



Paediatric Medicine

SPEECH AND LANGUAGE DELAY IN <3 YEARS AGE CHILDREN ATTENDING OUTPATIENT DEPARTMENT AT TERTIARY CARE HOSPITAL: AN OBSERVATIONAL STUDY

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ABSTRACT **Background:** Speech and language is the most widely used form of communication between individuals. Every child should be assessed for the speech and language delay so that delay at early stage can be identified and early intervention and appropriate treatment can be given to child. **Objective:** To estimate the prevalence of speech and language delay among 0-3 years children attending outpatient department of tertiary care centre. **Method:** This is Cross sectional observational study included 282 children of 0-3 years age attending OPD. Language Evaluation Scale Trivandrum (LEST) was applied on children and were assessed for speech & language delay. Children with speech and language delay were further assessed for hearing disability by BERA. Children with normal BERA report were further assessed for developmental delay in other domains by using DASII Scale. **Results:** Of the 282 children 1.4 % had delay, 1.8 % had suspect delay, 4.3% had questionable delay. Children came in OPD with common complaints like cough & cold, diarrhoea, fever, vomiting etc. but not any caregiver complaint about speech and language delay. In this study there was significant association between speech and language delay and place of residence ($p=0.003$). There was also significant association in between speech and Language delay and birth weight ($p=0.000048$). There was no association found between the other demographic variables. **Conclusion:** by using simple tool LEST scale in children we can easily screen language and speech delay in early age, can intervene in early stage and can prevent further consequences.

KEYWORDS : LEST score, development assessment.

INTRODUCTION:

Speech and language is the most widely used form of communication between individuals. For a child speech is a way to transfer his emotions to others, mean to seek attention and to develop social relations with other individuals. Speech & Language milestones are usually achieved in a predictable age. Speech and language development delay in children is one of the most common neurodevelopmental difficulties although it is often missed by caregivers, they are very concerned even about the minor ailments of their child but are unaware about the fact that their child is having speech and language delay. Speech refers to the mechanism of oral communication or the motor act of communicating by articulating verbal expressions. Language encompasses understanding, processing and production of communication. Several types of speech and language delay and disorders have been described, although terms used to describe them vary. Every child should be assessed for the speech and language delay so that delay at a early stage can be identified and early intervention and appropriate treatment can be given to child. These children are also at increased risk of emotional and behavioural problems. In these children if early intervention given may lead to improved social behaviour and academic performance. From the world many studies on children having speech and language delay reported with prevalence of 2.3% to 19%. From INDIA less studies have been done on this subject and prevalence was reported between 4.5% to 32% in various studies. In Madhya Pradesh less data is available on this aspect. There is need of simple tool to screen these children so that early intervention and treatment can be given to children which will improve their social behaviour and school performance. This study was planned to evaluate the prevalence of language and speech delay in children 0-3 years by application of Language Evaluation Scale Trivandrum (LEST) Scale.

METHOD:-

Present study is a cross sectional observational study conducted between December 2019 to September 2021 after getting approval from the institute approval committee.

Sample size:

Prevalence = 6%
Absolute precision = 3%
Sample size = $4pq/l$
= $4 \times 6 \times 94 / 3^2 = 250$
= 250

Inclusion Criteria :- children 0-3 years of age attending OPD.

Exclusion Criteria:-

1. Children diagnosed with global developmental delay
2. Children having speech and language delay secondary to CNS diseases, congenital malformations.
3. Children with known hearing impairment

Caregivers of children between age group 0-3 years attending OPD informed about the study and inclusion criteria. Language Evaluation Scale Trivandrum (LEST) was applied on children after taking informed consent. LEST scale for 0-3 years age group has 33 items & were used for speech and language delay evaluation. We assessed the development of the child by drawing a vertical line through the chart for their chronological age. If the child is able to complete items that are on the left of the line, then there is no delay for that item. If an item lies to the left of the line and the child is unable to complete the item then a delay is assumed. After applying LEST scale children has been classified into 4 categories:-

- No delay (all items done)
- Questionable delay (one item not done)
- Suspect (two items not done)
- Delay (three or more items not done)

Children who falls into questionable, suspect or delay also assessed for hearing defect to rule out any hearing disability as a cause of speech and language delay. For hearing assessment BERA was done on children having speech and language delay by Audiologist. If any children found with hearing disability on BERA then referred for appropriate intervention. Children with delay on LEST scale with no hearing impairment assessed for developmental delay in other domains by applying DASII (Development Assessment Scale For Indian Infants) scale.

Statistical analysis:-

The categorical data is summarised as frequencies and percentages. Continuous data is also categorized. Categorical data is analysed using Fisher's Exact test. p values < 0.05 are accepted as indicative of statistical significance.

