Original Article

School-Based Classical Music for ADHD Symptoms in Children

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ABSTRACT

Objective: To evaluate whether classical music exposure can reduce symptoms of attention deficit hyperactivity disorder (ADHD) in elementary school children.

Study Design: A quasi-experimental study

Place and Duration of Study: This study was conducted at the SDN Klampis Ngasem 1, Surabaya, Indonesia, from July 2024 to July 2025, encompassing preparation, data collection, and analysis over one year, with each participant completing a two-week intervention period.

Methods: A quasi-experimental pre–post study was performed among 121 third-grade students screened using the Abbreviated Conners' Teacher Rating Scale (ACTRS). Children scoring ≥12 were considered to have ADHD-related symptoms, and 26 met inclusion criteria after parental consent. Participants were randomly assigned to an intervention group (n = 13), who listened to classical music for 20 minutes over five sessions, or a control group (n = 13), who continued regular activities. Teachers completed the ACTRS before and after the intervention.

Results: The intervention group showed a significant decrease in ACTRS scores from 14.61 ± 2.98 to 10.46 ± 3.55 ($p = 0.005$), whereas the control group showed no significant change (median 12.00 pre- vs 12.00 post-intervention, $p = 0.59$). Between-group analysis confirmed greater improvement in the intervention group ($p = 0.004$).

Conclusion: Short-term classical music listening significantly reduced ADHD-related symptoms based on teacher ratings. This low-cost, non-invasive approach shows promise as a complementary strategy, though confirmation through larger and diagnostically verified studies is needed.

Key Words: Attention Deficit Hyperactivity Disorder; classical music; therapeutic play; emotion regulation; complementary therapy; child mental health

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INTRODUCTION

Attention Deficit Hyperactivity Disorder (ADHD) is one of the most common neurodevelopmental conditions in childhood, characterized by inattention, hyperactivity, and impulsivity that impair academic, social, and emotional functioning.[1] Global prevalence is estimated at 5–7% of children, with symptoms often persisting into adolescence and adulthood.

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The burden extends beyond the individual to families and schools, where challenges in behavior management and learning support are significant.[2]

Current treatment strategies typically combine pharmacological approaches with behavioral interventions. Although stimulant medications remain highly effective, concerns about side effects, long-term safety, and variability in treatment response have prompted interest in complementary or adjunctive strategies.[3] One promising avenue is music-based intervention, which is non-invasive, low-cost, and generally well-accepted by children and parents.[4]

Music has been shown to influence brain networks involved in attention, arousal, and executive function.[5] Structured and rhythmic auditory input, such as classical music, may enhance cortical regulation and promote calmness, leading to better concentration and emotional regulation.[6] Several studies and systematic reviews have reported improvements in behavior, attention, and mood among children and adults exposed to music. However, evidence specific to ADHD remains limited, particularly in school-based interventions.[5,7]

Tools such as the Abbreviated Conners' Teacher Rating Scale (ACTRS) provide a practical means of identifying children with elevated ADHD-related behaviors in classroom settings. While not a diagnostic instrument, ACTRS offers a validated screening

approach that captures symptom severity and allows teachers to monitor changes over time.[8]

This study was designed to examine whether structured exposure to classical music could reduce ADHD-related symptoms among elementary school children. By implementing a quasi-experimental design in a classroom setting, we aimed to assess the potential of classical music as a complementary approach to support attention, reduce hyperactivity, and improve self-regulation.

METHODS

Study design and setting: This research employed a quasi-experimental design with pre-test and post-test evaluation. The study was conducted at an elementary school, SDN Klampis Ngasem 1 Surabaya, Indonesia, during the academic year 2024-2025.

Participants: A total of 121 third-grade students were screened using the Abbreviated Conners' Teacher Rating Scale (ACTRS). Teachers completed the ACTRS for each student during class hours, with an estimated completion time of 15 minutes per child. Students with ACTRS scores ≥12 were considered to have ADHD-related symptoms and were eligible for participation. This threshold has been commonly applied in previous studies to identify children at risk for ADHD.[9]

From this screening, 26 children met the inclusion criterion and were enrolled after obtaining written parental consent. Participants were randomly assigned into an intervention group (n = 13) and a control group (n = 13).

Inclusion and exclusion criteria: Inclusion criteria were: (1) third-grade students aged 8–9 years, (2) ACTRS score ≥12, and (3) parental consent. Exclusion criteria included children with hearing impairments, neurological conditions, or other psychiatric disorders that could interfere with participation.

Intervention: The intervention consisted of structured listening to selected classical music for 20 minutes per session, across five consecutive school days. Sessions were conducted in groups in the school assembly hall, under supervision of teachers and the research team. The control group continued with their usual school activities without exposure to music.

Outcome measure: ADHD-related symptoms were measured using ACTRS, which includes 10 items assessing hyperactivity, inattention, and impulsivity on a four-point scale (0 = not at all, 3 = almost always). Scores ≥12 are considered indicative of significant ADHD symptomatology. Teachers completed the ACTRS before and immediately after the intervention.

Data analyses: Data were analyzed using SPSS version 22. Descriptive statistics summarized participant characteristics. Paired t-tests were used to compare pre- and post-intervention scores in the intervention group, while the Wilcoxon signed-rank test was applied for the control group due to non-normal data distribution. Between-group differences were analyzed using the Mann–Whitney test. Statistical significance was set at $p < 0.05$.

