

# The Role of Physical activity in children with asthma: A Systematic Review of the Literature

## ROLA AKTYWNOŚCI FIZYCZNEJ U DZIECI CHORYCH NA ASTMĘ: PRZEGLĄD LITERATURY

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### Summary

**Introduction:** Pediatric asthma is a prevalent chronic respiratory condition globally, posing significant clinical and public health challenges. While physical activity (PA) is essential for healthy childhood development, integrating PA into asthma care remains complex due to both medical and psychosocial factors.

**Purpose:** This review explores the multifactorial relationship between asthma and physical activity in children. It analyzes how clinical symptoms, psychological barriers, environmental contexts, family dynamics, and socioeconomic factors influence activity levels among pediatric asthma patients. The goal is to identify actionable strategies for supporting physical activity without compromising asthma control.

**Conclusion:** Although well-managed asthma does not inherently limit physical activity, many children—especially those with poorly controlled symptoms, obesity, or from marginalized backgrounds—face barriers to active lifestyles. Emotional factors like fear of exacerbations, parental anxiety, and restricted environments further complicate engagement in PA. Successful interventions require personalized, multidimensional approaches involving medical management, family education, behavioral support, and environmental improvements to promote both physical health and disease control.

**Materials and methods:** Our review is based on analysis of materials collected in 'Pubmed' using the keywords: physical activity, pediatric asthma, asthma management.

**Key words:** *Pediatric asthma, physical activity, asthma management*

### Streszczenie

**Wprowadzenie:** Astma u dzieci jest jedną z najczęściej występujących przewlekłych chorób układu oddechowego na świecie i stanowi istotne wyzwanie kliniczne oraz problem zdrowia publicznego. Pomimo że aktywność fizyczna (AF) odgrywa kluczową rolę w prawidłowym rozwoju somatycznym i psychospołecznym dzieci, jej włączanie do kompleksowej opieki nad pacjentami pediatrycznymi z astmą pozostaje zagadnieniem złożonym, uwarunkowanym zarówno czynnikami medycznymi, jak i psychospołecznymi.

**Cel:** Celem niniejszej pracy przeglądowej jest analiza wieloczynnikowych zależności pomiędzy astmą a aktywnością fizyczną u dzieci. Przedstawiono wpływ objawów klinicznych, barier psychologicznych, uwarunkowań środowiskowych, funkcjonowania rodziny oraz czynników społeczno-ekonomicznych na poziom aktywności fizycznej u dzieci chorujących na astmę. Dodatkowym celem jest identyfikacja możliwych do wdrożenia strategii wspierających aktywność fizyczną bez ryzyka pogorszenia kontroli choroby.

**Wnioski:** Prawidłowo kontrolowana astma nie stanowi sama w sobie przeciwwskazania do podejmowania aktywności fizycznej. Niemniej jednak wiele dzieci — w szczególności pacjenci z niewystarczającą kontrolą objawów, współistniejącą otyłością lub pochodzący ze środowisk defaworyzowanych — doświadczają licznych barier ograniczających aktywny styl życia. Czynniki emocjonalne, takie jak lęk przed zaostrzeniami choroby, nadmierny niepokój rodziców oraz ograniczające warunki środowiskowe, dodatkowo utrudniają uczestnictwo w aktywności fizycznej. Skuteczne interwencje powinny mieć charakter spersonalizowany i wielowymiarowy, obejmując optymalizację leczenia farmakologicznego, edukację rodziny, wsparcie behawioralne oraz modyfikację środowiska w celu jednoczesnego promowania zdrowia fizycznego i skutecznej kontroli astmy.

**Materiały i metody:** Przegląd piśmiennictwa przeprowadzono na podstawie analizy publikacji z bazy danych PubMed, wykorzystując następujące słowa kluczowe: *aktywność fizyczna, astma dziecięca, leczenie astmy*.

**Słowa kluczowe:** *astma dziecięca, aktywność fizyczna, leczenie astmy*

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## Introduction

Pediatric asthma is the most common chronic respiratory disease in children and remains a major focus of clinical and public health concern worldwide [1,2]. Despite the availability of multiple international guidelines aimed at improving clinical decision-making, the practical implementation of these recommendations often remains inconsistent. Effective symptom control remains the cornerstone of asthma management. Achieving this requires not only appropriate pharmacological treatment but also active engagement from healthcare professionals, patients, and their caregivers. Essential components include asthma education, avoidance of known triggers, regular health monitoring, and timely management of exacerbations. Although personalized therapies tailored to specific phenotypes are emerging, they have yet to become standard practice in pediatric asthma care.

Physical activity (PA), recognized for its broad physical and psychological benefits, plays a vital role in child development. However, its integration into asthma care is complicated. While many children with well-controlled asthma are as active as their healthy peers, others experience limitations due to symptom severity, environmental triggers, and psychosocial factors such as fear of exacerbation or parental anxiety. Disparities in activity levels are particularly evident among children from low-income or minority backgrounds, where barriers such as limited access to safe environments or insufficient health literacy are more pronounced.

This article explores the multifaceted relationship between physical activity and pediatric asthma. It examines not only the clinical impact of asthma on exercise capacity, but also the psychosocial, environmental, and systemic factors that influence physical activity in children with this condition. Understanding these complexities is essential to designing effective interventions that support healthy, active lifestyles in asthmatic children while ensuring optimal disease control.

### Physical Activity Levels in Children with Asthma Compared to Their Peers

Many studies suggest that children with well-controlled asthma do not significantly differ in physical activity levels from their healthy peers. A meta-analysis of 16 studies found no significant differences in moderate to vigorous physical activity (MVPA) levels and a small but significant reduction in sedentary time among children with asthma. Notably, factors such as age and gender did not affect the results [3].

