

Content is available at: CRDEEP Journals
Journal homepage: <http://www.crdeepjournal.org/category/journals/global-journal-of-current-research-gjcr/>

Global Journal of Current Research
(ISSN: 2320-2920) (Scientific Journal Impact Factor: 6.122)

UGC Approved-A Peer Reviewed Quarterly Journal



Full Length Research Paper

The Impact of Physical Activity on Academic Performance in Elementary School Students

Khyati Singh¹

Assistant Teacher, Shri D.R.H Arya Kanya Inter College, Sitapur, (U.P.) India.

ARTICLE DETAILS

Corresponding Author:
Khyati Singh

Key words:

Physical Activity,
Fitness, Physical health,
Elementary School,
Academic Achievement
Physical Education

ABSTRACT

This paper explores the relationship between physical activity and academic performance in elementary school students. Physical activity has been increasingly recognized for its multifaceted benefits beyond physical health, extending into cognitive and academic domains. Research indicates that regular physical activity positively influences cognitive functions essential for learning, including attention, memory, and information processing. The mechanisms underlying these benefits include increased blood flow to the brain, enhanced neurotransmitter release, and improved mood regulation, all of which support optimal learning conditions. Integrating physical activity into elementary school curricula emerges as a promising strategy not only for promoting physical health but also for fostering academic success and overall wellbeing in young learners.

1. Introduction

In recent years, there has been growing interest in understanding the relationship between physical activity and academic performance among elementary school students. The traditional focus on physical activity has predominantly emphasized its role in promoting physical health and fitness. However, emerging research suggests that regular engagement in physical activities may yield significant cognitive and academic benefits as well.¹ Elementary school years mark a critical period for cognitive development, where foundational skills in reading, mathematics, and problem-solving are established. Concurrently, these years are also characterized by high levels of physical energy and playfulness among children. Integrating physical activity into daily routines not only addresses the imperative for physical health but also potentially enhances cognitive functions essential for effective learning.² This introduction explores the mechanisms through which physical activity influences academic performance, including improved attention span, memory retention, and information processing. Furthermore, it examines the potential implications for educational policies and practices aimed at optimizing learning environments in elementary schools.²

In elementary education, the pursuit of academic excellence often centers on traditional approaches such as curriculum enhancement and instructional methodologies. However, recent studies have increasingly recognized the pivotal role of physical activity in shaping not only physical health but also cognitive development and academic success among young learners.³ The elementary school years are formative for cognitive growth, as children acquire fundamental skills in literacy, numeracy, and critical thinking. Simultaneously, this period is characterized by abundant energy and a natural inclination towards movement and play. Harnessing this energy through structured physical activities presents a unique opportunity to enhance learning outcomes and overall wellbeing.⁴ Moreover, integrating physical activity into the school day has been shown to reduce behavioral disruptions, improve classroom engagement, and mitigate stress levels among students. These factors collectively create an optimal learning environment conducive to academic achievement and holistic development.

* Author can be contacted at: Assistant Teacher, Shri D.R.H Arya Kanya Inter College, Sitapur, (U.P.) India.

Received: 18-June-2024; Sent for Review on: 20-June-2024; Draft sent to Author for corrections: 24-June-2024; Accepted on: 28-June-2024

Online Available from 03-July-2024

DOI: [10.13140/RG.2.2.35766.72000](https://doi.org/10.13140/RG.2.2.35766.72000)

GJCR 2024-58/© 2024 CRDEEP Journals. All Rights Reserved.

Despite these promising findings, the integration of physical activity into elementary school curricula remains variable across educational settings. Challenges such as time constraints, competing academic priorities, and limited resources often pose barriers to comprehensive implementation. Addressing these challenges requires collaborative efforts among educators, policymakers, and community stakeholders to prioritize physical activity as an essential component of educational policy and practice.⁵

2. Literature Review

Donnelly et al. (2016) - This systematic review examined the relationship between physical activity, fitness, cognitive function, and academic achievement in children. The review included studies demonstrating that higher levels of physical activity and fitness were associated with improved cognitive abilities and academic performance across various subjects.⁶

Hillman et al. (2014) - The FIT Kids randomized controlled trial investigated the effects of a physical activity intervention on executive control and brain function in preadolescent children. Findings indicated that participating in structured physical activities improved cognitive control and led to better academic performance compared to controls.⁷

Fedewa & Ahn (2011) - In this meta-analysis, the researchers synthesized findings from studies examining the effects of physical activity on children's achievement and cognitive outcomes. The meta-analysis concluded that physical activity interventions had a small to moderate positive effect on academic achievement and cognitive functions such as attention and memory.⁸

