

Original Research Article

Effect of remedial teaching on the scholastic performance of children with learning disability

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Received: 02 January 2020

Accepted: 08 January 2020

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ABSTRACT

Background: To assess the effectiveness of remedial teaching in children with learning disability and to find association between IQ score and age of the child with their improvement.

Methods: An interventional study using pre-post study design, took place in Child Development Centre (CDC) of tertiary care Medical College hospital. Participants includes 45 school going children of age group of 6-15 years. After initial diagnosis and IQ assessment, remedial teaching was given in CDC for 12 months. Techniques are chosen on an individual basis by formulating individualised education program (IEP) by special educators. Diagnosis and pre- post assessment were done using tool, NIMHANS SLD battery. Effectiveness was evaluated as improvement in class levels of students. Definite improvement was decided in each student if improvement was observed in 4 or more domains. Relationship of IQ score and age with their improvement in was noted.

Results: In pretest, poor results were found in attention and copying in 39 children, reading in 41, comprehension and spelling in 42, written expression in 43, and arithmetic in 44. In posttest, good results with statistical significance ($p < 0.05$) were found in attention in 33, copying in 27, reading in 24, arithmetic in 15, and spelling in 12 children. Definite improvement was noticed for 33% of students with significant association with age and not IQ score of the child.

Conclusions: This study shows that remedial teaching can bring about significant changes in academic skills namely attention, copying, reading, arithmetic, and spelling. 33% had definite improvement in 4 or more domains. The improvement in academic skills following remedial teaching was dependent on the child's age and not on IQ score.

Keywords: Intelligence quotient, Learning disability, Remedial teaching, Scholastic performance

INTRODUCTION

Learning is the acquisition of knowledge or skills through study, experience, or being taught.¹ Learning is a natural process. Humans are endowed with this superior ability and have instinct to be natural learners. As early as 19th century problems in thinking, speaking, listening, reading and writing were identified. In 1896, W. Pringle Morgan, a general practitioner in England, wrote in British Medical Journal about a 14-year-old boy Percy, quick at games and has intellect comparable to peers, but could

not read, which was the first published case.² The term learning disabilities which is now commonly used to represent them was coined by Samuel Kirk in 1963 who also gave the first specific definition of Learning Disability (LD).³ The term 'Learning Disability' (LD) is used synonymously with Specific Learning Disability and Specific Learning Disorder. Specific Learning Disorder is the term used by the fifth edition of Diagnostic and Statistical Manual of Mental Disorders (DSM-5) when a person has difficulties in at least one of the following areas i.e. reading, comprehension, spelling, written

expression, arithmetic and mathematical reasoning.⁴ The symptoms must have continued for at least six months despite targeted help. It is estimated that, in India, approximately 20 million school children has learning disability.⁵ The psychological and social difficulties that characterize learning-disabled children are often as problematic as the disability itself.⁶ Hence LD is complex problem and a multidisciplinary approach towards intervention is needed.⁷ There are many studies assessing prevalence of learning disability all over the world. There has been not much studies on how interventions can help the children especially in part of the country. Hence effectiveness of early intensive intervention is evaluated in this study.

METHODS

This is a longitudinal observational study conducted in the Child Development Center (CDC) of a tertiary care medical college hospital. It was done for a duration of 18 months from December 2017 to May 2019 among 45 school going children in the age group of 6-15 years. The study was started after getting clearance from the ethical committee. Sample collection was done from children who came to CDC.

Inclusion criteria

Children in the age group of 6 to 15 years with complaints of poor scholastic performance were included in the study.

Exclusion criteria

Children with any other significant development disorders were excluded from the study.

Diagnosis and initial assessment was done using the tool, NIMHANS specific learning disorder (SLD) battery and IQ was assessed using Malin’s Intelligence Scale for Indian Children.^{8,9} Remedial teaching was given in CDC

for a duration of 12 months. Duration of remedial teaching was decided by the special educator after assessment and individualized education program (IEP) was formulated. It was given as 45 minutes session, 2 to 3 session per week followed by 1 ½ hour group intervention and brain gym exercises once every week on Saturdays, which is as per the latest recommendation in India.¹⁰ Techniques are chosen on an individual basis by special educators who are B.Ed. in learning disability. Reassessment was done using NIMHANS SLD battery and effectiveness was evaluated as improvement in class levels of students. Definite improvement was decided in each student if improvement was observed in 4 or more domains after completion of 12 months intervention. The relationship of IQ score and age of children with their improvement was also noted.

Statistical analysis

Double data entry was done using excel sheet followed by quality check to ensure correctness. Descriptive statistics were used to summarize the proportions and means. The pre-and-post sample means were compared using Chi square test. A p value of <0.05 was considered as significant.

RESULTS

The study was conducted in 45 students who were diagnosed to have learning disability. The remedial teaching was conducted for a duration of 12 months. Among the 45 children, 36 were boys (80%) and 9 were girls (20%). 27 (60%) belonged to age group 6-10 years, and 18 (40%) belonged to age group 10-15 years. 30 (67%) belonged to lower primary classes, 9(20%) belonged to upper primary classes and 6 (13%) belonged to high school. 10 among them had history of developmental delay (22%), of which 4 had speech delay alone and 6 had both motor and speech delay, all within mild range. 30(67%) had average IQ (90-109) and 15 (33%) had low average IQ (80-89).¹¹

Table 1: Findings of pre and posttest with improvement in each domain.

