)	24 (7%)	
Total	25 (100%)	325 (100%)	350 (100%)	

Table 3
Association of language and speech delay with an order of children

Birth order	Result		Total	P-value
	No delay	Delay		
First	263 (94%)	17 (6%)	280 (100%)	0.03
Second	56 (87.5%)	8 (12.5%)	64 (100%)	
Third and more	6 (2.4%)	-	6 (100%)	
Total	325 (92.9%)	25 (7.1%)	350 (100%)	

Table 4
Comparison of LEST delay with the home environment

LEST	Positive home environment	Negative home environment	Total	P-value
LEST Delay	15 (6%)	10 (9%)	25 (7.1%)	0.01
LEST No Delay	221 (94%)	104 (91%)	325 (92.9%)	
Total	236 (100%)	114 (100%)	350	

Discussion

The prevalence of speech and language delay is 7% in this study population. In a study at CDC, Trivandrum the prevalence was 4.5 %[9]. In a similar study by Shiji et al, from Cochin, the prevalence was 5.5 % [10]. The prevalence was 6.2% in a study from North India by Sidhu et al [11]. Tomblin et al, found that 87% of children with articulation disorders were boys [12]. Choudhry et al also found male gender as a risk factor for language delay [13] but the present study did not find any association of gender with language delay. In this study, there is statistically significant language delay among the second born (12.5%) compared to (6%) seen in a first born child. This observation is as per the study of A. Dharamalingam et al in which language delay is more [21.31%] prevalent in second-order birth. The study done by Broookerhouser et al [14] children born late in the family was a significant factor in language delay. There was no association between maternal education and the socio-economic status of the family with language development. A similar observation was made by Mondal et al [15].

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 [15]. A negative home environment was significantly associated with language delay. Lack of a stimulating environment in the home is an independent risk factor for speech and language delay. The poor home environment was the only significant environmental risk factor in the study by Mondal et al [15]. The studies by Oxford et al, and Malhi et al also found lack of stimulation at home as a risk factor for language delay [16, 17].

Limitation of Study

This study was done only on those toddlers who sought health services at the tertiary care hospital. Follow up study of children with questionable delay and a community-based study is required to determine the true prevalence of language delay.

Conclusion

The prevalence of language delay was 7%. 16% of children had a questionable delay. Gender, socio-economic status, and perinatal factors were not significantly associated with language delay. A negative home environment was a significant risk factor in this study. LEST is a simple tool to screen children with language delay and can be used in outpatient practice and by field workers. Reinforced focus on maintaining a positive home environment plays a significant role in language development.

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