# **Research Article**

DOI: http://dx.doi.org/10.18203/2349-3291.ijcp20161421

# Learning disabilities: detection and neurological assessment in school going children

#### Sachin Darne\*

Department of Paediatrics, Terna Medical College, Nerul, India

Received: 25 April 2016 Revised: 02 May 2016 Accepted: 05 May 2016

\*Correspondence: Dr Sachin Darne,

E-mail: sndarne@gmail.com

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#### **ABSTRACT**

**Background:** The aim of the study was diagnosis of learning disability with the help of various screening tools.

**Methods:** The study was done on 371 children from an English medium school from 3<sup>rd</sup> and 4<sup>th</sup> standard in the age group of 9 to 11 years. All the children were firstly evaluated on the basis of their school reports followed by various screening tools such as behavioral checklist for screening the learning disability (BCSLD), diagnostic test for learning disability (DTLD), quick neurological screening test (QNST) and intelligence test.

**Results:** It was found that out of total 371 children only 3 children were diagnosed to have learning disability, out which 2 had mild type and 1 had moderate type of learning disability.

**Conclusions:** After screening a study population of 371 children, 3 children were diagnosed to have learning disability. Of these 3 children, 2 were found to have mild type and 1 was found to have moderate type of learning disability. All these 3 learning disability children were otherwise found to be healthy and of normal intelligence without any sociocultural or economic disadvantage. All the 3 children had some soft neurological signs as tested by QNST thereby falling in the suspicious range of learning disability. Incidence of learning disability from this study was 0.82%.

**Keywords:** Learning disability, BCSLD, DTLD, QNST, Intelligence test

## INTRODUCTION

Learning is one of the primary activities of childhood which represents the developmental milestone of schoolgoing children. Learning can be considered as complex adaptive phenomena influenced by any or all of the biological, sociocultural and psychological factors. As per psychological literature, learning can also be defined as mental ability or a relationship between performance and repeated stimulation.

The process of learning is thus considered as complex and not fully understood. The pediatrician sees a child after long period of school failure. Among a large group of children who fail to learn at usual rate (children with learning disorder), there is a considerably small group of children where the failure of learning cannot be accounted for by reference to any explanations currently available. The term learning disability is applied to this small group. Learning disability is a group of disorders which can be related to the areas of language, reading, writing and arithmetic. The various types of learning disabilities are sometimes found to co-occur with each other. Learning disorder is often found associated with attention deficit, hyperactivity and sometimes impulsiveness. Learning disorder can occur with other medical conditions but the two should not be interlinked. Other medical and psychosocial problems have to be ruled out before

reaching the diagnosis of learning disability. Learning disability children who have difficulty with reading should also be ruled out for attention disorders. Therefore, all attention deficit hyperactivity disorder (ADHD) children should also be ruled out for learning disability.<sup>5</sup> Being otherwise intelligent, these learning disabled children still present with academic difficulties. Learning disabilities has become a matter of increasing awareness and concern in today's competitive environment. Persistent difficulties with abilities to read, write, or mathematical skills during school years will establish the diagnosis.<sup>6</sup> Although epidemiological studies in the past have shown boys and girls to be equally affected by learning disability, more recently studies have shown boys to be 1.5 times more likely prone to the disorder. Early identification of these deficits could help children cope up with their skills with proper intervention with the help of teachers who have expertise in this field. The amount of care these children would require will depend on how severe their disorder is. Each child needs to be treated differently depending on their weakness in a particular area. The objective should be to improve the overall quality of life.<sup>3</sup> Children with learning disabilities should also be screened for psychiatric comorbid conditions.<sup>7</sup> If these children remain untreated then this could lead to depression, low selfesteem and other psychiatric problems.<sup>8</sup>

The current study was done in 371 children from 3<sup>rd</sup> and 4<sup>th</sup> standard from an English medium school. In this study, screening and certain diagnostic tests helped in detection of learning disability in children.

#### **METHODS**

## Study population

A total of 371 school-going children of 3<sup>rd</sup> and 4<sup>th</sup> standard of an English medium school.

## Study design

The first step was to screen all the students to find out who were at high risk for learning disabilities. This was done by taking grand total of their performance in school and selecting only those students who were on the lower side of one standard deviation below the mean of grand total i.e. M-1 (SD).

All these selected students further underwent behavioural checklist for screening the learning disability (BCSLD). The checklist consisted of 30 items to be filled in by teachers. This test was provided to the class teachers of these students who were asked to fill the questionnaire on the basis of behaviour of child in the class. Children scoring >50% of total score i.e. >30 marks were further subjected to detailed clinical checkup including eye, ear and skin checkup. The clinical checkup was done to rule out any other medical conditions which could have affected the learning ability of children.

The next step was application of diagnostic test for learning disability (DTLD) to students who scored >50% of total score in BCSLD. The DTLD consisted of 10 subtests; eye-hand co-ordination, figure ground perception, figure constancy, position-in-space, spatial relations, auditory perception, memory, cognitive abilities, receptive language and expressive language. A deficit in any of the above sub-tests would lead to learning problem.

The students found to have learning disability on DTLD were further subjected to intelligence test. The intelligence test applied was Kamat's intelligence test which is a modified form of Stanford Binet's intelligence test standardised for Indian children. This test was done to find out average or above intelligence. The intelligence test was followed by quick neurological screening test (QNST).

