

Effect Of Pranayama Practices On Mathematics Achievement Of Children With Learning Disabilities

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Abstract

As per the Right of Children to Free and Compulsory Education (RTE) Act 2009 in India, education is the fundamental right of every child in the age group of 6 to 14 years. Students studying in the class come from different socio-economic backgrounds, and so, the learning styles of each student differ. That means diversity exists in the class. According to the guidelines of the government, both the disabled and non-disabled can learn together without any discrimination. According to the RPWD Act 2016, there are 21 types of disabilities. Specific learning disabilities are one of them. Learning disabilities are delayed development in language, speech, reading, writing, spelling, or mathematics due to brain dysfunction or behavioural or emotional disturbance. In India, 5 to 15% of the student population is learning disabled (Muthusamy and Sahu, 2020). A mathematics disability is a type of learning disability that affects the student's basic mathematics skills. Approximately 6 to 14% of school-age children have difficulty solving mathematical problems (Barbaresi, Katysic, Weaver, and Jacobsen, 2005).

My study tries to investigate the effect of pranayama practises on the mathematics achievement of children with learning disabilities. In the present study, fifteen students aged 10–13 years with learning disabilities were selected for the study, whose mathematics achievement is very poor and who don't have any idea about basic mathematics. A pre-test was taken to know the error pattern and current level of the students in the basic mathematics area. This post-test was administered to children with learning disabilities after they had completed six weeks of rigorous pranayama training. The correlated t-test results showed that the children who were taking pranayama training showed significant improvement in mathematics achievement.

Keyword: Learning Disabilities, Mathematics Achievement, Pranayama practices.

Introduction:

The term "learning disability" was first used by Dr. Samuel Kirk in 1963. The area of learning disability developed in America during the 1960s and 1970s. Learning disability is an umbrella term that consists of different types of disabilities. Learning disabilities are delayed development in language, speech, reading, writing, spelling, or mathematics due to brain dysfunction or behavioural or emotional disturbance. Children with a learning disability have communication problems. Learning disabilities are of different forms, such as oral

language disabilities, reading disabilities, writing disabilities, mathematics disabilities, and non-verbal disabilities. It is not easy to identify a learning disabled child in a general classroom, as they look like an average learner and have a general IQ. Boys' students are more affected by learning disabilities than girls' students. A large percentage of learning disabled students are studying in general classrooms, but they are not recognised and do not receive any specialised education. In India, 5 to 15% of the student population is learning disabled (Muthusamy and Sahu, 2020). Most learning disabled students have

problems with basic mathematics at the primary level; they have problems with basic operations, shape and size, time, and abstract concepts. Approximately 6 to 14% of school-age children face difficulty with mathematics (Barbatesi, Katysic, Weaver, and Jacobsen, 2005). Mathematics is a core subject for developing students' minds and helping them solve real-life problems. However, developing competency issues in mathematical problems starts in children's primary schools and can go beyond adulthood (Bojanin, 2002). If a student does not understand the basic concept of mathematics, they will have trouble in life, not take an interest in their learning, and easily drop out of school after some time. The school and teachers don't understand the actual problems of the students, which is the major cause of dropouts from schools. We have to understand the student's weaknesses and strengths and have to try to solve their problems by using the best methods, approaches, or techniques. Since learning disabled students have mental processing disorders and hyperactive behaviour, this affects the achievement.

Pranayama is a set of breathing exercises that help to concentrate and reduce mental fatigue. Pranayama is one method to improve the performance and achievement of students. A study shows that pranayama is a helpful way to improve the academic performance of students (Gupta, Singh, Pribesh, and Maira, 2014). Due to low academic achievement, students face problems in their home and community, and then they feel stressed every time. These things make their lives sad. The study has shown that pranayama has helped in managing stress in students (Milada, 1994). A peaceful and stress-less mind plays an important role in making academic achievement and joyful learning possible. Students with learning disabilities have a problem with hyperactivity. A hyperactive student cannot excel academically. Meditation and yogasanas are helpful to reduce the aggressive behaviour of the students (Province, 1998). When the aggressive behaviour and anxiety of students are reduced, then students automatically take an interest in their learning and, as a result, their achievement improves.

