

## **Effectiveness of reading strategies on reading difficulties among school children: a quasi-experimental study**

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### **Abstract**

**Background:** Early success in reading skills usually leads to later success in reading, while failing to read before the third or fourth year of schooling may be indicative of life-long reading problems. Learning disorders do not go away, but strategies to work around them can make them less of a problem.

**Aim:** To evaluate the effectiveness of reading strategies on reading difficulties among schoolchildren.

**Methods:** A quasi-experimental design was adopted. The study setting was a middle school in South India. Using purposive sampling, 60 school children identified with reading difficulty were selected for the study. A pre-test on the level of reading difficulties was assessed using a Modified DST-J assessment scale for all 60 children. Validated reading strategies for the experimental group were administered. A post-test was done on fourth week data collection. The data gathered were analyzed using descriptive and inferential statistical methods and interpretations were made based on the objectives of the study.

**Results:** During the pre-test, in the experimental group (n=30), seven (23.3%) had mild reading difficulty, 21 (70%) had moderate reading difficulty and two (6.7%) had severe reading difficulty. In the control group, 11 (36.7%) had mild reading difficulty, 16 (53.3%) had moderate reading difficulty and three (10%) had severe reading difficulty. During the post-test in the experimental group, one (3.3%) had no reading difficulty, 18 (76.7%) had mild reading difficulty, six (20%) had moderate reading difficulty and none (0%) had severe reading difficulty. The mean score on the level of reading difficulty in the experimental group was 23 in the pre-test and 20.13 in the post-test. The estimated paired t-test value was 10.6, which is significant at  $p < 0.05$ . In the control group, the mean score on level of reading difficulty was 22.6 in the pretest and 22.5 in the posttest. The estimated paired t-test value was 1.2, which is non-significant at  $p < 0.05$ .

**Conclusion:** This study concludes that the use of reading strategies was effective in reducing levels of reading difficulty. Future research should focus on using this intervention on a wider population.

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## INTRODUCTION

Early success in reading skills usually leads to later success in reading, while failing to read before the third or fourth year of schooling may be indicative of life-long reading problems. Thus, early detection is best made in early childhood or during the first year of school, where the gap that separates students at risk of reading failure and students that are likely to be successful readers is small. Early detection alone however will not improve literacy levels unless the student receives an appropriate early intervention before reading problems become entrenched [18]. Developmental dyslexia is characterized by an unexpected difficulty in reading in children and adults who otherwise possess the intelligence, motivation, and schooling considered necessary for accurate and fluent reading. Dyslexia (or specific reading disability) is the most common and the most carefully studied of all learning disabilities, and affects 80+% of all those identified as learning-disabled.

Dyslexia is perhaps the most common neurobehavioral disorder affecting children, with prevalence rates ranging from 5-10% to 17.5% [4, 5]. Previously, it was believed that dyslexia affected boys primarily; however, more recent data [7-9] indicates similar numbers of affected boys and girls. [32] Worldwide, about 10 million children have difficulties learning to read. 10-15% eventually drop out of high school and only 2% complete a four-year college program. Surveys of adolescents and young adults with criminal records show that about half have reading difficulties. Even people with a mild reading impairment do not read for fun. For them, reading requires so much effort that they have little energy left for understanding what they have just read [25]. Evaluation and testing by a trained professional can help identify a learning disorder. The next step is special education, which involves helping the child in the areas where he or she needs the most help. Sometimes tutors or speech and language therapists also work with the children.

A child with a learning difficulty experiences significant delays in one or more academic or developmental areas. Learning difficulties are often the result of an intellectual disability, physical and sensory disabilities, emotional difficulties, lack of educational opportunities, an illness or disruption to schooling, and/or inadequate environmental experiences, which may be overcome with early intervention. The problems may be wholly or partly due to factors such as sensory motor problems, handicap, temperamental traits or psychological problems associated with learning difficulties. Environmental factors such as a poor educational system, psychosocial stressors in the context of the family or the school, and the inherent nature of scripts in different languages also contribute to learning difficulties [26]. Learning disorders do not go away, but strategies to work around them can make them less of a problem. [2] Hence, this study was conducted to evaluate the effectiveness of reading strategies on reading disability among schoolchildren.

