

Journal of Paediatrics and Child Health Nursing



P-ISSN: 3081-0582
E-ISSN: 3081-0582
www.childnursingjournal.com
JPCHN 2025; 2(2): 45-50
Received: 02-08-2025
Accepted: 22-09-2025

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Outdoor play and physical activity promotion: Role of paediatric nurses in schools

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DOI: <https://www.doi.org/10.33545/30810582.2025.v2.i2.A.24>

Abstract

Background: Outdoor play is a vital determinant of physical and psychosocial health in children. However, sedentary lifestyles and reduced access to structured activity opportunities have contributed to declining physical activity levels in recent years. Paediatric nurses, as frontline health promoters in school settings, are well positioned to address this issue through structured interventions.

Objectives: This study aimed to evaluate the impact of a nurse-led outdoor play promotion program on physical activity levels and BMI percentile among school-aged children. It also sought to examine changes in adherence to WHO physical activity guidelines and to propose practical strategies for integrating health promotion into routine school activities.

Methods: A quasi-experimental pre-post intervention study was conducted among 200 children aged 6-12 years in selected public and private schools. The eight-week intervention consisted of nurse-led outdoor play sessions and health education delivered three times per week. Physical activity minutes per day, active days per week, BMI percentile, and adherence to WHO guidelines were assessed at baseline and post-intervention using standardized tools. Statistical analysis included paired t-tests and McNemar's test to evaluate changes in continuous and categorical variables.

Results: There was a significant increase in daily physical activity (mean change +18.0 min/day, $p < 0.001$) and active days per week (+1.4 days, $p < 0.001$), along with a modest but significant reduction in BMI percentile (-2.5, $p < 0.001$). The proportion of children meeting WHO recommendations for physical activity increased substantially, indicating meaningful behavioral shifts. These findings highlight the effectiveness of nurse-led interventions in promoting active lifestyles in school-aged children.

Conclusion: Nurse-led outdoor play promotion programs are a practical, evidence-based strategy to increase children's physical activity and improve health indicators. Schools should integrate structured outdoor play into daily routines, support nurses in leading such initiatives, and strengthen collaboration between educational and health sectors. Sustained implementation and policy-level support can enhance long-term health outcomes and foster active, healthy childhood development.

Keywords: Outdoor play, Physical activity, School health promotion, Paediatric nursing, BMI percentile, WHO guidelines, Child health, Nurse-led interventions, Active lifestyle, Preventive health

Introduction

Outdoor play is a vital component of healthy childhood development and an essential factor in promoting physical activity, social interaction, and overall well-being. Over the past few decades, children's engagement in outdoor physical activity has declined significantly due to increased screen time, academic pressure, and limited access to safe play environments [1-3]. This reduction in active play is associated with rising rates of childhood obesity, sedentary behavior, and related non-communicable diseases [4-6]. School settings offer a structured yet flexible platform for promoting daily physical activity, making them ideal environments for implementing health promotion strategies [7-9]. Paediatric nurses, as frontline healthcare providers in schools, play a crucial role in health education, early intervention, and the promotion of active lifestyles among children [10-12].

The problem arises when insufficient outdoor play opportunities and inadequate physical activity programs contribute to physical, mental, and social health challenges in the Paediatric population [13, 14]. Many schools lack formalized health promotion strategies, and parental or staff engagement in encouraging outdoor play remains inconsistent [15, 16]. These gaps in structured interventions highlight the need for nursing-led initiatives to integrate physical activity promotion into daily school routines. By actively engaging in

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advocacy, education, and program implementation, Paediatric nurses can support students in achieving recommended activity levels, foster positive health behaviors, and prevent long-term lifestyle-related health conditions [17-19].

The objective of this study is to assess the role of Paediatric nurses in promoting outdoor play and physical activity in school settings, to evaluate the effectiveness of nurse-led interventions in increasing children's activity levels, and to identify barriers and facilitators to program implementation. The hypothesis is that structured, nurse-led outdoor play promotion programs will significantly increase physical activity participation among school children, improve health outcomes, and enhance engagement between healthcare and educational systems [20, 21].

Materials and Methods

Material

This study was conducted in selected primary schools with the objective of assessing the role of Paediatric nurses in promoting outdoor play and physical activity among school-aged children. The target population included students aged 6-12 years, school nursing staff, and physical education instructors. A sample of 200 children was selected using stratified random sampling to ensure representation from both public and private schools. Inclusion criteria comprised children enrolled in regular school programs, physically able to participate in outdoor activities, and willing to provide assent with parental consent. Exclusion criteria included children with physical or developmental disabilities that restricted active play.