## Study design scheme

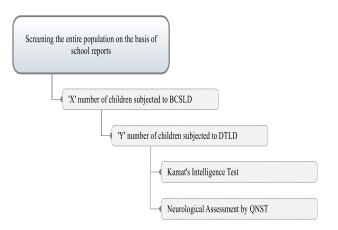


Figure 1: Study design scheme.

### Clinical proforma

- 1. Name of the child
- 2. Age/sex
- 3. Address
- 4. Religion/mother tongue
- 5. Standard/division
- 6. Grand total in school report
- 7. Analysis of school report [M-1 (SD)]
- 8. BCSLD test score
  - Clinical examination
    - a. Present history
    - b. Past history
    - c. Birth history
    - d. Family historye. Immunization history
    - f. Development history
    - g. Dietary history
    - h. General examination
    - i. Systemic examination
      - Respiratory
      - Cardiovascular

- Abdominal
- Central nervous system
- 10. Ear checkup
- 11. Eye checkup
- 12. Skin checkup
- 13. DTLD score
- 14. Intelligence report
- 15. QNST report

#### RESULTS

Total number of study population was 371 children evaluated from  $3^{rd}$  and  $4^{th}$  standard of an English medium school. Out of total 371 children, 170 were evaluated from  $3^{rd}$  standard and 201 were evaluated from  $4^{th}$  standard. The value for M-1(SD) for  $3^{rd}$  standard students was 455 and 21 children were found to have grand total less than 455. The value for M-1 (SD) for  $4^{th}$  standard students was 515 and 35 children were found to have

grand total less than 515. Total number of students from both the standards to be screened for learning disability was 21+35=56 students.

BCSLD was tested on these 56 students. Children who scored >50% of total score i.e. >30 marks numbered out to be 25. These 25 students who were suspected to have learning disability underwent clinical examination including eye, ear and skin checkup. Only one student was found to have conductive deafness and refractory error while the other 24 children were found to be normal. These 24 students were then subjected to DTLD. On the basis of scores in DTLD only 3 children were diagnosed to have learning disability; 2 with mild learning disability and 1 with severe learning disability. They were further subjected to intelligence test and neurological screening.

**Table 1: Study results.** 

	Student 1	Student 2	Student 3
Age and sex	10/M	9/M	11/M
Standard/division	3c	3a	4b
BCSLD score	45/60	30/60	50/60
Inference on BCSLD	Suspected learning disability	Suspected learning disability	Suspected learning disability
DTLD score	39/100	47/100	50/100
Inference on DTLD	Moderate	Mild	Mild
QNST score	29	26	32
Inference on QNST	Suspected learning disability	Suspected learning disability	Suspected learning disability
IQ test	95	101	118
Inference on IQ	Normal	Normal	Normal
Clinical Exam	No abnormality	No abnormality	No abnormality

All the 3 students scored above average intelligence quotient (IQ) and on QNST they scored in suspicious range of learning disability (Table 1).

### **DISCUSSION**

The age of these children varied from 9-11 years when it is best and accurate to diagnose learning disability. 6 The selected school had a student population of different caste and religions and of relatively upper or middle socioeconomic class which thereby excluded most of the sociocultural and economic disadvantages which the lower socioeconomic class students face thereby excluding children with learning disorders because of socioeconomic constraints. During analysis of school reports, the application of formula M-1 (SD) could hardly miss any learning disability child as it is hardly possible for them to have a grand total more than the average grand total for the respective standard. While applying BCSLD as per the manual, top 27% scores are at high risk for learning disability but in this study children with top 50% scores were subjected for further test thereby not

missing any child. One child was found to have conductive deafness and refractory error which was causing learning problem. This child was promptly excluded from further study. The DTLD confirmed the learning disability in 3 children who were otherwise normal and healthy with normal intelligence but had weaknesses in certain areas resulting in their disability to learn. All the three children differed in areas of weakness and strengths and also in various neurological signs tested by QNST. The incidence of learning disability in the school evaluated was 0.82%. In our study, it was observed that 2 children with mild learning disability had major weakness in the areas of auditory perception, cognitive abilities and expressive language while rest of the areas had average or above average abilities. The child with moderate learning disability had weakness in most areas having score around 5 or lesser, of which the weakest areas were of figure ground perception, position in space, spatial relation and expressive language. Higher scores were seen in figure constancy and receptive language, these being his stronger areas. On ONST all 3 children were found to have normal mental status except for some problems in reading in form of occasional

reversals, omissions writing in form of grammatical or spelling mistakes. They were found to be in the suspicious range of learning disability.

#### **CONCLUSION**

After screening a study population of 371 children, 3 children were diagnosed to have learning disability. Of these 3 children, 2 were found to have mild type and 1 was found to have moderate type of learning disability. All these 3 learning disability children were otherwise found to be healthy and of normal intelligence without any sociocultural or economic disadvantage. All the 3 children differed from each other in terms of their weaknesses and strengths in different areas of visual and auditory processing as well as memory and cognitive abilities. All the 3 children had some soft neurological signs as tested by QNST thereby falling in the suspicious range of learning disability. Incidence of learning disability from this study was 0.82%.

#### ACKNOWLEDGEMENTS

Author would like to thank Ms. Smriti Swarup from and Kamat Intelligence Test for their cooperation.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

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**Cite this article as:** Darne S. Learning disabilities: detection and neurological assessment in school going children. Int J Contemp Pediatr 2016;3:837-40.