

Effects of Structured Physical Activity Training on Working Memory among School Students

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Abstract: ***Background:** A healthy memory is important for child's development. Working Memory plays a major role in establishing a solid base for learning, both in school and beyond. It is an early process of brain function that is crucial for the learning. but in some cases, the working memory is significantly below average for their age, it may be due to current or pass stress. There are some other articles published regarding the increasing the working memory, in that structured physical activity stands prominence. **Aim:** The aim of the study was to assess the effect of Structured physical activity on working memory among school students. **Objectives:** The main objectives of the study are as follows: 1) To evaluate the effect of Structured physical activity on improving working memory among school students. 2) To evaluate the effect of the relaxed indoor physical activity on improving working memory among school students. **Methodology:** 30 participants were recruited in the study and divided into group-A (structured physical activity) & Group-B control group (indoor physical activity) with the 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 that improvement in working memory in both groups. but the significant improvement was seen in Group-A. **Conclusion:** This study concluded that both groups showed significant improvement but the structured physical activity is the most effective in improving the Working memory among school students.*

Keywords: structured physical activity, working memory cognition, aerobics, digit span test, school students

1. Introduction

- A healthy memory is important for child's development. Working Memory plays a major role in establishing a solid base for learning, both in school and beyond.
- It is an early process of brain function that is crucial for the learning. It provides temporary storage of information necessary for a more complex learning activity (**Baddley-1974**). working memory could play different roles in the relationship between divergent thinking and academic achievement, the positive relationship between divergent thinking and academic achievement for students¹ but in some cases the working memory is significantly below average for their age, it may be due to current or pass stress²
- In 1974 **Baddley** and hitch proposed a model of working memory that becomes and alternative to various models of memory storage.
- The main component of **Baddley's** working memory model that is led by the way of means of government functions, the executive function is the most important component which plays a role in synthesizing received information. Episodic buffer responsible for recalling information, integrating and manipulating materials depending on the executive process. The phonological loop is the part of that shops a restricted quantity of speech sounds for a brief-period. The visual and the spatial pads stores non- verbal visual and spatial information like objects and numbers³.
- Structures physical activity is an intervention in which participants were engaged in planned, individualized, supervised exercise programs⁴. This study aimed to identify the effect of Structured physical activity in improving working memory skill among school students

2. Methodology

- **Study Design:** Experimental study
- **Study Type:** Pre and Post type.
- **Study Setting:** Government primary and high school mugaiyur, Chengalpattu district-603305
- **Sample Size:** 30 Group-A (experimental group)15 and Group-B (control group)-15
- **Study Sampling Method:** Convenient sampling
- **Study Duration:** 4 Weeks
- **Study Population:** school students (age 11-14 years)

Inclusion Criteria

- Age group between 11-14 years⁴
- Both genders are included.
- Digit span score below 7.
- children who are not involved in active sports ⁴

Exclusion Criteria

- Visual or auditory issues
- children with other developmental disorders (eg: Mental retardation)
- Fixed deformities

3. Procedure

Group A (Experimental Group)	Group-B (Control Group)
15 school students intervened with the structured physical activity	15 school students intervened with the relaxed physical indoor activity
Structured physical activity (SPA) such as walking at an average pace, walking at a maximum speed, slow jogging, slow running, and skipping ⁴	Board games, stretching etc.. ⁴

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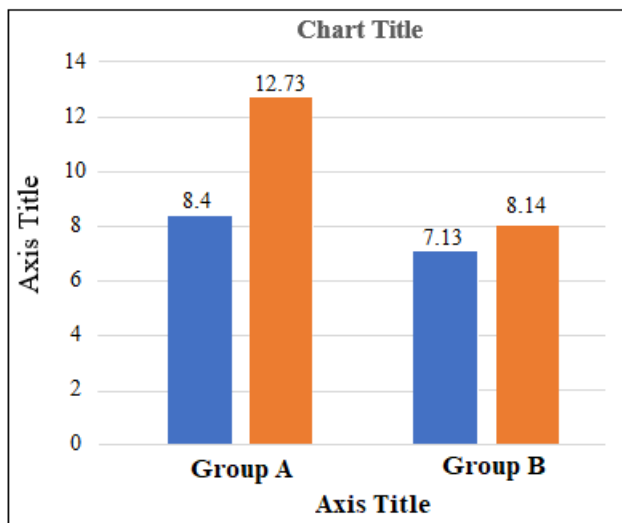
- The overall intervention duration was 40 minutes per session for 3 days per week for 4 weeks.
- Working memory is measured using Digit span test before and after the end of the study.



4. Result

On comparing the mean values of Group A and Group B on Digit span test shows significant improvement in the post test means but Structured physical activity (SPA) (Group A-Experimental group) shows (12.73) higher mean value is more effective than indoor (Group B-Control group) shows (8.14) at $p \leq 0.05$.

Digit span test	Group A		Group B		T – Test	‘P’ Value
	M	SD	M	SD		
Pre Test	8.4	1.49	7.13	1.51	8.5347	<0.0001
Post Test	12.73	1.28	8.14	0.39	2.5082	<0.0001



5. Discussion and Conclusion

5.1 Discussion

This study aimed to identify the effect of the structured physical activity on working memory among school students. Structured physical activity is a widely accepted method technique that aids in improving the performance in athlete's rehabilitation⁶. and the current evidence are inconclusive. Physical activity produces a various positive significant effect such as increased blood flow increased release of neurotrophic factors, such as brain- derived neurotrophic

factor (BDNF)⁷ and insulin-like growth factor-1 which increased arousal levels, and increased activity in specific brain areas⁶. Physical activity has shown a positive impact on visuospatial memory⁸. Studies have identified that physical activity intensity in children between the ages of 12-14 years shows positivity in cognitive flexibility and operational memory. The classroom-based activity like aerobics activity which integrated with the mathematical practices found to be improved. Studies also showed that tennis or football are associated with the development of the working memory¹⁰.

Analysis of this study has concluded that structured physical activity has produced a significant improvement in working memory among school students compared with relaxed indoor activities.

5.2 Conclusion

On analysis of Digit span test, marked signs of improvement between the group A and B were shown. But, the structured physical activity is the most effective in improving the Working memory among school students.

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