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Original Research Article

Validation of language evaluation scale Trivandrum in children aged 3 -6 years attending well baby clinic in a tertiary care hospital

Avinash Singraiah[1]*, Pavan Hegde[1], Hazel D. Mendonsa[2]

[1]Department of Pediatrics, Father Muller Medical College Hospital, Mangalore, Karnataka, India
[2]Department of Speech and hearing, Father Muller Medical College Hospital, Mangalore, Karnataka, India

*Correspondence:
Dr. Avinash Singraiah,
E-mail: avinash.dhanu@gmail.com

ABSTRACT

Background: Delay in language development is often an early and most sensitive indicator of intellectual disability. Language delay should be detected in early stages for early intervention, so our study is to validate a simple screening tool to assess language and speech delay in a tertiary care setting. Present study was conducted to validate LEST to use in pediatric clinics to identify delay in language development among children of 3-6years, and to compare LEST and extended receptive expressive emergent scale (Extended REELS).

Methods: This was a cross sectional descriptive study done in children aged 3-6 years attending well baby clinic at a tertiary care hospital. Total sample size was 100. After the written informed consent, LEST was applied to all children initially and then extended REELS was administered in the department of speech and hearing.

Results: The prevalence of language and speech delay in the present study was 16%. When one item delay was taken as 'LEST delay' (test positive), the sensitivity and specificity of LEST was found to be 25% and 80% respectively with a negative predictive value of 85% and Likelihood ratio (LR - negative) of 0.9. When two item delay was taken as 'LEST delay, sensitivity and specificity, was found to be 44% and 99% respectively with a negative predictive value of 91% and LR (negative) of 0.5.

Conclusions: The 16% prevalence of language delay in the children indicates the need for an early identification and for it a simple screening tool like LEST is a must during the routine evaluation of young children in pediatric clinics.

Keywords: Extended REELS, Language delay, LEST, Validation

INTRODUCTION

Language is a means of communication in which thoughts and feelings are symbolized so as to convey meaning to others, and the development of which occurs in a very sequential fashion. Language is divided into 2 components, first the receptive language which means understanding and second the expressive language which means talking.[1] Children with any developmental abnormalities will first seek help from a pediatrician, so it would be necessary to involve a screening tool which helps in early identification of any type of developmental delay in them. Delay in language development is often an early and most sensitive indicator of intellectual disability, autism spectrum disorder or social communication disorder and specific learning disorders.[2]

Language delay should be detected at the earliest for early intervention. MKC Nair et al developed and validated LEST initially for 0-3years and it was used by, Mishra, Kondekar, Ganavi and accepted as one of the best screening tool for identifying language and speech delay in a community setting.[1,3-5]

Same authors developed and validated LEST for 3-6 years of age.[6] In this study we are going to validate LEST

for 3-6 years to use as a screening tool to assess language and speech delay in a tertiary care setting.

METHODS

This was a cross sectional descriptive study done in Children aged 3-6 years attending well baby clinic at a tertiary care hospital. Total sample size was 100. All children who satisfied the inclusion criteria (children aged between 3-6years attending well baby clinic) with proper consent from parents or primary care givers were included in the study. Exclusion criteria include those who were ill, uncooperative for testing, and those who had history of developmental delay. LEST developed by MKC Nair et al was used in the study.[6]

For the administration of LEST, children need not go through the all 33 items of the measure. To rate LEST, the chronological age of the child was assessed first. A vertical line was drawn by keeping a scale (or just kept the scale vertically) at the point corresponding chronological age in months given horizontally in the X axis. All items (which are shown in blocks) completed fully to the left side of the scale were expected to be done by the child. If not attained by the child for that age, that item delay was assumed for the child. Standard extended REELS were administered to all children in the department of Speech and hearing. Institutional ethics committee cleared the protocol. All the data were recorded in a predesigned data collection form. The data was checked for completion, consistency and accuracy. Data was analysed using SPSS software version 24.0.

RESULTS

A total of 100 children aged between 3-6years were included in the study. 16% children were noted to have speech and language delay. Among 16 children with language delay 11 were boys and 5 were girls. Language delay was predominantly seen in the age group of 4-5 years followed by 5-6years.

