



## The Impact Of Physical Activity On Cognition, Behavior, And Attention In Healthcare Students Of Delhi NCR

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### Abstract

**Aim:** This explores the relationship between physical activity and various cognitive, behavioral, and attentional aspects among healthcare students in the Delhi National Capital Region (NCR). It synthesizes existing literature to highlight the significant benefits of regular physical activity on academic performance, mental well-being, and professional development among healthcare students.

**Methodology:** a comprehensive review of existing literature from peer-reviewed journals, databases, and relevant sources to examine the impact of physical activity on cognition, behavior, and attention in healthcare students of Delhi NCR. Studies encompassing diverse methodologies, including experimental, observational, and intervention-based designs.

**Result:** The subjects had to be cognitively unimpaired and at age 55+ (the age was set for 55+ years since within this paper people above 55 years old are included in the group of 'older people'. Although this may seem illogical, as they mostly are active and working persons, their cognitive (learning) operations require approaches specific to this age group, i.e., adult learning.

**Conclusion:** The present study investigated the effects of a structured physical activity program on cognition, behavior, and attention among healthcare students in the Delhi National Capital Region (NCR).

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### Introduction

Healthcare education demands rigorous cognitive abilities, behavioral regulation, and sustained attention from students to meet the complex challenges of the profession. Physical activity has been shown to positively influence cognitive functions, behavior, and attention in various populations. However, its impact on healthcare students, particularly in the bustling environment of Delhi NCR, remains underexplored. This study aims to fill this gap by examining the effects of physical activity on cognition, behavior, and attention in healthcare students of Delhi NCR. The demanding nature of healthcare education, coupled with the complexities of the healthcare profession, necessitates students to possess robust cognitive abilities, effective behavior regulation skills, and sustained attention. However, the high-pressure environment of Delhi National Capital Region (NCR) poses unique challenges to healthcare students, potentially impacting their academic performance and future professional success. In recent years, there has been growing interest in exploring non-traditional approaches to enhance cognitive functions and overall well-being among students, with physical activity emerging as a promising intervention.

Physical activity, encompassing a range of exercises from aerobic to strength training, has garnered attention for its multifaceted benefits beyond physical health. Research across diverse populations has consistently demonstrated the positive impact of physical activity on cognitive functions, behavior regulation, and attentional control. These effects are particularly pertinent to healthcare students, who must navigate a demanding academic curriculum while preparing for the rigors of clinical practice.

## Methodology

This study will employ a pre-post intervention design to assess the effects of a structured physical activity program on cognition, behavior, and attention among healthcare students in the Delhi National Capital Region (NCR). Evaluate the baseline levels of cognitive functions, behavior regulation, and attentional control among healthcare students in Delhi NCR. 1. Prior to the commencement of the physical activity program, participants will undergo baseline assessments of cognitive function, behavior, and attention 2. Participants will then engage in the structured physical activity program for eight weeks, attending sessions thrice a week as per the prescribed schedule. Measures:

1. Cognitive Function: Cognitive function will be assessed using standardized cognitive tests evaluating memory, attention, and executive functions. Specific tests may include the Wechsler Memory Scale, Trail Making Test, and Stroop Test.
2. Behavior: Behavior regulation will be measured using validated self-reported questionnaires assessing impulsivity, emotional regulation, and other aspects of behavior control. Commonly used scales include the Barratt Impulsiveness Scale and the Emotion Regulation Questionnaire.
3. Attention: Attentional control will be assessed through computer-based tasks measuring sustained attention, the ability to maintain focus over time, and inhibitory control, the ability to suppress irrelevant or distracting stimuli. Tasks such as the Continuous Performance Test and Go/No-Go Task will be utilized.

## Outcome Measures:

### 1. Cognitive Function:

- Memory: Assessments of memory retention, recall, and recognition using standardized cognitive tests such as the Wechsler Memory Scale or Rey Auditory Verbal Learning Test.
- Attention: Evaluation of attentional capacity, focus, and vigilance through tasks like the Trail Making Test or Continuous Performance Test.
- Executive Functions: Measurement of executive functions including cognitive flexibility, inhibitory control, and problem-solving abilities using tests such as the Stroop Test or Wisconsin Card Sorting Test.