RESULT:-

282 Children assessed for language & speech delay by applying LEST scale. On applying LEST scale in this study we found 21 children out of 282 children in study had delay in speech & language in which 1.4% of children had delay, 1.8% had suspect delay & 4.3 % had questionable delay (total prevalence 7.5%). BERA assessment was done for hearing assessment in these 21 children to rule out hearing

disability and found that no children had hearing disability. These 21 children further evaluated for developmental delay in other domain by applying DASII scale on which 7(2.5%) children had delay.(table 1)

Study Flow Chart

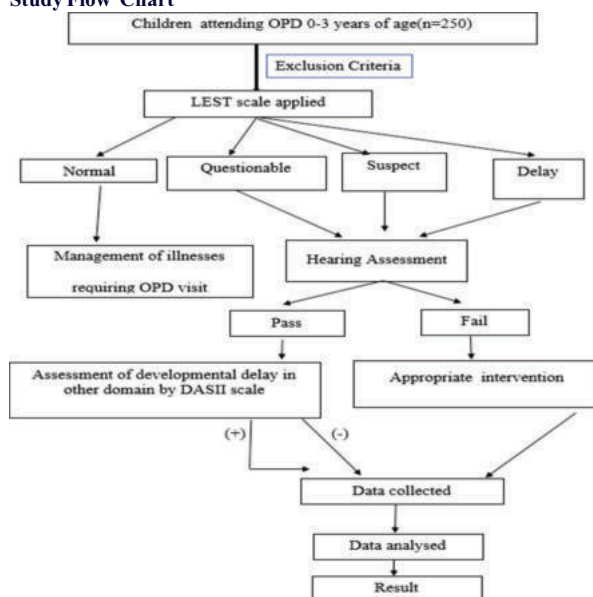


Table 1 : Developmental assessment of the study participants

Developmental assessment method	Number	Frequency
Language Evaluation Scale Trivandrum (LEST)scoring		
Normal	261	92.6
Questionable delay	12	4.3
Suspect delay	5	1.8
Delayed development	4	1.4
BERA Hearing Assessment		
Normal	21	7.4
Not done	261	92.6
Neurological Developmental Delay (DASII)		
Delay	7	2.5
No delay	13	4.6
Not done	262	94.9
Total	282	100

There was no significant association between the speech and language development of the child and age of the child however prevalence of delay was more in children less than 24 months (p value 0.489). There was slightly more prevalence of delay in males but there was no significant association (p value 0.407).(Table2)

Table 2: Risk factors – Age group and Sex across the LEST scoring

Risk factors	LEST score				Total	p value
	Normal	Questionable delay	Suspected delay	Delayed development		
Age group						
Less than 24 months	145 (92.4)	7 (4.5)	4 (2.5)	1 (0.6)	157 (100)	0.489#
24 to 36 months	116 (92.8)	5 (4)	1 (0.8)	3 (2.4)	125 (100)	
Sex						
Male	159 (90.9)	9 (5.1)	3 (1.7)	4(2.3)	175 (100)	0.407#
Female	102 (95.3)	3 (2.8)	2 (1.9)	0(0.0)	107 (100)	

#Fisher's Exact test used. Significance level is 0.05

There was no association between speech and language delay and socioeconomic status (p value 0.993). There was significant association between residing area and language delay (p=0.003),more prevalence was seen in children residing in urban area. There was no significant association between delay and number of siblings (p value 0.551). There was no significant association between delay and

educational qualification of mother and father (p value 0.687 and 0.255 respectively). There was no significant association between delay and working status of mother, however more prevalence seen in children with homemaker mother(p value 0.086).There was no significant association between delay and family size(p value 0.057).(Table 3)

Table 3: Risk factors – Socio-demographic characteristics and Family structure across the LEST scoring

