

Impact of intervention on children with learning disabilities

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Abstract: An interventional study was carried out on children with learning disabilities with children (ii) To administer an intervention module on identified sample. (iii) To assess the impact of intervention. A total of thirty seven children already identified with learning disabilities from the pre-primary schools of Rudrapur were studied. Planned intervention strategies were implemented on the weekly basis on each subject for three months regularly, after that post testing was conducted with the help of Behavioral checklist to evaluate the impact of intervention. Teachers and parents of these children were also interviewed periodically to assess the changes after intervention in children. Results revealed that dyslexia and dyscalculia were improved significantly ($P < 0.05$) after intervention. It was also observed that boys reflected significant ($P < 0.05$) improvement in learning disabilities after intervention. Results also revealed that children from nuclear families were improved significantly ($P < 0.05$) after intervention. Measures used by parents and teachers to help children were mainly convincing, scolding, consoling and referring specialists observed after intervention. Therefore from the results of the study it can be concluded that learning disabilities can be improved significantly with intensive early intervention.

Key words: Dyscalculia, dysgraphia, dyslexia, intervention, learning disability.

I. Introduction

The term “learning disability” describes a neurobiological disorder that affects people’s ability to interpret.

- What they see and hear or
- To link information from different parts of the brain.

These limitations can show up in many ways as specific difficulties with:

- Spoken language
- Written language
- Coordination
- Organization
- Socialization
- Self control and / or
- Attention

Such difficulties extend to school work and can impede learning to read or write or to do maths.

Learning Disabilities refers to a variety of disorders that affect the acquisition, retention, understanding, organization or use of verbal and / or non- verbal information.

A child, usually defined with learning problems in school even though he may be no less intelligent than his normal classmates, when he has difficulty in conquering one or more academic skill areas.

Learning disabilities are caused by difference in brain structure that is present at birth and is often hereditary. Learning disabilities can influence how someone learns to read, write, hear, speak and calculate.

Learning disability is a psychological and neurological condition that affects a person’s communicative capacities and potential to be taught effectively. The term includes such conditions as dysgraphia (writing disorder), dyslexia (reading disorder), dyscalculia (mathematics disorder).

People with learning disabilities may also have difficulties with organizational skills, social perception and social interactions.

“Learning Disabilities” refers to a number of disorders which may affect the acquisition, organization, retention, understanding or use of verbal or nonverbal information. These disorders affect learning in individuals who otherwise demonstrate at least average abilities essential for thinking and / or reasoning. As such, learning disabilities are distinct from global intellectual deficiency.

Learning disabilities range in severity and invariably interfere with the acquisition and use of one or more of following important skills.

- Oral language (e.g. listening, speaking, understanding)

- Reading (e.g. decoding, comprehension)
- Written language (e.g., spelling, written expression)
- Mathematics (e.g., computation, problem solving)

Learning disabilities are not the same as mental or physical disabilities, such as mental retardation, deafness, or blindness. But, learning disabilities may occur together with mental or physical disabilities. Individuals with learning disabilities require early identification and timely specialized assessments and interventions involving home, school, community and workplace settings. **Fuchs et al. (2008)** stated that responsiveness to intervention (RTI) is a method for both preventing and helping to identify learning disabilities. An important feature is its multi-tier structure: “primary intervention” refers to classroom instruction; “secondary intervention” usually involves more intensive pullout, small group instruction; and “tertiary intervention” typically denotes most intensive special education. The interventions need to be appropriate for each individual’s learning disability subtype and at a minimum, include the provision of:

- specific skill instruction;
- accommodation;
- compensatory strategies; and
- self advocacy skills;

There is no direct cure of learning disabilities; early screening and intervention can provide great benefits.

Interventions applied after a child has failed in reading for two or three years may not be effective for several reasons, including the student’s declining motivation and impaired self-concept.

Carlson (2005) stated that there is a vast difference between a learning difficulty and a learning disability; an individual with learning difficulty can learn using conventional teaching techniques while learning disability requires specialized interventions which depend on the type of disability.

Research attempting to identify effective treatment methods for different types and severity levels of reading deficits has been enormously difficult. This is because typical treatment studies have not been able to reliably determine whether the outcomes seen were attributable to the treatment method, the child’s general development, the child’s previous instruction, the concurrent instruction being provided in the regular classroom, or combinations of these factors. In addition, a majority of treatment studies have been hampered by not having central over teacher expertise and training. Thus, if a treatment method does not work effectively; one does not know if it is because of the characteristics of the method, the characteristics of the teacher, or the characteristics of the child. **Padakannaya and Venugopal (2003)** suggested that remedial teaching could be the most effective method to ameliorate the learning disability.