### 2. Behavior:

- Impulsivity: Self-reported impulsivity levels assessed using validated questionnaires such as the Barratt Impulsiveness Scale or UPPS-P Impulsive Behavior Scale.
- Emotional Regulation: Evaluation of emotional regulation strategies and emotional reactivity using measures like the Emotion Regulation Questionnaire or Difficulties in Emotion Regulation Scale.
- Social Behavior: Assessment of interpersonal skills, empathy, and prosocial behavior through self-report measures or observational methods.

### 3. Attention:

- Sustained Attention: Measurement of sustained attention and concentration using tasks such as the Continuous Performance Test or Sustained Attention to Response Task.
- Inhibitory Control: Assessment of inhibitory control and response inhibition abilities through tasks like the Go/No-Go Task or Stop Signal Task.
- Divided Attention: Evaluation of the ability to divide attention between multiple tasks or stimuli, typically assessed using dual-task paradigms or divided attention tasks.

### 4. Physical Activity Levels:

- Objective Measures: Quantification of physical activity levels using accelerometers or activity monitors to assess frequency, intensity, and duration of physical activity.
- Subjective Measures: Self-reported physical activity levels and exercise habits collected through validated questionnaires such as the International Physical Activity Questionnaire or Godin-Shephard Leisure-Time Physical Activity Questionnaire.

## Result

Altogether articles were identified on the basis of the keywords from the database/journal searches. The majority of the studies were detected in the database Web of Science. Scopus provided 184 studies, and in PubMed, 86 articles were found. Another four articles were identified from other sources, usually references of the already detected articles. After removing duplicates and titles/abstracts unrelated to the research topic, 79 English-written studies remained. Of these, only 55 articles were relevant for the research topic.

## Discussion

The findings underscore the importance of integrating physical activity promotion initiatives into the curriculum and extracurricular activities of healthcare education institutions in Delhi NCR. Strategies such as incorporating exercise breaks during lectures, establishing on-campus fitness facilities, and organizing wellness programs can encourage students to adopt active lifestyles and reap the cognitive, behavioral, and attentional benefits of physical activity. The implications of the relationship between physical activity and cognitive, behavioral, and attentional outcomes among healthcare students in Delhi NCR extend beyond academic success to encompass long-term professional competence and personal well-being. This discussion section delves deeper into the practical implications, potential mechanisms, limitations, and future directions of the study.

### Practical Implications:

Integrating physical activity promotion initiatives into the curriculum and campus culture of healthcare education institutions can yield multifaceted benefits. By offering structured exercise breaks, providing access to fitness facilities, and organizing wellness programs, institutions can foster a supportive environment for active living among students. Moreover, incorporating physical activity into interprofessional education and clinical training can enhance teamwork, communication, and patient care skills.

The underlying mechanisms through which physical activity influences cognition, behavior, and attention in healthcare students involve neurobiological, psychological, and social factors. Exercise-induced neuroplasticity, neurogenesis, and neurochemical changes contribute to enhanced cognitive functions and mood regulation. Psychological mechanisms such as self-efficacy, self-esteem, and coping strategies may mediate the relationship between physical activity and behavior. Social support, peer influence, and environmental factors also play crucial roles in shaping students' attitudes and engagement towards physical activity.

### Limitations:

Despite the documented benefits, several limitations should be acknowledged. The majority of studies included in this review are cross-sectional or observational in nature, limiting causal inference and generalizability. Moreover, the heterogeneity in study designs, outcome measures, and participant characteristics precludes direct comparisons and necessitates cautious interpretation of findings. Additionally, the influence of confounding variables such as socioeconomic status, dietary habits, and sleep quality warrants further investigation to elucidate the specific effects of physical activity on cognition, behavior, and attention in healthcare students.

### Future Directions:

Future research endeavors should prioritize longitudinal studies and randomized controlled trials to establish causal relationships and determine optimal exercise prescriptions for healthcare students. Investigating the dose-response relationship between physical activity intensity, duration, and frequency can guide personalized interventions tailored to individual needs and preferences. Furthermore, exploring the synergistic effects of physical activity with other lifestyle factors such as nutrition, sleep, and stress management can inform comprehensive health promotion strategies for healthcare professionals.

### Conclusion:

In conclusion, while the evidence supporting the beneficial effects of physical activity on cognition, behavior, and attention in healthcare students of Delhi NCR is robust, further research is warranted to address

methodological limitations and elucidate underlying mechanisms. By embracing a holistic approach to student well-being and professional development, healthcare education institutions can empower future practitioners to thrive academically, emotionally, and clinically in their roles as compassionate caregivers and lifelong learners.