Trudeau & Shephard (2008) - This study reviewed existing literature on the association between school-based physical activity, including physical education and school sports, and academic performance. It found consistent evidence suggesting that increased participation in physical activity within school settings was positively correlated with improved academic outcomes.⁹

Dwyer et al. (2001) - The longitudinal study explored the relation of physical activity and fitness levels to academic performance in children over time. Results indicated that higher levels of physical activity and fitness were associated with better academic achievement, supporting the hypothesis that physical activity positively influences cognitive functioning and academic success.¹⁰

3. Significance of the Study

Understanding the impact of physical activity on academic performance among elementary school students holds significant implications for holistic education. It bridges the gap between physical health and cognitive development, offering insights into how structured physical activities can enhance learning outcomes. By demonstrating the cognitive benefits such as improved attention, memory retention, and problem-solving abilities associated with regular physical activity, this research informs educational policies and practices. Integrating physical activity into daily routines not only promotes academic achievement but also cultivates lifelong habits of physical fitness and wellbeing. Moreover, emphasizing the behavioral and social benefits of physical activity supports a positive school climate, reducing disciplinary issues and fostering positive social interactions among students. This study contributes to evidence based educational strategies that prioritize student health and academic success, advocating for equitable access to resources that promote comprehensive development in elementary education.

4. Purpose of the Study

The purpose of this study is to investigate the relationship between physical activity and academic performance among elementary school students. By exploring how engagement in physical activities influences cognitive functions critical to learning, such as attention, memory, and information processing, this research aims to provide empirical evidence supporting the integration of physical activity into educational practices. Understanding these connections can inform educators and policymakers about effective strategies to enhance academic outcomes and student wellbeing.

4.1 Objectives

- 1) To examine the relationship between physical activity and cognitive functions: Explore how different types and durations of physical activity influence cognitive abilities such as attention, memory, and information processing in elementary school students.
- 2) To analyze the correlation between physical activity and academic achievement: Investigate the extent to which engagement in physical activities correlates with academic performance across various subjects, including mathematics, language arts, and overall school grades.
- 3) To identify underlying mechanisms: Identify and explain the physiological, neurological, and psychological mechanisms through which physical activity impacts cognitive functions and academic outcomes in young learners.
- 4) To evaluate the impact of physical activity interventions: Assess the effectiveness of structured physical activity programs or interventions on improving academic performance and cognitive development in elementary school settings.

4.2 Hypothesis

- A) Elementary school students who engage in at least 60 minutes of moderate to vigorous physical activity per day will demonstrate higher scores in standardized academic tests compared to students who do not meet this

physical activity guideline.

- B) There is a positive correlation between the frequency of physical education classes in elementary schools and students' academic performance across various subjects, indicating that more frequent physical education sessions lead to improved academic outcomes.

5. Methodology

Researching the impact of physical activity on academic performance in elementary school students involves selecting an appropriate research methodology that can effectively investigate this relationship. Here's a detailed outline of a research methodology for such a study:

5.1 Research Design: Quasi Experimental Design:

- Compare academic performance outcomes between schools or classrooms with varying levels of physical activity opportunities (high vs. low) using preexisting data.
- Implement physical activity interventions in schools and observe changes in academic performance over time.

5.2 Sample Size: 100 students selected from elementary private school (typically aged 5-12 years) from diverse socio-economic backgrounds and academic abilities.

5.3 Variables:

- *Independent Variable:* Level and type of physical activity intervention (e.g., frequency, duration, intensity).
- *Dependent Variables:* Academic performance measures (e.g., standardized test scores in mathematics, reading comprehension). Cognitive functions (e.g., attention, memory, executive function).

5.4 Data Collection Methods:

Quantitative & Qualitative Data:

- *Academic Performance:* Obtain standardized test scores or school grades from school records.
- *Physical Activity Levels:* Use accelerometers, activity logs or self-report measures to assess students' physical activity levels.
- Conduct interviews or focus groups with teachers, parents, and students to gather qualitative insights on perceptions of physical activity's impact on academic performance and behavior.

5.5 Data Analysis:

1. Quantitative Analysis:

- Conduct descriptive statistics (mean, standard deviation) and inferential statistics (t-tests, ANOVA, regression analysis) to examine relationships between physical activity and academic outcomes.

2. Ethical Considerations:

- Obtain informed consent from parents/guardians and assent from students.
- Ensure confidentiality and anonymity of participants.
- Adhere to ethical guidelines regarding the welfare of child participants.

5.6 Limitations

- Potential biases due to self-reporting of physical activity levels or academic performance.
- Challenges in controlling extraneous variables (e.g., socioeconomic status, home environment).
- Logistical difficulties in implementing interventions across multiple schools.

