Original Research Article

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

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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. 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. 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). 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
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. The psychological and social difficulties that
characterize learning-disabled children are often as
problematic as the disability itself. Hence LD is complex
problem and a multidisciplinary approach towards
intervention is needed. 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. 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. 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).

| 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 MISC. 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).

**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.

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