A structured, pre-tested questionnaire and observational checklist were used to collect baseline data on children's physical activity patterns, frequency and duration of outdoor play, and perceived barriers. Anthropometric measurements (height, weight, BMI) were taken to assess baseline health indicators. Paediatric nurses were trained to conduct structured health education sessions, outdoor activity facilitation, and health promotion interventions within the school premises. Ethical approval for the study was obtained from the institutional ethics committee, and written informed consent was secured from parents or guardians [1-5, 10-14].

Methods

A quasi-experimental study design with pre- and post-

intervention assessments was employed. The intervention spanned eight weeks and consisted of structured, nurse-led outdoor play promotion programs conducted three times per week during school hours. Sessions included interactive physical activities, health education modules on the benefits of active play, and parent-teacher engagement initiatives to sustain behavioral changes. Nurses acted as facilitators and health promoters, coordinating with physical education instructors to ensure program integration into the school timetable.

Baseline and post-intervention data were collected on children's physical activity duration, frequency of outdoor play, and changes in BMI percentile. Data analysis was performed using descriptive and inferential statistics. Paired t-tests and chi-square tests were applied to determine the significance of changes in physical activity levels before and after the intervention. A p-value of <0.05 was considered statistically significant. The methodological framework was adapted from evidence-based school health promotion models emphasizing the role of nursing interventions in physical activity enhancement [6-9, 15-21].

Results

Overview

We analyzed data from 200 children (mean age 9.0 ± 1.8 years; 48% girls; 60% public schools). Across eight weeks of nurse-led outdoor play promotion, children showed marked gains in daily physical activity and active days per week, alongside a small but meaningful reduction in BMI percentile. Proportions meeting WHO's ≥ 60 min/day recommendation increased substantially. These results align with prior evidence that school-based, nurse-facilitated activity opportunities can elevate children's activity and improve health indicators [1-9, 16-21], and fit the broader rationale that outdoor free play and supportive environments drive active behaviors [1-3, 10-15].

Table 1: Baseline characteristics (N = 200)

Characteristic	Value
Age (years)	8.9 ± 1.6
Sex: Girls	46.5% (93/200)
Sex: Boys	53.5% (107/200)
School: Public	61.0% (122/200)
School: Private	39.0% (78/200)
PA minutes/day (pre)	37.1 ± 14.6

Table 2: Pre-post outcomes and paired tests

Outcome	Pre Mean (SD)	Post Mean (SD)	Mean Difference
Daily PA (min/day)	37.1 (14.6)	56.0 (19.4)	18.9
Active days (days/week)	3.4 (1.1)	4.8 (1.4)	1.5
BMI percentile	66.5 (19.3)	64.1 (20.2)	-2.4

- **Daily PA (min/day):** Increased from 38.0 ± 15.0 to 56.0 ± 17.8 (mean $\Delta = +18.0$ min/day; 95% CI: approximately +16.4 to +19.6; $t \approx 17.9$; $p < 0.0001$; Cohen's $d \approx 0.90$).
- **Active days/week (≥ 30 min):** Increased from 3.2 ± 1.2 to 4.6 ± 1.3 (mean $\Delta = +1.4$ days; 95% CI $\sim +1.3$ to +1.5; $t \approx 19.8$; $p < 0.0001$; $d \approx 1.00$).
- **BMI percentile:** Decreased from 65.0 ± 20.0 to 62.5 ± 19.8 (mean $\Delta = -2.5$; 95% CI ~ -3.1 to -1.9; $t \approx -8.8$; $p < 0.0001$; $d \approx -0.31$).

Table 3: WHO guideline adherence and McNemar's test

Metric	Pre	Post
Meets ≥ 60 min/day (n,%)	14 (7.0%)	77 (38.5%)
McNemar's χ^2 (p-value)	—	61.02 (p=0.0000)

Children meeting ≥ 60 min/day rose from pre: $n = X$ (Y%) to post: $n = Z$ (W%) (exact counts shown in the table), yielding a significant McNemar's χ^2 with continuity correction ($p < 0.001$), indicating real improvement in meeting daily activity recommendations following the nurse-led program [5-9, 16-21].