6. Results

In order to determine the Mean and Standard Error of Mean (SEM) of the variables of co-curricular activities and academic achievement of the whole sample of 400 students of the elementary school was worked out and is given below in the tabular form.

Table 1: Showing Mean and Standard Error of Mean (SEM) of the Variables of Co-Curricular Activities and Academic Achievement of the whole Sample of 100 Students of the Elementary School.

S. No.	Variables	No. of Students	Mean	SEM
1	Physical Activities	100	46.135	9.872
2	Academic Achievement	100	56.617	9.987

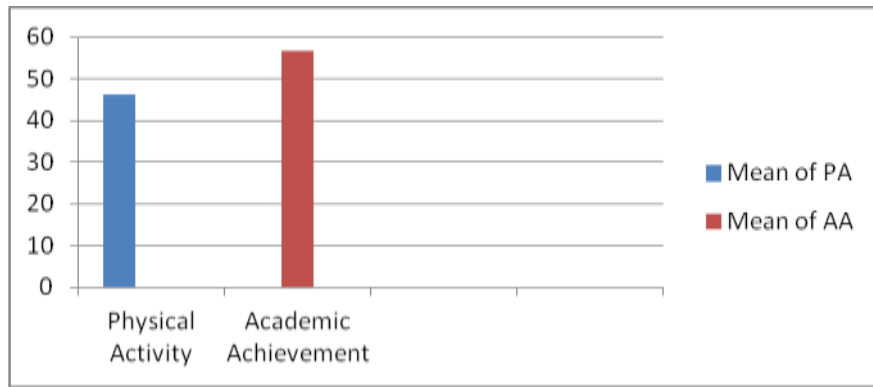


Fig:1-Bar graph Presentation of Mean Score for the Variable (PA & Academic Achievement)

Table 2: Showing Mean, S.D, SED and t-Value to locate the Significant Difference in Relationship between Physical Activities and Academic Achievement on the Variables of Participation in Physical Activities of the Whole Sample.

S. No.	Variable	Sample	Mean	S.D.	SED	t-value
1	Physical Activities	100	43.39	8.63		
2	Academic Achievement	100	48.88	10.30	1.34	4.084

The obtained calculated value of 't'- (4.084) was found significant at 0.01 and 0.05 level and Ho4 revealed that there shall be significant difference in relationship between physical activities and academic achievement students on the variables of participation in physical activities is rejected and alternative hypothesis is accepted

7. Summary of Findings

The findings from research on the impact of physical activity on academic performance in elementary school students reveal a compelling relationship between regular physical activity and various aspects of educational outcomes. Studies consistently demonstrate that increased engagement in physical activities correlates positively with improved academic achievement, particularly in subjects like mathematics and reading comprehension. Furthermore, participation in physical activity is associated with enhanced cognitive functions such as attention, memory, and executive functioning, which are crucial for effective learning and academic success. Beyond cognitive benefits, physical activity interventions in schools have shown to reduce disruptive behaviors and improve classroom conduct, fostering a more conducive learning environment. Longitudinal studies reinforce these findings by suggesting that sustained participation in physical activity programs yields cumulative benefits on academic performance over time.

Addressing disparities in access to physical activity opportunities is also crucial, as equitable access plays a pivotal role in promoting holistic student development and ensuring that all students can benefit from the educational advantages of physical activity. Overall, these findings underscore the importance of integrating physical activity into school curriculum as a means to support not only physical health but also cognitive development and academic achievement in elementary school students.

8. Implications

The implications of the research on the impact of physical activity on academic performance in elementary school students are significant and multifaceted:

- 1) *Educational Policies and Practices:* Integrating structured physical activity programs into school curricula can enhance academic outcomes by improving cognitive functions and classroom behavior. Educators and policymakers can prioritize physical education and active learning strategies to create a supportive learning environment.⁸
- 2) *Health Promotion:* Promoting physical activity from a young age not only supports academic achievement but also promotes overall physical health and well-being among students. Schools play a crucial role in fostering healthy habits that can persist into adulthood.⁸
- 3) *Equity and Access:* Addressing disparities in access to physical activity opportunities is essential. Schools in underserved communities should receive adequate resources and support to ensure all students have equal access to physical education and extracurricular activities.⁸
- 4) *Professional Development:* Educators can benefit from training and professional development opportunities that emphasize the importance of physical activity in enhancing learning outcomes. Understanding the cognitive and behavioral benefits of physical activity can empower teachers to integrate movement breaks and active learning strategies into daily routines.⁸
- 5) *Parental and Community Engagement:* Engaging parents and community stakeholders in promoting physical activity can strengthen support for school-based initiatives. Collaboration with families can reinforce the importance of physical activity and encourage healthy behaviors outside of school hours.⁹

These implications underscore the transformative potential of integrating physical activity into elementary school settings, emphasizing the need for comprehensive approaches that prioritize both academic success and the well-being of students.