## METHODS

**Design:** The study utilizes a quasi-experimental, nonequivalent control group pre-test post-test design.

**Sampling and setting:** The study was conducted at a middle school in South India with 530 pupils. Of these, 287 students were aged 8-12 years. Purposive sampling was used and the sample size was 60 children, who have been identified as have reading difficulties. Among these, 30 samples were conveniently selected for the experimental group and 30 for the control group.

**Description of tool:** A structured questionnaire was used to collect demographic data. A modified Dyslexia Screening Test - Junior (DST-J) Scale was used to assess levels of reading difficulty. The tool consists of 10 items. The modified DST-J scores ranged from 0 to 40. Each item assessed the reading ability on a four point scale. The reliability of the tool was obtained by test-retest method.

The calculated value was  $r=0.90$ , which signifies that the tool is highly reliable<sup>[7, 11, 14]</sup>.

**Data collection:** Consent was obtained from the head of the institution and respective class teachers by approaching and explaining the purpose of the study. Help was solicited from the class teacher throughout study. The students were made to sit comfortably during the screening test and extra time was given to students who did not finish, which was noted. The experimental group were taught the reading strategies every day for one month. Then the post-test was done for both experimental and control group participants. The investigator established a rapport with the students and assured them that the information would be kept confidential.

**Data Analysis:** Frequency and percentage distribution was used to analyze the demographic variables and to assess levels of reading difficulty. Mean and standard deviation was used to assess the effectiveness of reading strategies on reading difficulty levels. An unpaired t-test was used to compare the post-test reading difficulty levels in the experimental and control groups. A paired t-test was used to compare the pre- and post-test reading difficulty levels in the experimental group. A chi-square test was used to find out the association of the post-test reading difficulty levels in the experimental and control groups with their selected demographic variables.

**Ethical considerations:** The proposed study was conducted after the approval of the institutional dissertation ethics committee. Formal permission was obtained from the middle school. We also obtained written consent from each subject (parents) before starting the data collection. Assurance was given to all participants regarding the confidentiality of the data collected.

## RESULTS

**Participant characteristics:** The demographic profile of the experimental group according to age is as follows: 4 (13.3%) were 8 years old, 8 (26.7%) were 9 years old, 9 (30%) were 10 years old and 9 (30%) were 11 years old. In the control group: 6 (20%) were 8 years old, 9 (30%) were 9 years old, 7 (23.3%) were 10 years old and 11 years old.

Distribution of the sample according to sex shows that in the experimental group, 16 (53.3%) were female and 14 (46.7%) were male. In the control group, 11 (36.7%) were female and 19 (63.3%) were male.

Distribution of the sample according to education shows that in the experimental group, 4 (13.3%) were students of standard 3, 8 (26.7%) were students of standard 4, 9 (30%) were students of standard 5 and 9 (30%) were students of standard 6. In the control group, 6 (20%) were students of standard 3, 9 (30%) were students of standard 4, 7 (23.3%) were students of standard 5 and 8 (26.7%) were students of standard 6.

Distribution of the sample according to number of siblings shows that in experimental group, 11 (36.7%) had one sibling, 15 (50%) had two sibling and 4 (13.3%) had more than two siblings. In the control group, 3 (10%) had one sibling, 17 (56.7%) had two siblings and 10 (33.3%) had more than two siblings.

Distribution of the sample according to birth order shows that in the experimental group, 11 (36.7%) were the first child, 14 (46.7%) were the second child and 5 (16.7%) were the third child. In the control group, 5 (16.6%) were the only child, 11 (36.7%) were the first child, 11 (36.7%) were the second child and 3 (10%) were the fourth child or above (Table 1).