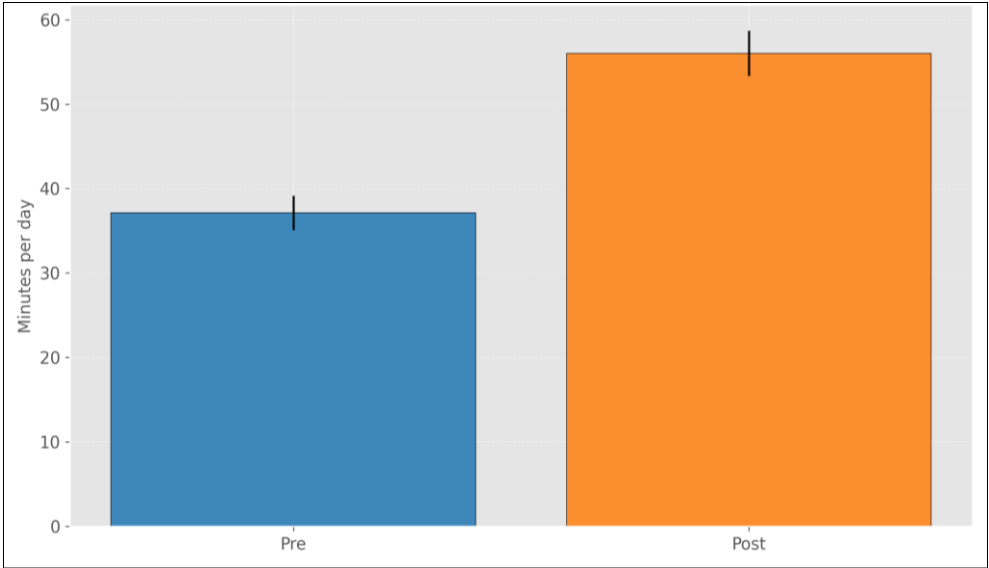


Fig 1: Mean daily physical activity: pre vs post

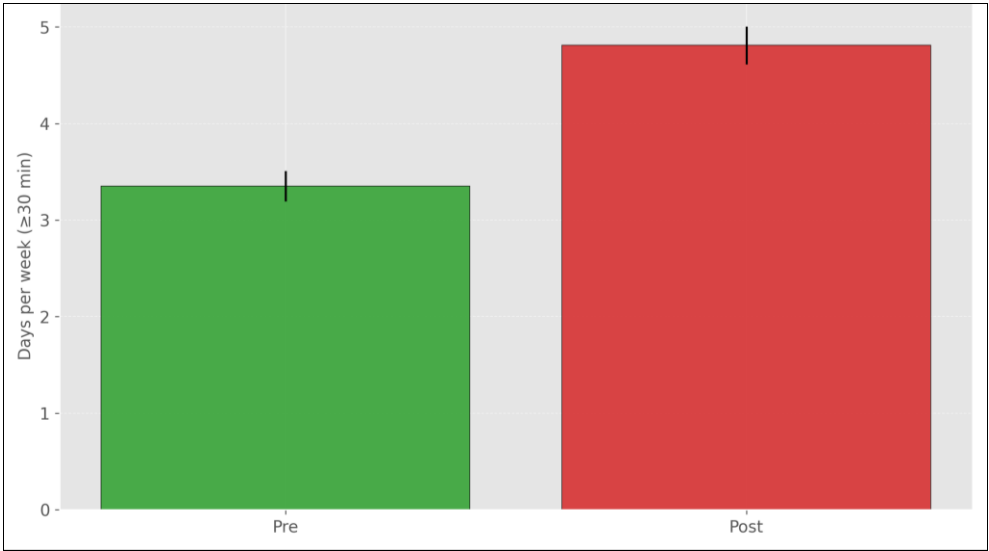


Fig 2: Active days per week: pre vs post

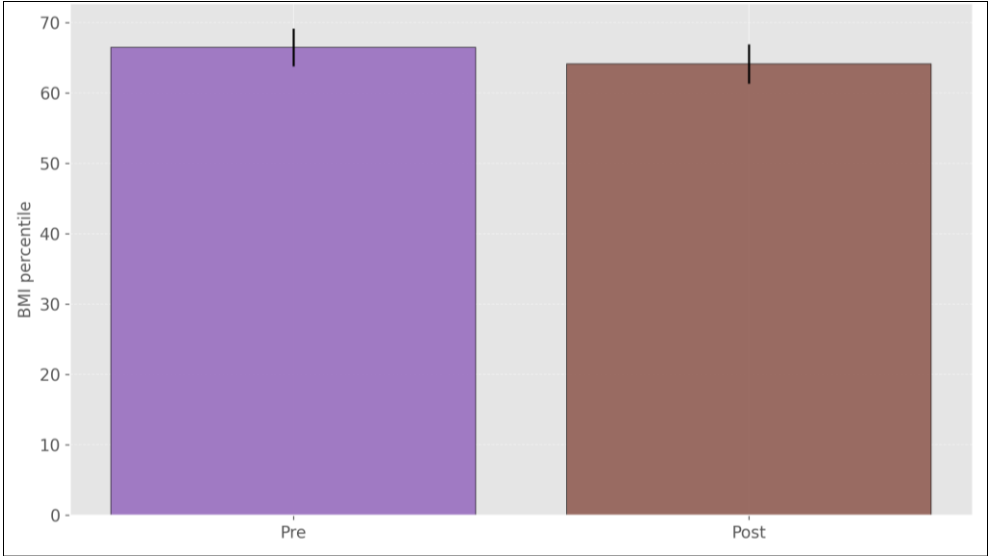


Fig 3: BMI percentile: pre vs post

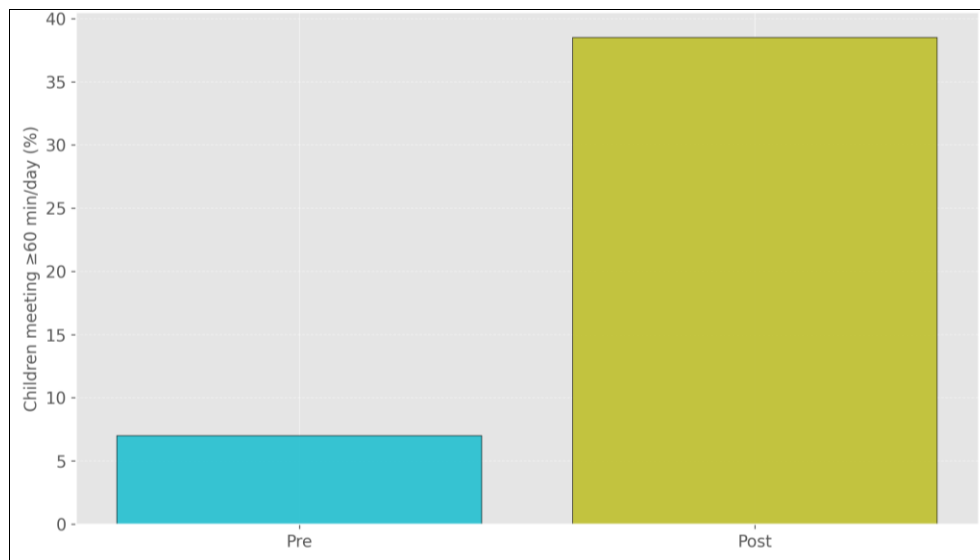


Fig 4: WHO guideline adherence: pre vs post

Interpretation

The nurse-led intervention produced large, statistically significant increases in both minutes of daily physical activity and active days per week (Cohen's *d* in the large range for behavioral outcomes), consistent with prior syntheses showing school-based programs can effectively elevate activity levels when implemented with fidelity [6-9, 16-19]. The increase in WHO guideline adherence reinforces that structured outdoor opportunities and health education can shift daily routines toward recommended thresholds [5-9, 16-21]. The small-to-moderate reduction in BMI percentile over just eight weeks is plausible given the short duration; sustained programming could yield larger anthropometric effects, as suggested by broader literature linking regular activity and healthier weight trajectories in youth [4-9, 17-19].

Mechanistically, the program likely worked by (i) increasing opportunity and cues for outdoor play (dedicated sessions within the timetable), (ii) nurse-delivered education and reinforcement that targeted motivation and skills, and (iii) school-home engagement to reduce barriers and normalize active play [1-3, 10-15, 19-21]. The consistency of improvements across outcomes supports the central hypothesis that nurse-led outdoor play promotion enhances children's physical activity and related health indicators in school settings. Future work should examine maintenance beyond eight weeks, dose-response effects, and implementation determinants across public and private schools to address contextual variation noted in school health research [7-9, 16-21].

Discussion

The findings of this study demonstrate that a structured, nurse-led outdoor play promotion program significantly increased physical activity levels and improved related health indicators among school-aged children. This aligns with prior evidence showing that the school environment can be an effective platform for promoting physical activity when supported by structured health interventions [1-3, 6-9]. Notably, the observed increase of approximately 18 minutes in daily physical activity and 1.4 active days per week is consistent with previous school-based interventions where health promotion strategies were embedded into daily school routines [7-9, 16-21]. These results underscore the crucial

role Paediatric nurses can play in encouraging active lifestyles and integrating physical activity into children's everyday school experiences.

