RESEARCH PAPER

Effects of Brain Gym Exercise versus Dual-Task Training Along With Aerobics on Working Memory among Dyslexic School Students

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ABSTRACT

Background

Learning disability is an important concern in young school aged children. Prevalence rate in India is also quite alarming. Bungawali Abduh (2018) has said that the brain gym exercise has improving the working memory among students with learning disabilities.

Aim: The aim of the study was to compare the effects of brain gym exercise versus dual- task training along with aerobics on working memory among dyslexic students.

Objectives

The main objectives of the study were as follows:

- To evaluate the effect of brain gym exercise with aerobics on working memory among dyslexic students.
- To evaluate the effect of dual-task training with aerobics on working memory among dyslexic students.
- To compare the effect of brain gym exercise versus dual-task training along with aerobics on working memory among dyslexic students.

Methodology: 30 participants were recruited for the study and divided into group- A (brain gym exercise and aerobics) & Group-B (dual-task training and aerobics) for a duration of 4 weeks. The outcomes were measured using digit span memory tests.

Result: The pre and post- test values of digit span test showed a significant improvement in working memory in in Group-A.

Conclusion: Brain gym exercise with aerobics was more effective than the dual- task training with aerobics among dyslexic students.

Keywords: Dyslexia, working memory, brain-gym exercise, dual task training, digit span test

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INTRODUCTION

Healthy and sharp mind is the origin of the happy life[1]. The neurological learning disorder is called dyslexia. [2]Dyslexia is a specific learning disorder that is neurological in nature. It is characterized by the difficulties in reading, writing and spelling due to compromised phonological awareness and phonological processing skills[3].

Learning Disability

A study from the south India (Ramma,Gowramma- 2002) has reported the incidence of dyslexia is to range between 5-60% in the primary school children. several factors lead to poor academic performance, including but not limited to the community around them, their friends, their school, psychological disorders, and family problems[7].

The Working Memory

In 1974 Baddley and hitch proposed a model of working memory that becomes and alternative to various models of memory storage. The learning disability is commonly associated with the weak working memory function of a student that impacts his or her performance in school[6]. In the typical classroom, high demands on working memory are unrelenting, and even learners with typical working memory capacity often lose information from working memory before they can complete a thought or commit new information to long term memory[4].The working memory is often investigated by the performance on digit span test(WSIC- III)[6]

Brain Gym Exercise

The brain gym is a sequences of 26 exercise that are thought to improve the academic and Behavioural performance by engaging the both hemispheres of the brain (JOHN and ANN,2014)[10] It helps to improve academics, coordination, organization and attitude. It is based on

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principle of training the person through movements[11] Brain Gym is a set of exercises designed to improve and strengthen cognitive function for learning, to link the body and the mind, and to stimulate the usage of the brain's hemispheres through physical and mental tactics[12].

Dual-Task Training

Dual-task training is a training in which two or more tasks are performed at the same time continuously, However, dual task training allows co-ordination of the various tasks, as one can perform more than two tasks at the same time. [13]The cognitive dual task and the motor dual task training plays an important role in our daily life. Walking while talking, using a mobile phones etc. dual task inteference also create impacting gait performance and balance has observed not only in normal or healthy subjects but also in subjects with neurological disorders like stroke, parkinson's disease etc[14]…

Aim of The Study

The aim of the study was to assess the effect of brain gym exercise versus the dual-task training along with aerobics on improving the working memory among dyslexic students.

OBJECTIVES OF THE STUDY

The main objectives of the study are as follows:

- To evaluate the effect of brain gym exercise with aerobics on working memory among dyslexic students.
- To evaluate the effect of dual-task training with aerobics on working memory among dyslexic students.
- To compare the effects of brain gym exercise versus dual-task training along with aerobics on working memory among dyslexic students.