II. Methodology

The samples were selected purposively for the study. Rudrapur town, District Udham Singh Nagar was selected purposively for the study. Children were selected randomly for the study. Base line data was taken from the previous research which comprised of a sample size of 150 randomly selected boys and girls. A total of thirty seven children already identified with learning disabilities from the pre-primary school of Rudrapur were taken as the sample. 3 schools from Rudrapur town were selected randomly for the study i.e. Shri Guru Nanak Public School, Holy Child Public School and Richmond Public School. The planned intervention was implemented for three months regularly on children with intermediate evaluations. This study is descriptive in nature hence survey method was used to collect the data. Interview schedules were used to collect information. Schedules were used with great care to have minimum possible bias.

To begin with, different schools were visited, then behavioural checklist for screening the learning disabled was applied on the identified children with learning disability. After that the intervention modules were applied on the learning disabled children. This process was repeated weekly on these children regularly up to three months.

III. Tools And Techniques

The checklist used was ‘Behavioural checklist for screening the learning disabled’ developed by Dr. Smriti Swarup and Dr. Dharnishtha H. Mehta. A self prepared survey schedule was used for teachers and parents to collect the information regarding their child.

3.1 Intervention modules for children:

3.1.1 Visual discrimination:- This is the ability to differentiate objects based on their individual characteristics.

3.1.1.1 Activities to develop visual discrimination skills:

- Sorting :-** Show the different colors and shapes to the pupils and ask them to sort out a particular color and shape from the group.

ii. **Matching sequence:-** Show a sequence of colors, shapes and object to the pupils and tell them to arrange it in a given manner.

iii. **Letter change:-** Show the pupils some word and letter which looks similar but contains minute difference in itself.

3.1.2 Visual memory:- It is a part of memory preserving some characteristics of our senses pertaining to visual experience.

3.1.1.2 Activities to develop visual memory skills:

i. **Recall object features:-** Let the pupils look at an object and talk about its features. Then take the object away and ask them to recall some of its features.

ii. **Complete the shape:-** show the pupils a shape and then give them an incomplete drawing of the same shape. Ask the pupils to complete the shape from memory.

iii. **What's missing:-** show the pupils two similar pictures and ask them identify what is missing from one of the pictures.

iv. **Kim's game:-** place some everyday objects on a table. Show them to the pupils for about a minute, then cover them and see how many each can recall. This can also be played by taking one object away and asking the pupils to identify the object that is missing.

3.1.3 Line tracking:- Follow the lines without getting lost ! Do you end up at the right place ? Remember to use only your eyes, not your finger.

3.2 Areas of perception:

a) **Visual or Auditory discrimination:-** Visual discrimination is a visual perceptual skill and refers to the ability to differentiate one object from another. Auditory discrimination is the ability to recognize differences in phonemes (sounds). This includes the ability to identify words and sounds that are similar and those which are different.

b) **Visual or auditory closure:-** Visual closure is often considered to be a function of visual discrimination. This is the ability to identify or recognize a symbol or object when the entire object is not visible.

c) **Visual or auditory memory:-** Visual memory is a part of memory preserving some characteristics of our senses pertaining to visual experience. Auditory memory is the ability to store and recall information which was given verbally.

d) **Visual or auditory sequencing:-** Putting what is seen or heard in the right order. Auditory sequencing is the ability to remember or reconstruct the order of items in a list or the order of sounds in a word or syllable.

e) **Spatial perception:-** Laterality (above vs. below, between, inside vs. outside) and one's position in space.

IV. Result And Discussion

Table 1:- Percentage distribution of learning disabilities in children before and after intervention.

| Learning disabilities | Learning disabled children before intervention | | Learning disabled children after intervention | |
|-----------------------|--|------|---|------|
| | N | % | n | % |
| Dyslexia | 25 | 55.5 | 8 | 21.6 |
| Dysgraphia | 30 | 66.6 | 14 | 37.8 |
| Dyscalculia | 37 | 82.2 | 19 | 51.3 |

Calculated value of $X^2 = 0.859$ ($P < 0.05$)

It is clear from the table 4 and fig. 4.1 that before intervention dyslexia was exhibited by 55.5 percent children and it decreased up to 21.6 percent after intervention. Where as dysgraphia was faced by 66.6 percent children before intervention and it decreased up to 37.8 percent after intervention, likewise before intervention the percentage of dyscalculia was present in 82.2 percent children and it decreased to 51.3 percent after intervention. Similar results were also found by several other researchers as well indicating that intensive and systematic interventions help in reducing the problem to a great extent. Other researchers have also reported that mathematical disabilities are found in majority, learning disabilities in children follow by dysgraphia and then dyslexia.