Need of the study:

A high percentage of students with learning disabilities at the primary level are facing problems in basic mathematics. 5 to 8% of school-aged children face problems with basic math concepts (Geary, 2004). Mathematics is a core subject for students and helps them with problem-solving. However, developing competency issues in mathematical problems starts in children's primary schools and can go beyond adulthood (Bojanin, 2002). In this regard, there is a need to understand the reasons for the problems of students in mathematics to improve their mathematical skills; if the problem is resolved at an early stage, then they can do better in mathematics and in life also. Students with learning disabilities have problems with mental processing, organising things, and understanding abstract concepts. From the different studies, it is found that yoga and pranayama are a way to reduce stress, enhance memory, and concentrate the mind. Pranayama is a set of breathing exercises that help physical as well as mental fitness. Pranayama is effective in improving physical and mental health (Anand, Awasthi, Patwardhan, and Singh, 2018).

Little research has been done in the field of learning disabilities related to pranayama. Through this study, an attempt is made to understand the effect of pranayama practises on the mathematics achievement of children with learning disabilities. I have tried to explore how the different pranayama practises are helpful for children with learning disabilities to improve their mathematics achievement.

Objective of the study:

- To develop pranayama practice regimen for children with learning disabilities.
- To study the problem in mathematics of children with learning disabilities.
- To study the effectiveness of pranayama practises on the mathematics achievement of children with learning disabilities.

Hypotheses of the study:

Null hypotheses (H_0): There is no significant difference between the mean score of pre-test

and post-test in the mathematics achievement of children with learning disabilities.

Methodology:

Research design of the study:

A research design is the systematic and logical plan for developing and designing the direction of the study. Research design is the blueprint for collecting the data, measuring the data, and analysing the data to provide a systematic plan and procedure to researchers for quality research. In the present study, a single group pretest and post-test design was used. The study is experimental in nature, and a quantitative approach was used to understand the effect of pranayama practises on the mathematics achievement of people with learning disabilities.

The single group pre-test and post-test design is a sort of quasi-experimental design in which the outcome of interest is measured twice: once before and once after a non-random set of participants is exposed to a specific treatment.

There are three major characteristics of single group pre-test and post-test design-

- Selection of the participants for the study was non-random.
- Lack of control groups to compare results.
- The effectiveness of the intervention is measured by comparing the measurements before and after the intervention.

Population of the study:

A collection of all well-defined distinct objects, events, things, or people is called a population. The population is an important component of the research study on which researchers are working. Present study, the population is defined as all the primary school students identified as learning disabled and studying in government schools in Harhua Block.

Sample of the study:

A sample is the subset of the population that is truly representative of the population.

The sample is taken from the government primary schools of the Harhua district. In the present study, fifteen students with learning disabilities in the age group 10–13 years facing problems in mathematics were selected, and a purposive sampling technique was used for selecting the sample from the population.

Tools used for study:

- Self developed knowledge based diagnostic test of basic mathematics.
- Self developed knowledge based achievement test of basic mathematics

Description of the tool:

The researcher discussed the development of the diagnostic and achievement tests for children with learning disabilities facing problems in mathematics with his supervisor, mathematics teacher, and experts in the field who were working in the field of learning disabilities. Researchers also study different books and research papers based on the research topic. The test is designed to measure the mathematics errors made by learning disabled students, and also the mathematics achievement of the students. The test is divided into four dimensions, namely place value; identification of operations; simple addition and addition with carry forward; simple subtraction; and subtraction with borrow. Content and face validity were done by experts in the field who are working in the fields of mathematics and learning disabilities. The test is changed by the researcher after the recommendation of the expert. Both the pre-test and post-test have twelve questions with twenty marks. Reliability of the test is also done by the test re-test method.

Preparation of Pranayama Module:

Pranayama means 'an exercise which is to be performed if you want to extend your life. It is a set of breathing exercises that help to concentrate the mind, reduce anxiety and mental fatigue. There are many types of pranayama, but only four were studied in my study: Bhastrika, Anulom-Vilom, Bhramari, and Udgeet. Given 40 minutes/day from 10:00 am to 10:35 am with the help of an expert in yoga. Providing 1 minute rest for

each exercise and pranayama. This schedule prepared by the help of yoga expert.