RESEARCH DESIGN AND METHODOLOGY

An experimental study design was conducted with 30 dylexic candidates within the age group ranging between 7 and 12 years who fulfilled the inclusion and exclusion criteria.

Inclusion Criteria

- Primary school children suffering from dyslexia.
- Age between 7 to 12 years and their parents agreed to participate in the current study.
- Both gender were included in this study.

Exclusion Criteria

- Children with other developmental disorders have not included.
- Subjects who had a gnetic or chronic disease or syndrome, having a disease of the musculoskeletal system not being suitable.
- Unwilling to participate in this study were excluded.

Outcome Measures

- Digit span test

Procedure:

Sample selection was done based on the inclusion and exclusion criteria. Consent form was received from the subjects in written format. Study consists of 30 subjects ranging within the age group between 7-12years. They were divided into 2 groups, namely Group A and B.

Group- A: Experimental group- 15 SUBJECTS

Group- B: Control group -15 SUBJECTS

INTERVENTION

Group-A (Brain Gym Exercise and Aerobics)

- 3 sessions per week on alternate days were given (4 weeks×3 days=12 sessions).
- Duration of each session was 45 minutes.
- Brain gym exercise was given for 30 min (each exercise- 3 min)
- Warm up (5min) was given which included major stretches & active movements which were followed by exercise protocol.
- Cool down (5min) was given in between the exercise.
- Rest- 5mins
- Aerobic training – normal brisk walking was given for 30 min per day in alternative days

Group-B Dual-Task Training and Aerobics)

- 3 sessions per week on alternate days were given (4 weeks×3 days=12 sessions).
- Duration of each session was 45 minutes.
- Dual task training was given for 30 min (each exercise-3 mins)
- Warm up(5min) was given which included major stretches & active movements which were followed by exercise protocol .
- Cool down(5min) was given in between the exercise.
- Rest- 5mins
- Aerobic training – normal brisk walking was given for 30 min per day in alternative days

EXERCISE PROTOCOL

Group-A: Brain Gym Exercise with Aerobics

S.NO	BRAIN GYM EXERCISE AND AEROBICS
1.	Brain buttons
2.	Space buttons
3.	Earth button
4.	Thinking cape
5.	Cross crawl
6.	Hook up
7.	Lazy eight
8.	Double doodle
9.	Sits ups and cross crawls
	Neck rolls
10.	
11.	Aerobic training – normal brisk walking

Group-B: Dual-Task Training With Aerobics:

S.NO	DUAL-TASK TRAINING WITH AEROBICS
1.	Walking and pick up the object from a toy bag. Walking and repeating the numbers.
2.	Walking and naming each object with their colors. Reading the colors and changing the directions. Hopping and picking up the objects from the floor.
3.	Cycling and holding the object.
4.	Walking in a narrow span and counting the numbers in backward by three. walking and carrying a plate with the glass on the top.
5.	Spot marching and executing 7 serial subractions.
6.	
7.	Sitting and drawing letter of the alphabet with foot and naming the words starting with the same letters.
8.	
9.	
10.	
11.	Aerobic training – normal brisk walking

STATISTICAL ANALYSIS:

Data Analysis and Interpretation:

GROUP A: (Brain Gym Exercise And Aerobics)

Table 1- Pre test and Post test values

GROUP- A	MEAN		STANDARD DEIATION		T- VALUE	P- VALUE
Digit span test	PRE- TEST	POST- TEST	PRE - TEST	POST- TEST		<0.0001
	8.4	12.73	1.49	01.28	8.5347	

GROUP B: (Dual-Task Training With Aerobics)