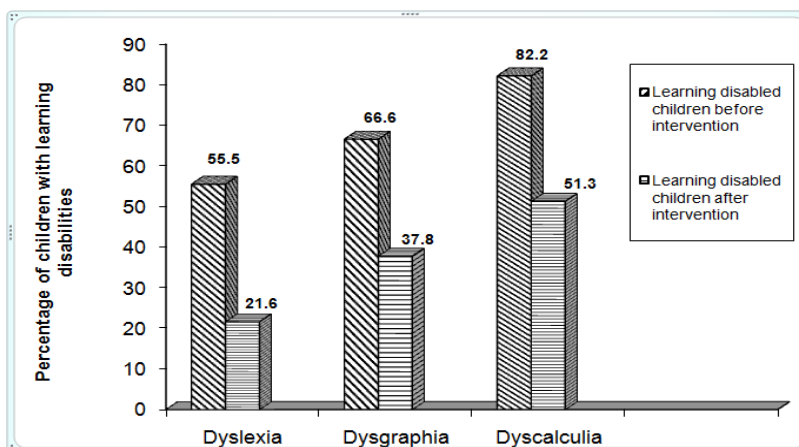
Torebeyns et.al. (2004) stated that mathematical disabilities are most prevalent learning disabilities among pre school children

Shalev et. al. (1997) reported that children with dyslexia and dyscalculia are more profoundly impaired in arithmetic than children with dyscalculia alone.

Light and Defries (1995) stated that more than 60% of students with learning disabilities possess significant disabilities in mathematics.

Lerner (1989) suggested that approximately 80% of children identified as having learning disabilities have their primary difficulties in learning to read.

The above tabular data shows that after intervention the highest rate of problem remained in dyscalculia (51.3%) followed by dysgraphia (37.8%) and the least was seen in dyslexia (21.6%).



The calculated value of X^2 in the above table is smaller than the table value of X^2 at 5% probability level and on 2 degree of freedom. Hence it is proved that the improvement shown in their disabilities after intervention is not significant which indicates that to reduce the problem to a significant level they require more intensified intervention.

Table 2:- Impact of intervention on learning disabilities of children.

| Learning disabilities | Total no. of learning disabled children (N=37) | | | |
|-----------------------|---|--|-----------------|--------|
| | No. of children With disabilities before intervention | No. of children with disabilities after intervention | Cal. value of Z | Result |
| Dyslexia | 25 | 8 | 1.963 | S |
| Dysgraphia | 30 | 14 | 0.102 | NS |
| Dyscalculia | 37 | 19 | 2.251 | S |

Note – Table value of Z = 1.96 (P<0.05)

S - Significant

NS – Non significant

Table 2 showed that in reference to children’s dyslexia and dyscalculia, intervention has reduced the problems significantly. Whereas in connection to dysgraphia the observed results show that intervention could not bring significant improvement in writing problem of children. Chaban (2000) stated that early intervention programs can be quite effective to reduce the learning disabilities in children.

Table 3:- Impact of intervention on learning disabilities of children in reference to their socioeconomic groups.

| Socioeconomic groups | No. of children with disabilities before intervention | No. of children with disabilities after intervention | Cal. Value Of Z | Result |
|----------------------|---|--|-----------------|--------|
| Lower | 13 | 1 | 1.558 | NS |
| Middle | 9 | 2 | 0.887 | NS |
| Upper | 15 | 1 | 1.844 | NS |

Note – Table value of Z = 1.96

S = Significant

NS =Non significant

It is evident from the table 3 that the calculated Z values for the lower, middle and upper socioeconomic groups were 1.558, 0.887 and 1.844 respectively which were lower than the table value that is 1.96 at 5% probability level indicating that children, in reference to their socioeconomic status have not shown significant impact of intervention on their learning problems. These results confirm the literature that bearings in family

histories are more significant than any other factor, it is also stated by **Banks (2003)** that learning disabilities are caused by a difference in brain structure that is present at birth and is often hereditary.

Table 4:- Impact of intervention on learning disabilities in boys and girls.

| Category of group | Total no. of learning disabled children (N=37) | | | |
|-------------------|---|--|-----------------|--------|
| | No. of children with disabilities before intervention | No. of children With disabilities after intervention | Cal. value of Z | Result |
| Boys | 26 | 2 | 4.74 | S |
| Girls | 11 | 2 | 1.166 | NS |

Note – table value of Z = 1.96 (P<0.05)

S- Significant

NS – Non significant

Table 4 indicates that the calculated value of Z is 4.77 which is greater than the table value of Z that is 1.96 at 5% probability level revealing that the boys showed significant effect of intervention on their learning problems. In the case of girls the calculated Z (1.156) is lower than the table value of Z (1.96) at 5% probability level indicating, unlike boys they did not show significant effect of intervention on their learning disabilities. **Aneja et. al. (1999)** have also pointed out that boys showed significant effect of intervention in the improvement of learning disabilities in comparison to the girls which could be attributed to the girls being more attention deficit along with learning disabilities than boys which has also been proved by **Joseph et. al. (2002)**.