**Table 1: Frequency and percentage distribution of sample according to demographic****Variables**

S. No.	Demographic Variables	Experimental Group (n=30)		Control Group (n=30)	
		f	%	F	%
1.	Age				
	a) 8years	4	13.3	6	20
	b) 9 years	8	26.7	9	30
	c) 10 years	9	30	7	23.3
	d) 11years	9	30	8	26.7
2.	Sex of the child				
	a) Male	14	46.7	19	63.3
	b) Female	20	53.3	21	36.7
3.	Educational status.				
	a) 3 <sup>rd</sup> std	4	13.3	6	20
	b) 4 <sup>th</sup> std	8	26.7	9	30
	c) 5 <sup>th</sup> std	9	30	7	23.3
	d) 6 <sup>th</sup> std	9	30	8	26.7
4.	Number of sibling				
	a) 1	11	36.7	3	10
	b) 2	15	50	17	56.7
	c) <2	4	13.3	10	33.3
5.	Birth Order				
	a) First	11	36.7	11	36.7
	b) Second	14	46.7	11	36.7
	c) Third	5	16.6	5	16.6
	d) Fourth or above	-	-	3	10
6.	Educational status of Father				
	a) Illiterate	1	3.3	2	6.7
	b) Primary	5	16.7	1	3.3
	c) High School	6	20	5	16.7
	d) Higher Secondary	11	36.7	11	36.7
	e) Graduate	7	23.3	11	36.7
7.	Educational status of Mother				
	a) Illiterate	1	3.3	1	3.3
	b) Primary	6	20	5	16.7
	c) High School	9	30	5	16.7
	d) Higher Secondary	11	36.7	9	30
	e) Graduate	3	10	10	33.3
8.	Primary Care Giver				
	a) Parents	21	70	12	40
	b) Grand Parents	9	30	15	50
	c) Guardian	-	-	3	10
	d) Others	-	-	-	-
9.	Type of family				
	a) Nuclear	20	66.7	19	63.3
	b) Joint	10	33.3	15	50
	c) Broken	-	-	6	20
10.	Residence				
	a) Rural	-	-	-	-
	b) Semi Rural	21	70	13	43.3
	c) Urban	-	-	-	-
	d) Semi Urban	9	30	17	56.7

**Result 1: Pre-test findings: Frequency and percentage distribution of sample according to reading difficulty levels in experimental and control groups before intervention**

During pre-test, in the experimental group, 7 (23.3%) had mild reading difficulty, 21 (70%) had moderate reading difficulty and 2 (6.7%) had severe reading difficulty. In the control group, 11 (36.7%) had mild reading difficulty, 16 (53.3%) had moderate reading difficulty and 3 (10%) had severe reading difficulty (Table 2).

**Result 2: Post-test findings: Distribution of sample according to reading difficulty levels after intervention**

During post-test, in the experimental group, 1 (3.3%) had no reading difficulty, 23 (76.7%) had mild reading difficulty, 6 (20%) had moderate reading difficulty and 0 (0%) had severe reading difficulty. In the control group, 11 (36.7%) had mild reading difficulty, 16 (53.3%) had moderate reading difficulty and 3 (10%) had severe reading difficulty (Table 3).

**Table 2: Distribution of sample according to reading difficulty levels before intervention**

S. No	Level of reading difficulty	Pre test			
		Experimental group n=30		Control group n=30	
		f	%	f	%
1.	Mild reading difficulty	7	23.3	11	36.7
2.	Moderate reading difficulty	21	70	16	53.3
3.	Severe reading difficulty	2	6.7	6	10

**Table 3: Frequency and percentage distribution of sample according to reading difficulty levels in experimental and control groups after intervention**

		Post test			
		Experimental group n=30		Control group n=30	
		F	%	f	%
1.	No reading difficulty	1	3.3	+-	-
2.	Mild reading difficulty	23	76.7	11	36.7
3.	Moderate reading difficulty	6	20	16	53.3
4.	Severe reading difficulty	-	-	3	10

**RESULTS 3:** The mean score on reading difficulty levels in the experimental group was 23 in pre-test and 20.13 in post-test. The estimated t-value was 10.6 which is significant at  $p < 0.05$ . It shows that reading strategies were effective in reducing reading difficulty levels

S. No	Group	Mean	SD	Mean difference	Df	t-value
1.	Experimental group					
	Pre test	23	1.85	2.87	29	10.6
Post test	20.13					
2.	Control group					
	Pre test	22.6	0.30	0.1	29	1.2
Post test	22.5					