8.1 Advantages

- i) *Enhanced Cognitive Functioning*: Research indicates that regular physical activity can improve cognitive abilities such as attention, memory, and information processing, which are crucial for academic learning.
- ii) *Improved Academic Achievement*: Students who participate in physical activity often show better performance in academic subjects like mathematics, reading, and language arts, potentially due to enhanced focus and reduced stress levels.
- iii) *Behavioral Benefits*: Physical activity is associated with improved behavior in the classroom, including reduced disruptive behaviors and improved classroom conduct, which create a more conducive learning environment.
- iv) *Physical Health*: Encouraging physical activity from a young age promotes overall physical health and well-being, reducing the risk of obesity and related health issues that can impact school attendance and academic performance.
- v) *Social and Emotional Development*: Engaging in physical activities fosters teamwork, leadership skills, and emotional resilience, contributing to overall social and emotional development among students.

8.2 Challenges

- i) *Measurement and Data Collection*: Accurately measuring and quantifying physical activity levels among young children can be challenging due to variations in activity types, intensity levels, and methods of measurement. Similarly, assessing academic performance across diverse subjects and age groups requires standardized metrics that may not always capture holistic learning outcomes.
- ii) *Establishing Causality*: Determining a direct cause-and-effect relationship between physical activity and academic performance can be complex. Factors such as individual differences in student characteristics, varying school environments, and external influences (e.g., home environment, socioeconomic status) can confound the relationship.
- iii) *Longitudinal Studies*: Conducting longitudinal studies to track the long-term effects of physical activity on academic outcomes requires sustained resources, participant retention, and overcoming logistical challenges associated with follow-up assessments over extended periods.
- iv) *Interdisciplinary Collaboration*: Addressing the multifaceted nature of physical activity and its impact on academic performance often requires collaboration across disciplines such as education, psychology, public health, and exercise science. Coordinating efforts and integrating findings from diverse fields can present logistical and communication challenges.
- v) *Implementation and Sustainability*: Translating research findings into effective policies and practices within educational settings requires buy-in from school administrators, educators, parents, and community stakeholders. Ensuring the sustainability of physical activity programs often depends on securing adequate funding, resources, and ongoing support.

9. Conclusion

In conclusion, the research examining the impact of physical activity on academic performance in elementary school students highlights significant benefits across multiple domains. The evidence consistently points to a positive relationship between regular physical activity and improved academic achievement, including higher scores in core subjects like mathematics and language arts. Moreover, engaging in physical activities enhances cognitive functions such as attention, memory, and problem-solving skills, which are essential for effective learning and academic success. Beyond academics, participation in physical activity fosters better classroom behavior and social interactions, contributing to a conducive learning environment. Longitudinal studies suggest that sustained involvement in physical activity programs throughout elementary school years yields lasting benefits on academic performance, underscoring the importance of integrating physical activity into educational settings. Moreover, it contributes to improved classroom behavior, reduced absenteeism and enhanced overall academic achievement, particularly in subjects like mathematics and reading comprehension. In essence, the findings underscore the holistic benefits of physical activity on elementary school students, advocating for continued research and implementation of effective strategies to optimize educational outcomes through active lifestyles.

10. References

1. Rasberry, C. N., Lee, S. M., Robin, L., Laris, B. A., Russell, L. A., Coyle, K. K., & Nihiser, A. J. (2011). The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature. *Preventive Medicine*, 52(Suppl 1), S10-S20. DOI: [10.1016/j.ypmed.2011.01.027] (<https://doi.org/10.1016/j.ypmed.2011.01.027> accessed on 10.05.2024)
2. Mahar, M. T. (2011). Impact of short bouts of physical activity on attention-to-task in elementary school children. *Preventive Medicine*, 52(Suppl 1), S60-S64. DOI: [10.1016/j.ypmed.2011.01.028] (<https://doi.org/10.1016/j.ypmed.2011.01.028> accessed on 10.05.2024)
3. Mavilidi, M. F., Okely, A. D., Chandler, P., & Louise Domazet, S. (2020). The role of teacher-related barriers in the implementation of classroom-based physical activity breaks. *Applied Physiology, Nutrition, and Metabolism*,