Domains in NIMHANS SLD battery	Pre-test Good	Pre- test Poor	Post- test Good	Post- test Poor	Improvement (%)	p value and Significance
Attention	6	39	33	12	27(60)	<0.00001 Yes
Reading	4	41	24	21	20(44)	0.00001 Yes
Comprehension	3	42	9	36	6(13)	0.0628 No
Copying	6	39	27	18	21(47)	0.00001 Yes
Spelling	3	42	12	33	9(20)	0.0109 Yes
Written expression	2	43	6	39	4(9)	0.138 No
Arithmetic	1	44	15	30	14(31)	0.00011 Yes

At the beginning of the study the children were diagnosed as LD using NIMHANS SLD battery and IQ was

assessed using MISIC. The average duration of remedial teaching was 120 hours. i.e. 135 minutes per week per

student in one year and were then reassessed using NIMHANS SLD battery for improvement in specific domains. The major seven domains in the battery are attention, reading, comprehension, copying, spelling, written expression and arithmetic. The findings of pre and posttest with improvement in each domain were evaluated in detail (Table 1). It can be seen that among the 45 children, in pretest, poor results were found in attention and copying in 39 children, reading in 41, comprehension and spelling in 42, written expression in 43, and arithmetic in 44. In posttest, good results with statistical significance ($p < 0.05$) were found in attention in 33, copying in 27, reading in 24, arithmetic in 15, and spelling in 12 children. Good results without statistical significance were seen in comprehension 9 ($p = 0.06$), and written expression in 6 ($p = 0.138$). Maximum improvement was noted in attention which was 60% followed by copying 47%, reading 44%, arithmetic 31%, spelling 20%, comprehension 13% and least in written expression 9%. It can be seen that improvement was noted in all domains after intervention, but significant improvement was noted only in attention, reading, copying, spelling, and arithmetic.

On an individual basis improvement in each domain was again scrutinized. Children with improvement in more than or equal to 4 domains was considered to have definite improvement. It was found that 15(33%) among the 45 had definite improvement.

Table 2: Association between IQ score and definite improvement in performance.

IQ score	No. of children	≥ 4 domains	< 4 domains
80- 89 (Low Average)	15	3	12
90- 109 (Average)	30	12	18
>110 (Above average)	0	0	0
Total	45	15	30

p value = 0.179712, not significant.

The association between IQ score and age of children with definite improvement was assessed (Table 2). Among 45 students, 15 belonged to low average IQ group and among them only 3 had definite improvement. 30 among 45 students belonged to average IQ group and among them 12 had definite improvement. Though it appears that more students in average IQ group had definite improvement, it was not statistically significant as per chi square test ($p > 0.050$). Hence it was found that in children with LD, improvement in academic skills following remedial teaching was not dependent on their IQ scores. Among 45 students, 27 belonged to age group 6-10 years and among them 13 had definite improvement. 18 belonged to age group 11- 15 years and among them 2 had definite improvement. The association was statistically significant as per chi square test ($p < 0.050$)

hence proving that earlier the intervention better the results (Table 3).

Table 3: Association between age and definite improvement in performance.

Age (years)	No. of children	≥ 4 domains	< 4 domains
6-10	27	13	15
11- 15	18	2	15
Total	45	15	30

p value = 0.038 (< 0.05), significant

DISCUSSION

LD is not a single disability, but a general category of special education composed of disabilities in any one or a combination of seven skill domains.¹² This study was done to assess the effectiveness of remedial teaching, which was given for an average of 120 hours, in children diagnosed with learning disability. Results have shown that focused and individualized remedial teaching will bring improvement in academic performance in these children. The improvement was significant in attention, reading, copying, spelling and arithmetic. Maximum improvement was noted in attention, which may be due to one to one basis care given to children in a setting which was not a regular school environment. According to the study by Shahzadi Malhotra, G. Rajender et al, similar improvement in attention was also noted after cognitive retraining technique in children with LD in Delhi.¹³

Data wise 33% of children had definite improvement in 4 or more domains in NIMHANS SLD battery. This was correlated with IQ of children but was not found to be statistically significant. This was comparable with studies as early as 1989 and the study by Vellutino et al, stated that intelligence is not a strong predictor of reading achievement and does not predict responsiveness to remedial instruction.^{14,15} There was significant association between age of the child and definite improvement indicating that remedial teaching is maximum benefitted if LD is detected and intervention initiated at an early age. There is enough evidence in the literature to support this finding.¹²

Study showed that deriving an IEP depending on the child's individual strengths and weaknesses is crucial to improvement in scholastic performance. Parental motivation, awareness programs, positive reinforcement and tender loving care along with brain gym exercises were included in our program which might have brought the significant improvement. The correlation of these could not be assessed.

The cornerstone of the treatment of LD is thorough comprehensive evaluation and outcome based, multidisciplinary intervention. Screening of all children at the age of 7 years for LD in pediatric clinic will be highly beneficial.¹⁰

This study has shown that intensive intervention through special education can bring about changes in the academic skills of children with learning disability. It can be noted that significant number of students had improvement in attention, reading, copying, arithmetic and spelling with maximum improvement noted in attention (73%). Improvement was not noted in comprehension and written expression in significant number of students. It was also noted that 33% students had improvement in more than or equal to 4 domains. Improvement in these children was found to be dependent on their age but not on their IQ scores. Hence it is important to identify learning disability early, evaluate and give necessary remedial teaching as it can produce significant improvement in scholastic performance.

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: Vincent AC, Elenjickal MG, Sukumaran TU. Effect of remedial teaching on the scholastic performance of children with learning disability. Int J Contemp Pediatr 2020;7:487-90.