**RESULTS 4: Comparison of post-test reading difficulty levels in experimental and control groups**

While comparing the post-test reading difficulty levels in the experimental and control groups, the mean score of reading difficulty in the experimental group was  $23 \pm 2.87$  and in the control group was  $22.6 \pm 0.1$ . The estimated t-value was 2.29\* which is significant at  $p < 0.05$ . It shows that reading strategies were effective in reducing reading difficulty levels (Table 4)

**Table 4: Mean, standard deviation and independent value on levels of reading difficulty in experimental and control groups after intervention**

S. No	Group	Mean	SD	Mean difference	Df	t-value
1.	Experimental group	20.13	10.6	2.37	58	2.29*
2.	Control group	22.5	1.2			

Table value  $t=2$ , \* Significant at  $p < 0.05$  level.

**RESULTS 5: Association between the post-test reading difficulty levels and their selected demographic variables in experimental and control groups**

There was no significant association ( $p < 0.05$ ) between the post-test level of reading difficulty among school children with their selected demographic variables in the experimental group and in the control group (Table 5).

**Table 5: Chi-square test on the post-test level of reading difficulty among school children with their selected demographic variables in experimental and control groups**

S. No	Demographic variables	Experimental Group (n=30)			Control Group (n=30)		
		df	$\chi^2$	Table Value	df	$\chi^2$	Table Value
1.	Age	9	3.36	16.92	9	13.50	16.92
2.	Sex	3	2.73	7.82	3	5.53	7.82
3.	Education	9	5.07	16.92	9	8.27	16.92
4.	Number of siblings	6	3.47	12.59	6	4.99	12.59
5.	Birth order	9	1.64	16.92	9	6.60	16.92
6.	Father's education	12	8.10	21.03	12	13.68	21.03
7.	Mother's education	12	6.47	21.03	12	2.68	21.03
8.	Primary care giver	9	0.57	16.92	9	4.15	16.92
9.	Type of family	6	2.54	12.59	6	5.86	12.59
10.	Residence	9	12.89	16.92	9	11.34	16.92

\*Significant at  $p < 0.05$  level

## DISCUSSION

Results revealed that reading difficulties were more common in boys than in girls [27]. The problem is partly developmental; girls mature more quickly than boys. They enter school with a good vocabulary and better fine motor skills, so it's easier for them to learn, read and write more efficiently than boys. Boys differed greatly in the presence of learning difficulties but also in exhibiting symptoms of learning disability from girls. The results of the current study did not show that boys had higher levels of reading difficulties than girls. No significant difference between girls and boys was found in terms of reading levels.

Research studies reveal that children with reading disorders have deficits in the area of phonological

awareness skills [28]. The results of the current study suggest that children with reading disorders have deficits in phonological processing compared to average readers. These components include non-word reading, phoneme detection and syllable identification. Findings in literature also suggest that the nature of the remedial intervention is critical to successful outcomes in children with reading difficulties and that the use of an evidence-based phonological reading intervention facilitates the development of those neural systems that underlie skilled reading. Assessment after intervention revealed that all 30 children in the phonological awareness intervention group showed improvement in their reading scores. They made fewer errors and were able to read passages that were closer to their age/class level. Many of the children displayed an ability to correct their own errors while

reading. In addition, if a word occurred more than once in a passage and the children made an error and corrected it the first time it appeared, they remembered to read it correctly thereafter. These behavioral changes were also reflected in the increase in their reading scores after the intervention compared with their pre-treatment reading scores and the scores of age-matched average readers. Improvement was also seen in phonological awareness abilities. There was no significant difference in children of class III and IV but children in class IV without reading difficulties had higher academic achievement than class III. As age advances, the children became more competitive and success oriented.

## CONCLUSION

From the results of the study, we conclude that most middle school children in India have unidentified reading difficulties. This may start on or after the age of seven and is more prevalent among schoolchildren over the age of 12. Interventions such as reading strategies seemed to be effective in reducing reading difficulties. It was also a cost effective intervention and can be done at any time. Further studies with larger sample sizes and different settings can be undertaken to endorse our research.

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