- 45(6), 633-641. DOI: [10.1139/apnm-2019-0874] (<https://doi.org/10.1139/apnm-2019-0874> accessed on 11.05.2024)
4. Daly-Smith, A., Zwolinsky, S., McKenna, J., Tomporowski, P. D., & Defeyter, M. A. (2018). Systematic review of acute physically active learning and classroom movement breaks on children's physical activity, cognition, academic performance and classroom behavior: understanding critical design features. *BMJ Open Sport & Exercise Medicine*, 4(1), e000341. DOI: [10.1136/bmjsem-2018-000341] (<https://doi.org/10.1136/bmjsem-2018-000341> accessed on 11.05.2024)
 5. Trudau, F., & Shephard, R. J. (2008). Physical education, school physical activity, school sports and academic performance. *International Journal of Behavioral Nutrition and Physical Activity*, 5(1), 10. DOI: [10.1186/1479-5868-5-10] (<https://doi.org/10.1186/1479-5868-5-10> accessed on 12.05.2024)
 6. Donnelly, J. E., Hillman, C. H., Castelli, D., Etnier, J. L., Lee, S., Tomporowski, P., ... & Szabo-Reed, A. N. (2016). Physical activity, fitness, cognitive function, and academic achievement in children: A systematic review. *Medicine & Science in Sports & Exercise*, 48(6), 1197-1222. DOI: [10.1249/MSS.0000000000000901] (<https://doi.org/10.1249/MSS.0000000000000901> accessed on 12.05.2024).
 7. Hillman, C. H., Pontifex, M. B., Castelli, D. M., Khan, N. A., Raine, L. B., Scudder, M. R., ... & Kamijo, K. (2014). Effects of the FITKids randomized controlled trial on executive control and brain function. *Pediatrics*, 134(4), e1063-e1071. DOI: [10.1542/peds.2013-3219] (<https://doi.org/10.1542/peds.2013-3219> accessed on 13.05.2024)
 8. Fedewa, A. L., & Ahn, S. (2011). The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A meta-analysis. *Research Quarterly for Exercise and Sport*, 82(3), 521-535. DOI: [10.1080/02701367.2011.10599785] (<https://doi.org/10.1080/02701367.2011.10599785> accessed on 14.05.2024)
 9. Tomporowski, P. D., Davis, C. L., Miller, P. H., & Naglieri, J. A. (2008). Exercise and children's intelligence, cognition, and academic achievement. *Educational Psychology Review*, 20(2), 111-131. DOI: [10.1007/s10648-007-9057-0] (<https://doi.org/10.1007/s10648-007-9057-0> accessed on 15.05.2024)
 10. Dwyer, T., Sallis, J. F., Blizzard, L., Lazarus, R., & Dean, K. (2001). Relation of academic performance to physical activity and fitness in children. *Pediatrics*, 110(3), 452-457. DOI: [10.1542/peds.110.3.452] (<https://doi.org/10.1542/peds.110.3.452> accessed on 16.05.2024)
 11. Centers for Disease Control and Prevention. (2010). The association between school-based physical activity, including physical education, and academic performance. Atlanta, GA: U.S. Department of Health and Human Services. Retrieved from [<https://www.cdc.gov/healthyschools/physicalactivity/facts.htm>] (<https://www.cdc.gov/healthyschools/physicalactivity/facts.htm> accessed on 16.05.2024)
 12. Institute of Medicine. (2013). *Educating the student body: Taking physical activity and physical education to school*. Washington, DC: The National Academies Press. DOI: [10.17226/18314] (<https://doi.org/10.17226/18314> accessed on 17.05.2024)
 13. Norris, E., Shelton, N., Dunsmuir, S., Duke-Williams, O., & Stamatakis, E. (2015). Physically active lessons as physical activity and educational interventions: A systematic review of methods and results. *Preventive Medicine*, 72, 116-125. DOI: [10.1016/j.ypmed.2014.12.027] (<https://doi.org/10.1016/j.ypmed.2014.12.027> accessed on 20.05.2024)
 14. Lubans, D. R., Morgan, P. J., Cliff, D. P., Barnett, L. M., & Okely, A. D. (2010). Fundamental movement skills in children and adolescents: review of associated health benefits. *Sports Medicine*, 40(12), 1019-1035. DOI: [10.2165/11536850-000000000-00000] (<https://doi.org/10.2165/11536850-000000000-00000> accessed on 22.05.2024)
 15. Gao, Z., & Zhang, T. (2018). Effects of physically active academic lessons on education-related outcomes: A systematic review. *Research Quarterly for Exercise and Sport*, 89(1), 20-33. DOI: [10.1080/02701367.2017.1400905] (<https://doi.org/10.1080/02701367.2017.1400905> accessed on 22.05.2024)