Table 5:- Impact of intervention on learning disabilities in children based on their family type.

| Family type | Total no. of learning disabled children (N=37) | | | |
|-------------|---|--|-----------------|--------|
| | No. of children with disabilities before intervention | No. of children with disabilities after intervention | Cal. Value of Z | Result |
| Nuclear | 22 | 2 | 2.83 | S |
| Joint | 9 | 1 | 1.004 | NS |
| Extended | 6 | 1 | 0.614 | NS |

Note = Table value of Z = 1.96 (P<0.05)

S- Significant

NS – Non significant

It is evident from the table 5 that in relation to the children from the nuclear families that the calculated value of Z is 2.83 which is greater than the table value of Z that is 1.96 at 5% probability level hence it is concluded from the above tabular data that the children from nuclear families have been benefited significantly by the intervention.

Where as in the connection to the joint families the calculated value of Z is 1.004 which is lower than the table value of Z that is 1.96 at 5% probability level revealing that the children from the joint families have not shown significant effect of intervention on their learning disabilities. Similarly in the extended families the calculated value of Z is 0.614 which is below than the table value of Z that is 1.96 at 5% probability level showing that the children from extended families have also not been benefited significantly from the intervention. Nuclear families have been identified as being more supportive in reducing the problem because their children with problem get focused and undivided attention from the parents which is not possible with larger number of family members.

Table 6:- Impact of measures used by parents and teachers for handling learning disabilities of their children before and after intervention.

| Measures used by parents and teachers | Total no. of learning disabled children (N=37) | | | |
|---------------------------------------|---|--|-----------------|--------|
| | No. of children with disabilities before intervention | No. of children with disabilities after intervention | Cal. value of Z | Result |
| Convincing | 37 | 20 | 15.37 | S |
| Scolding | 37 | 35 | 2.23 | S |

| | | | | |
|---------------------------------------|----|----|-------|----|
| Frightening | 34 | 25 | 0.421 | NS |
| Consoling | 33 | 16 | 1.98 | S |
| Physical punishment | 30 | 22 | 0.328 | NS |
| Persuading | 26 | 22 | 0.292 | NS |
| Satisfying the child's demand | 18 | 18 | 0.634 | NS |
| Referring specialists /Doctors | 3 | 14 | 16.4 | S |

Note = Table value of Z = 1.96

S- Significant

NS – Non significant

As depicted from the table 6 that the calculated value of Z for convincing, scolding, consoling and referring specialists/doctors are 15.37, 2.23, 1.98 and 16.4 respectively which are greater than the table value of Z i.e. 1.96 at 5% probability level so it is observed from the table that there is a significant effect of all these methods to handle learning disabilities of their children. Whereas the Z calculated for frightening, physical punishment, persuading and satisfying the child's demand are 0.421, 0.328, 0.292 and 0.634 respectively which are less than the table value of Z i.e. 1.96 at 5% probability level hence it can be concluded that the intervention has strengthened the positive aspects of parenting in taking care of children with learning disabilities.

Table 7:- Percentage distribution of multiple learning disabilities in children before and after intervention.

| Multiple learning disabilities | Learning disabled children before intervention | | Learning disabled children after intervention | |
|--|--|-------|---|-------|
| | N | % | n | % |
| Dyslexia + Dysgraphia | 17 | 36.17 | 3 | 8.11 |
| Dyslexia + Dyscalculia | 21 | 44.68 | 5 | 13.51 |
| Dysgraphia + Dyscalculia | 20 | 42.55 | 8 | 21.62 |
| Dyslexia + Dysgraphia + Dyscalculia | 15 | 31.9 | 7 | 18.91 |

It is clear from the table 7 and fig. 4.8 that before intervention dyslexia and dysgraphia were exhibited by 36.17 percent children and it remained 8.11 percent after intervention. Whereas dyslexia and dyscalculia were faced by 44.68 percent children before intervention and it decreased up to 13.51 percent after intervention, likewise before intervention dysgraphia and dyscalculia were exhibited by 42.55 percent children before intervention and it decreased to 8.1 percent after intervention. In addition to dyslexia, dysgraphia and dyscalculia were faced by 31.9 percent children before intervention and it remained to 10.81 percent children after intervention.

V. Conclusion

From the results of the study it can be concluded that constant help and support in form of effective interventions in schools and at home can bring identifiable improvement in children with learning disabilities, outcomes of the study suggested that dyscalculia requires more intensive and longer attention than the other learning disabilities. Gender differences have been indicative of girls requiring greater attention than the boys. Results have also suggested that the changes in parental and school teachers approach can also be brought with consistent counseling which helps in bringing the wholesome improvement in the child's learning disabilities.

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