Risk factors	LEST score				Total	P value
	Normal	Questionable delay	Suspected delay	Delayed development		
Socio-economic status						
Upper	2 (66.7)	0 (0)	0 (0)	0 (0.0)	2 (100)	0.993 #
Upper Middle	55 (93.2)	2 (3.4)	1 (1.7)	1 (1.7)	59 (100)	
Lower Middle	81 (91.0)	5 (5.6)	2 (2.2)	1 (1.1)	89 (100)	
Upper Lower	120 (93.0)	5 (3.9)	2(1.6)	2 (1.6)	129(100)	
Lower	3(100)	0 (0)	0 (0)	0 (0)	3(100)	
Residence						
Urban area	212 (95.5)	5 (2.3)	3 (1.4)	2(0.9)	222 (100)	0.003 #
Rural area	49 (81.7)	7(11.7)	2 (3.3)	2 (3.3)	60 (100)	
Family Size						
Nuclear	102 (91.9)	5 (4.5)	2 (1.8)	2 (1.8)	111 (100)	0.972 #
Joint	159 (93.0)	7 (4.1)	3 (1.8)	2 (1.2)	171 (100)	
Number of Siblings						
0	107 (91.5)	5 (4.3)	4 (3.4)	1 (0.9)	117 (100)	0.551 #
1	108 (94.7)	4 (3.5)	1 (0.9)	1 (0.9)	114 (100)	
2	31 (86.1)	3 (8.3)	0 (0)	2 (5.6)	36 (100)	
3	10 (100)	0 (0)	0 (0)	0 (0)	10 (100)	
4	5 (100)	0 (0)	0 (0)	0 (0)	5 (100)	
Educational qualification of mother						
Illiterate	37 (90.2)	2 (4.9)	2 (4.9)	0 (0.0)	41 (100)	0.687 #
Primary School	85 (93.4)	4 (4.4)	0 (0.0)	2 (2.2)	91 (100)	
Middle School	63 (94.0)	2 (3.0)	1 (1.5)	1 (1.5)	67 (100)	
High School	30 (93.8)	1 (3.1)	1 (3.1)	0 (0.0)	32 (100)	
Graduate	27 (84.4)	3 (9.4)	1 (3.1)	1 (3.1)	32 (100)	
Post graduate	19 (100)	0 (0)	0 (0)	0 (0)	19 (100)	
Educational qualification of father						
Illiterate	39 (97.5)	0 (0)	0 (0)	1 (2.5)	40 (100)	0.255 #
Primary School	67 (98.5)	1 (1.5)	0 (0)	0 (0)	68 (100)	
Middle School	59 (86.8)	6 (8.8)	2 (2.9)	1 (1.5)	68 (100)	
High School	36 (90.0)	2 (5.0)	1 (2.5)	1 (2.5)	40 (100)	
Graduate	50 (90.9)	3 (5.5)	1 (1.8)	1 (1.8)	55 (100)	
Post graduate	10 (90.9)	0 (0)	1 (9.1)	0 (0)	11 (100)	
Working status of mother						
Home maker	241 (93.4)	8 (3.1)	5 (1.9)	4 (1.6)	258 (100)	0.057 #
Working	20 (83.3)	4 (16.7)	0 (0)	0 (0)	24 (100)	

#Fisher's Exact test used. *Significant at 0.05 level

There was no significant association between delay and gestational age of children (p value 0.173). There was no significant association between delay and birth order of children (p value 0.852). There was significant association between delay and birth weight (p=0.000048), prevalence was more in children less than 2500 grams birth weight. There was no significant association between delay and mode of delivery (p value 0.154) and history of hospitalization at birth (p value 0.094). There was no significant association between delay and maternal age at the time of delivery (p value 0.900). (Table 4)

Table 4 : Risk factors – Birth history across the LEST scoring

Risk factors	LEST score				Total	P value
	Normal	Questionable delay	Suspected delay	Delayed development		
Gestational Age						
Term	235 (93.3)	9 (3.6)	5 (2.0)	3 (1.2)	250 (100)	0.173#
Preterm	26 (86.7)	3 (10)	0 (0)	1 (3.3)	30 (100)	
Birth Weight						
Appropriate for Gestational Age (AGA)	198 (96.6)	2 (1.0)	3 (1.5)	2 (1.0)	205 (100)	0.000048*#
Low birth weight (LBW)	63 (81.8)	10 (13)	2 (2.6)	2 (2.6)	77 (100)	
Birth Order						
1	127 (92.7)	5 (3.6)	4 (2.9)	1 (0.7)	137 (100)	0.852#
2	93 (92.1)	5 (5)	1 (1)	2 (2)	101 (100)	
3	29 (90.6)	2 (6.3)	0 (0)	1 (3.1)	32 (100)	
4	9 (100)	0 (0)	0 (0)	0 (0)	9(100)	
5	3 (100)	0 (0)	0 (0)	0 (0)	3 (100)	
Mode of delivery						
Normal Vaginal Delivery	175 (90.2)	11 (5.7)	4 (2.1)	4 (2.1)	194 (100)	0.154#
LSCS	86 (97.7)	1 (1.1)	1 (1.1)	0 (0)	88 (100)	
Hospitalization at birth						
Yes	15 (83.3)	3 (16.7)	0 (0)	0 (0)	18 (100)	0.094#
No	246 (93.2)	9(3.4)	5 (1.9)	4 (1.4)	264 (100)	
Maternal Age at the time of delivery						
18 to < 20 yrs	2 (100)	0 (0)	0 (0)	0 (0)	2 (100)	0.900#
≥ 20 to < 25 yrs	119 (91.5)	6 (4.6)	3 (2.3)	2 (1.5)	130 (100)	
≥ 25 to < 30 yrs	100 (91.7)	6 (5.5)	1 (0.9)	2 (1.8)	109 (100)	
≥ 30 to < 35 yrs	32 (97)	0 (0)	1 (3)	0 (0)	33 (100)	
≥ 35 yrs	8 (100)	0 (0)	0 (0)	0 (0)	8(100)	
Total	261(92.6)	12 (4.3)	5 (1.8)	4 (1.4)	282(100)	