The improvement in WHO guideline adherence (≥ 60 minutes of daily physical activity) further emphasizes the impact of health professional involvement in activity promotion. Earlier research suggests that nurse-led interventions enhance both student engagement and behavioral change because nurses are uniquely positioned to provide individualized health education, monitor progress, and collaborate with teachers and parents [10-12, 16-21]. This dual role of educator and health advocate allows nurses to address both environmental and behavioral barriers to outdoor play, leading to more sustainable changes in physical activity patterns.

Furthermore, the modest but significant reduction in BMI percentile, despite the short intervention period, indicates early health benefits that could become more pronounced over time with continued participation. Physical activity interventions, especially those emphasizing outdoor play, have been linked to improved weight trajectories, cardiovascular health, and psychosocial outcomes in children [4-6, 13-15, 17-19]. Given that childhood obesity and sedentary behaviors remain pressing public health concerns globally, these findings have important implications for preventive health strategies.

The success of this intervention can be attributed to several factors. First, structured outdoor play sessions provided regular and enjoyable opportunities for movement, thereby increasing daily energy expenditure. Second, the active involvement of Paediatric nurses ensured consistency, accountability, and a supportive environment for children. Third, integrating educational components likely enhanced children's understanding of the benefits of physical activity, improving intrinsic motivation to participate. These mechanisms echo existing literature on the effectiveness of combining structured programming with health education in school settings [7-9, 16-21].

However, some considerations must be acknowledged. The study was conducted over eight weeks, which may limit long-term extrapolation of outcomes. Sustained behavior change requires ongoing support, reinforcement, and environmental facilitation. Additionally, variability in

school infrastructure and parental involvement could influence intervention outcomes, as highlighted in other studies examining similar programs [1-3, 15-19]. Future research should explore longer intervention periods, follow-up assessments, and tailored strategies for different school types to ensure broader applicability.

Overall, the results provide strong support for incorporating nurse-led outdoor play programs into comprehensive school health frameworks. Paediatric nurses can act as catalysts for change, bridging health promotion and education to foster active, healthier lifestyles in children. By creating enabling environments that prioritize outdoor play, schools can contribute meaningfully to reducing sedentary behaviors, improving physical fitness, and promoting overall child well-being [5-9, 16-21].

Conclusion

This study provides compelling evidence that nurse-led outdoor play promotion interventions can effectively enhance children's physical activity levels, increase adherence to daily movement recommendations, and improve early indicators of health such as BMI percentile. By embedding structured play opportunities into the school environment, supported by health education and parental engagement, Paediatric nurses can serve as pivotal change agents in shaping active behaviors among children. The significant increase in daily activity minutes and active days per week observed in this study highlights that schools are not merely academic spaces but also powerful platforms for preventive health promotion. Outdoor play is not only essential for physical well-being but also contributes to cognitive development, social interaction, and emotional resilience, thereby supporting a holistic approach to child health.

To ensure sustained impact, it is crucial to translate these findings into practical strategies at the school and community levels. One key recommendation is to integrate nurse-led outdoor activity sessions as a routine component of the school timetable, ensuring that children receive structured opportunities for physical movement during the day. Schools should provide safe and accessible outdoor spaces that encourage free play, games, and physical challenges appropriate to different age groups. In parallel, training and empowering Paediatric nurses to deliver activity-based interventions, lead health education programs, and monitor children's progress can ensure consistency and accountability. Collaboration between nurses, teachers, and parents should be strengthened to create supportive environments that reinforce healthy habits both at school and at home.

Additionally, policy initiatives can play a critical role in institutionalizing these practices. Education and health departments can work together to set minimum standards for physical activity time in schools and to allocate resources for training nursing staff in health promotion strategies. Developing culturally appropriate and engaging programs can further enhance children's motivation to participate actively. Monitoring and evaluation frameworks should be established to track outcomes over time, helping schools adapt and sustain successful initiatives. Lastly, fostering community partnerships—such as involving local recreation centers, parent groups, and health organizations—can expand the reach of these interventions beyond school walls.

In essence, investing in structured, nurse-led outdoor play programs represents a strategic and sustainable approach to promoting active lifestyles and preventing lifestyle-related health issues from an early age. By prioritizing physical activity in school health frameworks, we can build healthier generations, support academic achievement through improved physical and mental well-being, and create environments where children thrive both inside and outside the classroom.

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How to Cite This Article

Santoso PA, Pratama RA, Halimah SN. Outdoor play and physical activity promotion: Role of paediatric nurses in schools. *Journal of Paediatrics and Child Health Nursing.* 2025; 2(2): 45-50.

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