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Effect of activity based intervention programme on motor skills of primary school students with dyspraxia

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Abstract

Motor skills are the key factor for appropriate movements. So, the main objectives of the present study were to identify the students with dyspraxia and to study the effect of activity based intervention programme on the motor skills problems of the students with dyspraxia. The investigator designed an activity based intervention programme on motor skills and its impact was assessed with the help of 'Movement Assessment Battery for Children – 2 Checklist'. The performance of the students of experimental and control groups were compared before and after the implementation of activity based programme related to motor skills. Findings showed the positive effect of activity-based intervention programme on motor skills of primary school students with dyspraxia.

Keywords: Motor skills, dyspraxia, activity based intervention programme

Introduction

Over the last decade, education for children with special needs (CWSN) has gained an acceleration in the interest and provision that is continuing to emerge in schools in India. With a much greater awareness in schools of conditions like dyslexia, dyspraxia and autism, and the effects they have in the context of educational curriculum, schools are becoming a better place to help children access curriculum that takes account of the diverse needs of its learners. It is a great challenge on the part of teachers and educational specialists to deal with such children with disabilities through the use of innovative educational strategies (Reddy, 2011) ^[44]. Reading, writing and mathematics are not the only learning areas and skills affected by learning disabilities but other types of learning disabilities are also there like difficulties with motor skills (movement and coordination), understanding spoken language, distinguishing between sounds, and interpreting visual information etc.

Dyspraxia is a learning disability that causes difficulty with patterns of movement. It is also called motor learning disability. Dyspraxia mainly affects the movement and coordination of an individual. This learning disability does not change intelligence but it affects the learning ability of an individual. "The main problem here is that messages from the brain are not being reliably transmitted to the body" (The American Heritage Medical Dictionary, 2007). Dyspraxia has been recognized in the earlier 20th century. Since then dyspraxia has been described in different ways such as dyspraxia is a disorder of sensory integration, (Ayres, 1972). An impairment or immaturity of the organisation of movement is called as dyspraxia (The Dyspraxia Foundation, 2013) ^[56], Dyspraxia is a difficulty with planning movements (Cermak, 1991) ^[10] and children with dyspraxia are those who, in the absence of physical and/or neurological disorder, have difficulties in control and co-ordination of voluntary motor activity.

A motor skill is an intentional movement involving a motor or muscular component that must be learned and voluntarily produced to proficiently perform a goal-oriented task. Motor Learning is referred to the relatively permanent gains in motor skill capability associated with practice or experience (Schmidt & Lee, 2005). If we understand how movement skills are performed and learned, we are in better position to teach them (Henderson *et al.*, 2007) ^[21]. Motor skills are the skills and actions that involve the movement of muscles in the body. Hession (2014) ^[23], Kareem (2015) ^[27], Martin *et al.* (2016) and Pimenta *et al.* (2019) ^[47] conducted studies on children with dyspraxia and revealed that interventions resulted in significant gains in the behaviours and motor skills of the dyspraxic children.

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Nordqvist (2017) conducted a study on children with dyspraxia and found that dyspraxia did not affect intelligence but it may cause learning problems. Silva (2017) and Santos and Ferracioli (2020) conducted a study to identify the prevalence rate and specific areas of dyspraxia in children and found 14.3% and 11.6% of prevalence rate respectively. McHale and Cermak (1992) [34], Smith (1993) [52] and Gonzalez *et al.* (2019) conducted a study to measure gross motor, fine motor and language development in children and revealed that both gross and fine motor skills helped in fostering language development from infancy period to the early childhood period.

About 10% of people have some degree of dyspraxia, while approximately 2% have it severely. If the average classroom has 30 children, there is probably one child with dyspraxia in almost each classroom (Jones, 2005) [25]. In addition to motor difficulties; children with dyspraxia may experience low self-esteem, social isolation and poor academic achievement. Dyspraxia may also affect behaviour. Therefore, dyspraxia may affect any or all areas of development may be physical, intellectual, social, emotional, sensory and language as well as may impair the normal process of learning (Udoh and Okoro, 2013) [57]. While education is the key to a bright future for children with special educational needs, there are many barriers. The informal discussion with teachers and experts in the field convinced the investigator that such a study may become an eye-opener for the teachers to recognise the increasing need for special training programmes for the differently-abled students. Therefore, a modest attempt is made to study the problems, assessment and management of dyspraxia in regular classrooms and to seek the suggestions of the experts regarding the measures that can be adopted for improving the motor performance of students with Dyspraxia.