#Fisher's Exact test used. *Significant at 0.05 level

There was no significant association between delay and family history of delayed speech and language development. There was also no significant association between delay and screen time exposure (p value 0.196). (Table 5)

Table 5: Risk factors – Socio-demographic characteristics and Family structure across the LEST scoring

Risk factors	LEST score				Total	p value
	Normal	Questionable delay	Suspected delay	Delayed development		
Family history of delayed language and speech development						
Yes	0 (0)	0 (0)	1 (100)	0 (0)	1 (100)	-
No	261 (92.9)	12 (4.3)	4 (1.4)	4 (1.4)	281 (100)	
Screen time exposure						
Less than 2 hrs	144 (94.1)	4 (2.6)	4 (2.6)	1 (0.7)	153 (100)	0.196
More than or equal to 2 hrs	117 (90.7)	8 (6.2)	1 (0.8)	3 (2.3)	129 (100)	
Total	261 (92.6)	12 (4.3)	5 (1.8)	4 (1.4)	282 (100)	

#Fisher's Exact test used. *Significance level is 0.05

DISCUSSION:-

Out of 282 children screened using LEST scale 92.6% had normal language development, 4.3% had questionable delay, 1.8% had suspect delay and 1.4% had total delay (prevalence of speech and language delay 7.5%). Avinash Singaiah et al showed that prevalence of the language delay was 16%[1]. Ganavi R et al showed prevalence of delay 6.6%, 18% questionable delay and 18% suspect delay[2]. Shiji K. Jacob showed 5.5% delay, 2.2% questionable delay in speech and language development[3]. Arunakumar Raju et al showed 6% prevalence of language delay in their study[4]. Santosh Venketrman Kondekar et al showed 13% prevalence of language delay[5]. Pradeep Debata et al showed 32% prevalence of language delay in their study[6]. Swapna K Pillai et al found 11% prevalence of language and speech delay in their study[7]. Dr Rajeswari & Dr Lavanya R showed 19% questionable delay, 6.5% suspect delay and 4.5% delay[8]. Abraham Binu et al found in their study 13.7% delay, 18% questionable delay and 15.7% suspect delay[9]. Ibekwe Matilda Uju et al showed prevalence of 15.3% in speech and language delay[10]. A Mishra showed prevalence of 5.9% for speech and language delay[11]. Nivedita Mondal et al showed prevalence of 27 % for language delay[12]. Shobhana S showed prevalence of 9.6% for language delay[13].

In this study there was significant association between birth weight and language delay, birth weight <2500 grams was associated with speech and language delay. Arunakumar Raju et al found No association between language delay and birth weight. 63(18%) children were low birth weight babies.[4] Shobhana S showed association of low birth weight with speech and language delay[13].

There was association of place of residence with speech and language delay. Prevalence of language delay was more seen in children residing in urban area. Nivedita Mondal et al found in their study that rural residence (OR=1.4) had association with poor speech and language delay but was not statistically significant.[12] A Mishra et al showed relation in LEST delay and place of residence as 10(83.3%) were urban dwellers and 2 (18.7%) were from rural background.[11] Arunakumar Raju et al found No association between language delay and place of residence. 238 (68%) children were from rural background and 112 (32%) were from urban area.[4]

There was no association of age, sex, family size, socioeconomic status, number of siblings, educational qualification of parents, working status of mother, gestational age at birth, birth order, mode of delivery, history of hospitalisation at birth, maternal age at the time of delivery, family history of language and speech delay, screen time exposure with speech and language delay in this study.

CONCLUSION:

Present study was carried out on 282 children visiting OPD. All children came with different systemic illnesses but not any caregiver complained about the speech or language delay. On all these 282 children screening test for speech and language delay was performed using LEST scale. Out of 282 children 92.5% had normal language development, 4.3% had questionable delay, 1.8% had suspect delay and 1.4% had total delay (prevalence of speech and language delay 7.5%).

The association between age of presentation among the participants gender ,socioeconomic status, ,family size ,number of siblings, education of parents, working status of mother, gestational age, birth order, mode of delivery, hospitalisation at birth, maternal age at the time of delivery ,family history of delayed speech and language delay, screen time exposure and speech and language delay was found statistically insignificant in this study .

In this study it was found that 72.6% children's birth weight was appropriate for gestational age and 27.3% children's birth weight was 2 kg (p value=0.000048).

There was association of place of residence with speech and language delay (p=0.003).

In all the participants with speech and language delay no one was found with hearing disability when assessed by BERA. In total 21 study participants with speech and language delay between the age group 0-3 years 4 participants had developmental delay when assessed with DASII scale.

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