When one item delay was taken as 'LEST delay' (test positive), the sensitivity and specificity of LEST, was found to be 25% and 80%, respectively with a negative predictive value of 85% and LR (negative) of 0.9. When two item delay was taken as 'LEST delay' (test positive), the sensitivity and specificity of LEST, was found to be 44% and 99% respectively with a negative predictive value of 91% and LR (negative) of 0.5.

Table 1: Gender related variation in language delay.

	Normal	Delay	Total
Male	46	11	57
Female	38	5	43
Total	**84**	**16**	**100**

Table 2: Language delay in each age group.

Age group	Normal	Delay	Total
3-4years	23	1	24
4-5years	34	8	42
5-6years	27	7	34
Total	**84**	**16**	**100**

Table 3: LEST (3-6 years) against extended REELS (one item delay as 'LEST positive').

LEST	REELS positive	REELS negative	Total
Test positive (1 item delay)	4	17	21
Normal	12	67	79
Total	**16**	**84**	**100**

Table 4: LEST (3-6 years) against extended REELS (one item delay as 'LEST positive').

LEST	REELS positive	REELS negative	Total
Test positive (2 item delay)	7	1	8
Normal	9	83	92
Total	**16**	**84**	**100**

Table 5: Test characteristics with 2 different criteria.

Criteria for test positivity	1 item delay	2 item delay
Sensitivity (%)	25%	44%
Specificity (%)	80%	99%
Positive predictive value (%)	19%	88%
Negative predictive value (%)	85%	91%
Likelihood ratio positive	1.24	37
Likelihood ratio negative	0.9	0.5

DISCUSSION

Among various studies done on language and speech delay in 3-6 years, the prevalence was 4-15%.[7] The prevalence of language and speech delay in our study was 16%. Studies done by Nair et al who have developed the LEST scale among 3-6 years stated that the prevalence was 5%.[6] Binu et al noted that there was a prevalence of 13.75% speech delay among children attending routine clinics.[8] Dharmalingam reported the prevalence to be 9.5%.[9] The language delay was more in the boys compared to girls with the male:female ratio of 2.2:1 which was similar to the study done by Binu et al where they found that male:female ratio of 1.3:1. Similar to our study results Dharmalingam et al reported that children in 4 to 5 years were more affected followed by 5-6 years.[8,9]

After shifting the test positivity (tool positivity) from one item delay to two item delay (LEST positive), it was

noted that there was an increase of the sensitivity from 25% to 44% and test specificity showed an increase from 80% to 99%. For using LEST as a screening tool for delay in language, we selected two item delay as test positive accepting a lesser (out of the two options) sensitivity of 44% because of the relatively higher positive predictive value (PPV of 19% and 88%, respectively for one item delay and two item delay as the tool criteria positive) and lesser false positives in the screened sample. This option gives a very good Negative Predictive Value (NPV) of 91% also, which is desirable for a screening tool. The choice between one-item or two-item delay in LEST depends on the need in the community, whether to have a highly sensitive test with a very low PPV or to have a lesser sensitivity with a relatively higher and acceptable PPV. Unlike sensitivity and specificity, the PPV and NPV are more influenced by the prevalence of the disease. Also we got a LR positive of 37 with two- item delay as tool positive criteria.

Nair et al in their study concluded that one-item Language delay and two-item delay showed a sensitivity of 81% and 47%; specificity 68% and 94%: positive predictive value 12% and 31%; negative predictive value 98% and 97%; and accuracy 68.5% and 92%, respectively.[6] Changing the tool positivity from one-to-two item delay, resulted in decrease of sensitivity from 81% to 47% though specificity increased from 68% to 94%. Also suggested to consider delay in two item as test positive, because of the relatively higher positive predictive value and lesser false positives in the screened sample, with an excellent negative predictive value.

Study low sensitivity of 44% is acceptable since speech and language development is a continuous process without a definite line for normal/abnormal. We through this study suggest two item delay as test positive because of high specificity and having a higher positive predictive value, and a lower, but acceptable sensitivity.

CONCLUSION

That LEST (3-6 years) is a simple, reliable and valid Indian tool for identifying children of 3-6 years with language delay in the hospital setting with an acceptable sensitivity, specificity, positive predictive value and likelihood ratios. This is a simple tool which can be done without any expertise and can be completed in a short span of time. And hereby we recommend LEST a must during the routine evaluation of young children in pediatric clinics helping in early identification of children with delay in speech and language skills and enabling them to receive an early intervention.

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