Table1: Pranayama schedule

S.No.	Practices/Exercise	Duration(minute)	No. of repetition
1.	Warup exercise/activity (standing running, cardio exercise, top to bottom rotational exercise, sukshma exercise, normal aashan)	8	
2.	Surya Namaskar		5-8
3.	Bhastrika Pranayama	5	
4.	Anulom-Vilom Pranayama	5	
5.	Bhramari Pranayama	5	
6.	Udgeet Pranayama	5	
7.	Savasana/Yog Nidra	3	

Statistical technique:

The data obtained by conducting pre-test and post-test and data analyses by using appropriate statistical techniques. In this study investigator used descriptive and inferential techniques was used such as mean, standard deviation and correlated “t” test for analyzing the data. Correlated “t” test is used to compare the single group mean scores of students before and after the treatment to know the effectiveness of the pranayama.

Analysis and Interpretation:

The analysis and interpretation of the data obtained from the research is an important

part of the study. On the basis of this research, he makes a conclusion about his study. At first, the pre-test was conducted on the selected group. The pre-test was conducted to learn about the current level and problems faced by children with learning disabilities in mathematics. The mean and the standard deviation were calculated for the pre-test score and also the post-test score, measured after six weeks of rigorous pranayama training. The mean and the standard deviation were calculated and it was compared with the pre-test score in the comparison table given below.

Table 2: t-test analysis

	Pre test	Post test
Mean	6.9	10

Standard deviation(SD)	2.02	1.49
Number of sample(N)	15	15
Degree of freedom(df)	14	
t value at 5% level of significance	2.14	
Calculated value of t	4.72	

From the above table, it can be observed that the mean score of the pre-test is 6.9 and the mean score of the post-test is 10, while the standard deviation of the pre-test is 2.02 and the standard deviation of the post-test is 1.49. From the table, it is clear that the mean score of the post-test is greater than the mean score of the pre-test. This shows that an improvement occurs after the treatment. The standard score of the post-test is less than the standard score of the pre-test. This shows that the spread of scores is reduced after the treatment. Also, from the table, the calculated value of "t" is 4.72, and the table value of "t" at 5% level of significance with 14 degrees of freedom is 2.14. The calculated value of "t" is greater than the tabulated value of "t" at a 5% level of significance. Thus, the null hypothesis is rejected. That means there is a significant difference between the mean score of the pre-test and post-test of learning disabled students in mathematics. That means pranayama practises play a significant role in improving the mathematics achievement of children with learning disabilities.

Finding of the study:

The students in the study were aged 10–13 years, learning disabled, and having difficulties with mathematics. In the pre-test, most of the students do not have knowledge about place value, addition with carry forward, and subtraction with borrow. Students from the group were taking regular pranayama practises and showed an interest in learning. After six weeks of pranayama practices, a post test was conducted. A post-test result showed that most of the students were able to understand place value; addition with carry forward, and subtraction with

borrow. Also, from the "t" statistics, the results showed a significant improvement after the pranayama training among children with learning disabilities. That means the mathematics achievement of the children with learning disabilities improved after the pranayama training of six weeks. From the different studies, it is also clear that the pranayama practises improve the achievement of children with special needs.

Kumar, Panday and Vaksh (2016) conducted study on effect of pranayama on academic performance of school student, found that after 6 month of pranayama training the achievement of the students are increased. Such studies have been done in the past, which show that pranayama helps in increasing the achievement of students. And hence in my study, pranayama practices are also improve the mathematics achievement of children with learning disabilities.

Conclusion:

It is clear that during the COVID-19 crisis, a global lockdown was imposed on classes, but for children, long periods of time spent on mobile are not possible, so most students are anxious and do not take an interest in learning. Pranayama is a powerful tool for reducing anxiety, concentrating the mind, and for mental well-being. It also helps to improve interest among children. Children with learning disabilities face problems in concentration, attention, and low achievement. Pranayama can help these kinds of children. The present study was conducted to determine the effect of pranayama practises on the achievement of children with learning disabilities. The result of the study showed that most of the students

with learning disabilities improved their mathematics achievement after the six-week training of pranayama.

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