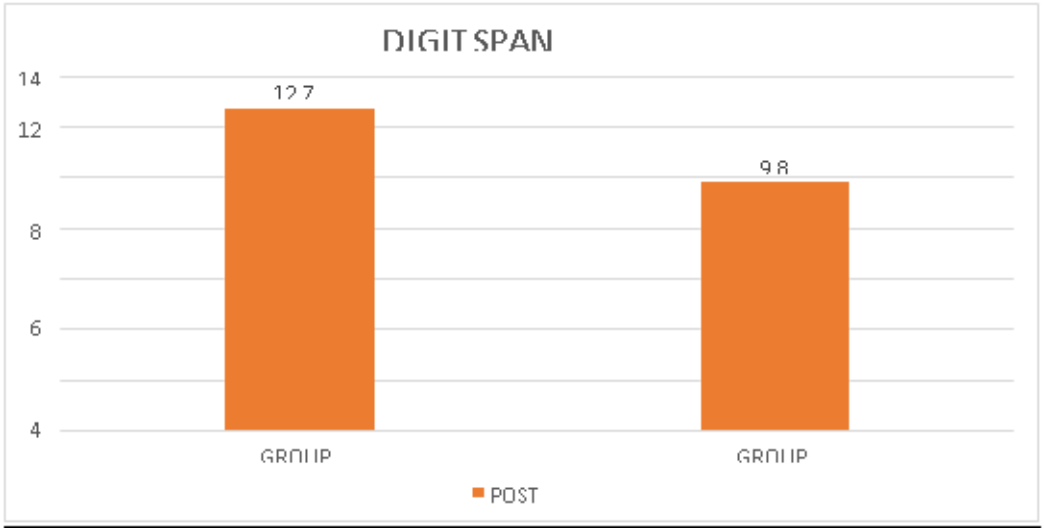
Table 2- Pre test and Post test values

GROUP- B	MEAN		STANDARD DEIATION		T- VALUE	P- VALUE
Digit span test	PRE- TEST	POST- TEST	PRE- TEST	POST- TEST	10.5830	
	7.13	9.80	1.51	0.39		<0.0001

Group A & B:

Table 3 – Comparison of Mean values of group A & B for digit span test:

Digit span test	MEAN VALUES POST- TEST	T-VALUE	P-VALUE
GROUP-A	12.73	8.5347	<0.0001
GROUP-B	9.8	10.5830	<0.0001



GRAPH:Comparision of post-test values of digit span test of group A(brain gym exercise and aerobics) and Group-B(Dual-Task training with aerobics)

RESULT

The statistical values of the respective groups - group A (brain gym exercise with aerobics) and the group B (Dual-task training with aerobics) for working memory are as follows: T value – 8.5347, the P value < 0.001 and T value – 10.5830, P value < 0.001 respectively. Hence this study result showed statistical improvement in working memory in both group A and group B, but there was a significant greater improvement in the group A (Brain gym exercise with aerobics) than group B.

DISCUSSION

The purpose of the study was to compare the effects of brain gym exercise versus dual task training along with aerobics on working memory among dyslexic students. In this 30-students were selected from 7- 14 years were divided into 2 groups. GROUP -A (Brain Gym with aerobics) and GROUP-B(Dual task training with aerobics). The assessments were taken for the dyslexic students and the brain gym exercises and dual task training were given for the individuals along with aerobics for 4 weeks and the result were measured using the DIGIT SPAN MEMORY TEST. The data collected was statistically analyzed by Unpaired t-test. After that, the pre-test measures of the Digit span test was evaluated and recorded as post-test values after 4 weeks of training. With an Average mean Difference of 4.33, t value of 8.5347 and a p value of 0.001 in brain gym exercise with aerobics group and in Dual task training with aerobics with an Average mean Difference of 2.5, t value of 10.5 and a p value of 0.0001, the post-test values of the Experimental Group A and B were significant, according to our findings. Despite the fact that both groups improved statistically considerably, it was discovered that the Experimental Group-A(brain gym exercise with aerobics) improved Working memory more than the Experimental Group-B(Dual task training with aerobics) alone among Dyslexic students.

CONCLUSION

The study concluded that group A (brain gym exercise with aerobics) was more effective than group-B (dual task training with aerobics) in improving the working memory.

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