Objectives of the study

The objectives of the present study are:

- To identify the students with Dyspraxia at primary level.
- To study the effect of the activity-based intervention programme on motor skills of primary school students with dyspraxia.

Hypotheses of the study

To achieve the objectives of the study, following hypotheses were formulated:

1. There exists no significant differences among the motor skills of students with dyspraxia of experimental group and control group before the implementation of activity based intervention programme.
2. There exists no significant difference among the motor skills of students with dyspraxia of experimental group and control group after the implementation of activity based intervention programme.

Population and sample

- **Population:** This study was conducted in only one district of Punjab namely Nawanshahr. The population of the present study consisted of all the students of Grade III studying in CBSE affiliated English Medium Public Schools of Nawanshahr.
- **Sample:** In the present study, initially the random sampling technique was used to select the schools. At

the first stage, the investigator selected four CBSE affiliated English Medium Public Schools from Nawanshahr district randomly. Further, the purposive sampling method was used by the investigator to identify the Dyspraxic children.

Tools Used

Following tools were used to collect the data:

- Raven's Standard Progressive Matrices (SPM)
- Teacher's Referral Form developed by the researcher.
- MABC-2 (Movement Assessment Battery for Children-2) Checklist

Design of the study

In the present study, the pre-test post-test control group design was used.

Experimental Group	Measures	Control Group
Pre-Test	MABC-2 Checklist	Post-Test
Intervention	50 days Activity Based Intervention Programme on Motor Skills	No Treatment
Post-Test	MABC-2 Checklist	Post-Test

Following were the four operational stages in the study

1. Identification
2. Pre-Testing Stage
3. Intervention Stage
4. Post- Testing Stage

Stage I: Identification Stage

The purpose of Identification and Pre-Testing Stage was to identify the students with 'dyspraxia'. This stage included the following phases:

- **Phase I:** Screening the students having problems with motor skills on the basis of Teacher's Referral Form.
- **Phase II:** Assessing the level of Intelligence Quotient of referred students on the basis of Standard Progressive Matrices (SPM).
- **Phase III:** Identification of Dyspraxic Students

On the basis of above criteria of identification of dyspraxic students, the description of prevalence rate of dyspraxia among the primary school students is given in the following table 1:

Table 1: Prevalence Rate of Dyspraxia

Total No. of Students in Grade III	Students Referred by the Class Teacher	No. of Dyspraxic Students	Percentage of Dyspraxic Students
496	105	62	12.5

The result of this stage shows that the prevalence rate of dyspraxia among Grade III students is 12.5% which is above the rates of prevalence found in most of the related studies. Meachon (2018) [35] concluded that dyspraxia is a condition prevalent in approximately 10% of the main population of the United Kingdom. According to Gibbs *et al.* (2007) [19] dyspraxia is a hidden problem. The estimated prevalence rate is approximately 10%. Sayammagaru (2017) [49] concluded that this problem of dyspraxia affects about 6-10% of all children. The prevalence rate of dyspraxia is greater than 6-10% because many children with symptoms have never been officially diagnosed.

Stage II: Pre-Testing Stage

After identification of students with dyspraxia and formation of experimental and control groups, the next stage was to compare the motor skills performance of students of both the groups. It was compared on MABC-2 Checklist to find out whether there was any significant difference between the mean performances of both the groups. The scores of MABC-2 obtained during the identification phase were taken as pre-test scores.

The mean differentials (t-test) of experimental group and control group on MABC-2 Checklist were calculated before the implementation of the intervention programme. These values are shown in the following table:

Table 2: Significance of Difference between Mean Scores of Experimental Group and Control Group on MABC-2 Checklist (Pre-Testing)

Groups	N	Mean	S.D.	t-value
Experimental	30	58.3	10.4	1.29*
Control	30	55.13	8.46	

*Not Significant at 0.05 level

The table - 2 shows that the means of pre – test scores of experimental group and control group on Movement Assessment Battery for Children-2 Checklist are 58.3 and 55.13 respectively with standard deviations (SDs) 10.4 and 8.46 respectively. The calculated 't'-value is recorded as 1.29 that is much below the t- value at 0.05 level of significance. Hence, there exists no significant difference between the motor skills performances of both the groups on 'MABC-2 Checklist' before the implementation of the intervention programme. It means that whatever difference between their mean scores exists; they are only due to chance factor.