Ethical considerations: This study was approved by our institutional ethics committee under approval number **168/EC/KEPK/FKUA/2025**. Written informed consent was obtained from the parents or guardians of all participants.

RESULTS

A total of 121 third-grade students were screened using the Abbreviated Conners' Teacher Rating Scale (ACTRS). Twenty-six children scored ≥12 and were therefore considered to have elevated ADHD-related symptoms. These children were enrolled after parental consent and randomly assigned into the intervention group (n=13) or the control group (n=13). All participants completed both pre- and post-test assessments.

Table No. 1. Sample characteristics.

Characteristic	Intervention (n = 13)	Control (n = 13)
ACTRS Score (Mean ± SD)	14.61 ± 2.98	12.00 ± 0.58
Sex		
Male	11 (84.6%)	7 (53.8%)
Female	2 (15.4%)	6 (46.2%)

Baseline characteristics: Baseline characteristics are presented in Table 1. The mean ACTRS score at baseline was higher in the intervention group (14.61 ± 2.98) compared with the control group (12.00 ± 0.58). The intervention group consisted mostly of boys (84.6%), whereas the control group had a more balanced sex distribution (53.8% male, 46.2% female).

Table No. 2: Pre- and post-intervention ACTRS scores in intervention and control groups

Group	Pre-intervention (Mean ± SD / Median)	Post-intervention (Mean ± SD / Median)	Within-group p-value	Score difference Median (min–max)	Between-group p-value
Intervention (n = 13)	14.61 ± 2.98	10.46 ± 3.55	0.005	–5.00 (–10.00 – 5.00)	0.004
Control (n = 13)	12.00 (12.00 – 13.00)	12.00 (11.00 – 13.00)	0.59	0.00 (–1.00 – 1.00)	

Symptom changes: Pre- and post-intervention ACTRS scores are summarized in Table 2. The intervention group demonstrated a significant reduction in ADHD-related symptoms after five consecutive sessions of classical music listening, with mean scores decreasing from 14.61 ± 2.98 to 10.46 ± 3.55 ($p = 0.005$). In contrast, the control group showed no meaningful change; median scores remained at 12.00 pre-test versus 12.00 post-test ($p = 0.59$).

Between-group comparison: The reduction in ACTRS scores was significantly greater in the intervention group compared with the control group (median difference –5.00 versus 0.00, $p = 0.004$, Table 2). These results indicate that short-term exposure to classical music was associated with measurable improvements in ADHD-related symptoms.

DISCUSSION

This study found that short-term exposure to classical music was associated with a significant reduction in ADHD-related symptoms among elementary school children, as measured by teacher ratings on the ACTRS. In contrast, children in the control group showed no meaningful change. These findings suggest that classical music listening may be a promising complementary strategy to reduce behavioral symptoms associated with ADHD in school settings.

Our results are consistent with previous work showing that music interventions can improve attention, emotional regulation, and behavior in children with ADHD or related conditions.[10] Studies of the so-called "Mozart effect" and other music-based therapies have reported improvements in executive function, mood, and arousal regulation.[11] Recent systematic reviews have also emphasized the potential of music to modulate attention networks and reward pathways implicated in ADHD. By providing structured auditory input, classical music may help regulate cortical activity, reduce hyperarousal, and support sustained attention.[5,12]

The intervention's feasibility and acceptability shine through: sessions were group-based, conducted right in the school environment, required minimal resources, and demanded no specialized equipment. These are key advantages, especially in schools where access to behavioral or pharmacological care is limited. This highlights the potential for classical music to be implemented as an adjunctive classroom strategy, particularly in resource-limited settings where access to behavioral or pharmacological therapy may be restricted.[13,14]

Nevertheless, several limitations must be acknowledged. First, ADHD was identified based on ACTRS scores rather than a full clinical evaluation. Although ACTRS is a validated and widely used screening tool, it cannot substitute for a comprehensive diagnosis based on DSM-5 criteria.[15] Second, the sample size was relatively small, and the intervention lasted only five days, limiting generalizability and the ability to evaluate long-term effects. Third, outcomes relied on teacher reports, which may be influenced by subjective perceptions. Future studies should include larger samples, multiple informants, longer interventions, and objective measures of cognitive performance or neurophysiological activity.

Despite these limitations, the findings contribute to the growing body of evidence supporting music interventions for ADHD. By demonstrating measurable symptom improvement after a brief school-based intervention, this study highlights the potential role of classical music as an accessible, non-invasive, and low-cost complement to standard ADHD management.

CONCLUSION

This study showed that short-term exposure to classical music was associated with a significant reduction in ADHD-related symptoms among elementary school children, as measured by teacher ratings on the ACTRS. Children who participated in the intervention demonstrated improvements in attention, reduced hyperactivity, and better self-regulation compared with controls. As an accessible, low-cost, and non-invasive strategy, classical music may complement established behavioral and pharmacological approaches in ADHD management.

Author's Contribution:

Concept & Design or acquisition of analysis or interpretation of data:	Karen Delicia Setiobudi, Yunias Setiawati, Atika
Drafting or Revising Critically:	Karen Delicia Setiobudi, Yunias Setiawati
Final Approval of version:	All the above authors
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