Stage III: Intervention Stage

After pre-testing stage, the investigators developed and implemented the 'Activity Based Intervention Programme' for improving motor skills of students with dyspraxia. The duration of the whole programme was 50 days. The experimental group was taught through this activity based intervention programme for Gross and Fine Motor Skills in dynamic environment. This programme comprised of different activities based on various remedial strategies. The duration of each activity was not fixed. Different instructional strategies and various kinds of study materials, sports materials as well as other daily routine materials were used during the sessions.

Stage IV: Post-testing Stage

After the completion of the intervention programme, the following tests were re-administered to the experimental group and control group to study the effectiveness of Activity Based Intervention Programme on motor Skills of the students with dyspraxia.

Section I: Comparison of Motor Skills of Experimental and Control Group on MABC-2 Checklist (Post-Testing): The post- test mean scores of the experimental group and control group were compared to find out the impact of treatment measure i.e. 'Activity Based Intervention Programme' on motor skills performance of students with dyspraxia.

Table 3: Significance of Difference between Mean Scores of Experimental Group and Control Group on MABC-2 Checklist (Post-Testing)

Group	N	Mean	S.D.	t-value
Experimental Group	30	33.07	4.87	11.61*
Control Group	30	53.23	8.16	

* Significant at 0.01 level

From the table-3, it is clear that mean and standard deviation for experimental group are found to be 33.07 and 4.87 respectively. Likewise, the mean and standard deviation for control group are found to be 53.23 and 8.16 respectively. 't'-ratio is calculated as 11.61 which is greater than the 't'-value at 0.01 level of significance. This shows that the obtained 't'- value is significant at both the levels of confidence. Therefore, it is clear from the results that mean scores of experimental group and control group differ significantly on Movement Assessment Battery for Children-2 Checklist after the implementation of the intervention programme. Also, the post- test mean score of experimental group on 'Movement Assessment Battery for Children-2' Checklist is low in comparison to post – test mean score of control group. It indicates that the students of experimental group have performed better after they were exposed to intervention programme.

Section II: Comparison of Motor Skills Performance of Experimental group on MABC-2 Checklist (Pre – Test and Post- Test)

After the experimental group was exposed to the intervention programme, the performance of the students of this group was compared to the pre – test i.e. tests taken before the implementation of the treatment measure and post – test i.e. tests taken after the execution of intervention programme. The results are analyzed by comparing the means and standard deviations of pre – test and post – test scores of the students of the experimental group on Movement Assessment Battery for Children-2 Checklist.

Table 4: Significance of Difference between Pre-Test and Post-Test Mean Scores of Experimental Group on MABC-2 Checklist

Experimental Group	N	Mean	S.D.	t-value
Pre-Test	30	58.3	10.49	11.95*
Post-Test	30	33.07	4.87	

Table 4 shows the mean differentials (t-test) of Pre- Test and Post – Test scores of experimental group on Movement Assessment Battery for Children-2 Checklist. The mean and standard deviation for pre – test scores of experimental group are found to be 58.3 and 10.49 respectively. Likewise, the mean and standard deviation for post – test scores of experimental group are found to be 33.07 and 4.87 respectively. 't'-ratio is calculated as 11.95 which is greater than the 't'- value at 0.01 level of significance. Therefore, it is clear from the results that mean scores of pre- test and post - test of experimental group differ significantly on Movement Assessment Battery for Children-2 Checklist. When the performance of students of experimental group was compared before and after the execution of Activity Based Intervention Programme in Motor Skills, the students showed improvement in the motor areas.

Conclusion

The findings of the present study show that the motor skills performance of the students of experimental group has improved. The reason may be that the activities planned for the Motor Skills were related to their day to day life experiences and the students were involved in the various physical activities, self-care, various class activities and recreational activities etc. during the intervention programme. Many studies support the results of the present study. Jackson (1999) ^[24] suggested that 'Sensory Stimulation Protocol' had an effect on the Motor Skills of the students with dyspraxia. He suggested the intervention focusing on the ability of the subjects by teaching strategies that facilitate the motor plans. Similarly, Revie and Larkin (1993) ^[45] did a study on children with poor motor coordination and administered Task – Specific Intervention on these children with poor motor skills. The experiment resulted in significant gain for all the groups. Also, in a study conducted by McGlashan *et al.* (2017) ^[33] on children of age group 8 to 10 years, the students in the intervention group showed improved manual dexterity on MABC-2 and children in the control group showed no improvement in the manual dexterity on MABC-2.

Motor skills problems are common. Dyspraxia was thought to be incurable but fortunately, early diagnosis, educational support and required treatment can help the affected individual overcome their motor skills problems. In a nutshell, it is evident from the results that activity based intervention programme has helped the students with dyspraxia in enhancing motor skills in the dynamic environment.

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