Similarly, a review of 28 studies that included both subjective and objective measures also found no significant differences in daily step counts or moderate activity time between children with asthma and the control group [4]. Comparable results were found in a meta-analysis of 12 studies using only objective measures (e.g., accelerometers), where the differences between groups were statistically insignificant [5].

However, not all studies are in agreement. In a study involving 318 children, those with asthma demonstrated lower functional performance and significantly fewer daily steps than their healthy peers. Moreover, the

proportion of physically inactive children was nearly twice as high in the asthma group [6].

### Psychosocial Factors Limiting Physical Activity

Numerous analyses indicate that it is not asthma itself but its associated symptoms—such as shortness of breath, wheezing, or fear of exacerbation—that may limit children's activity levels. Children with asthma more frequently report limitations in vigorous activity, even though total physical activity time does not differ from that of healthy children [7].

An interesting aspect is the influence of physical self-perception. A study conducted in Taiwan showed that children with asthma participated less frequently in high-intensity physical activities, although their physical self-esteem did not significantly differ from that of healthy children. Furthermore, gender—not asthma—was the main factor influencing self-perception in terms of strength, endurance, and perceived body weight [8].

### Environmental and External Factors Influencing Activity

Limitations in the physical activity of children with asthma also stem from environmental conditions.

The COVID-19 lockdown period also impacted children's activity levels—daily step counts dropped by about 3,000, and both moderate and vigorous activity times significantly decreased. Interestingly, despite reduced activity, asthma symptom control improved, suggesting that other factors may play a role in exacerbation mechanisms [9].

Asthma is among the most common chronic conditions in children and is known to impact daily functioning, including participation in physical activity. However, research increasingly shows that beyond the clinical symptoms, family-related psychosocial and behavioral factors significantly influence activity levels. Parental attitudes, management strategies, and emotional responses to asthma play a critical role in shaping children's engagement in PA and, by extension, their overall health outcomes.

Beyond immediate environmental exposures, psychosocial and behavioral factors have been shown to significantly influence allergic conditions, including asthma, in adolescent populations [10]. Large-scale population data indicate that asthma prevalence is associated with adverse health behaviors, such as smoking, drinking or sleep deprivation as well as with poorer self-rated health status. Moreover, elevated stress perception has emerged as a critical determinant of allergic disease burden, underscoring the importance of psychological well-being in disease expression and management. These observations suggest that asthma-related activity limitations may be partially mediated by psychosocial strain and maladaptive coping strategies, rather than by physiological constraints alone.

Physical activity itself is increasingly understood as the product of interconnected individual, social, and environmental influences rather than a single determinant [11]. Network-based analyses demonstrate that factors such as self-efficacy, intrinsic motivation, perceived social support, and supportive physical environments are closely linked to engagement in physical activity, often through indirect pathways. Importantly, social support functions as a central hub

connecting motivational, behavioral, and environmental factors, whereas externally imposed pressure or regulation may negatively affect activity participation. In the context of pediatric asthma, this suggests that children’s activity levels are likely influenced by family attitudes and environmental support systems as much as by symptom severity.

Consistent with ecological models of health behavior, research further emphasizes the role of family, school, and community environments in shaping adolescents’ physical activity patterns [12]. Supportive parent–child relationships, positive parental expectations, and safe, socially cohesive communities have been shown to promote higher levels of physical exercise. At the school level, a positive school climate and strong home–school collaboration appear to exert greater influence on activity behavior than access to sports infrastructure alone. These findings reinforce the notion that social and relational environments are critical determinants of physical activity engagement, particularly for children managing chronic conditions such as asthma.

Taken together, these data indicate that activity limitations in children with asthma cannot be attributed solely to medical factors. Instead, they arise from a dynamic interaction between environmental exposures, psychosocial stressors, family behaviors, and broader social contexts. Effective strategies to promote physical activity in this population should therefore integrate medical management with psychosocial support and family- and community-based interventions, aiming to reduce unnecessary restrictions while fostering confidence, autonomy, and supportive environments.

**Parental Attitudes, Behaviors, and Emotional Responses**

Differences in parental attitudes toward nutrition and physical activity between families of children with and without asthma may partially explain disparities in lifestyle

behaviors and weight status. In a study involving 621 parents of children aged 10–16, those with asthmatic children reported higher use of emotional feeding strategies and greater pressure for their children to exercise. These behaviors were associated with a higher BMI z-score (BMIz) in the asthmatic group. When asthma was poorly controlled, these associations weakened, suggesting that asthma control moderates the influence of parenting practices on lifestyle outcomes [13].

Moreover, anxiety about asthma episodes during exertion is prevalent among both children and parents. A cross-sectional study involving 150 children and their caregivers found that moderate to severe asthma was associated with increased fear of physical limitations, particularly during physical exertion. Parents expressed even greater concern than their children, especially about sudden asthma attacks, adverse effects of medication, and school absenteeism [14]. These fears can discourage both spontaneous and organized physical activities. A comparative summary of factors influencing physical activity in children with asthma [7-14] is provided in Table I.

**Table I.** Factors influencing physical activity in children with asthma

Category	Examples
Psychosocial factors	Fear of exacerbation, physical self-perception, gender
Environmental factors	COVID-19 lockdown period
External factors	Parental attitudes, management strategies, emotional response, psychosocial strain, social support, school support

Table prepared on the basis of sources 7-14.

**Family Management of Asthma and Physical Activity**

The role of parents in asthma management is particularly important in the context of physical activity. Interrupting the cycle of sedentary behaviour among children with asthma and obesity appears especially crucial. A sedentary lifestyle aggravates respiratory symptoms and contributes to weight gain. Intensive interventions primarily include motivational interviewing with parents, as well as jointly setting realistic goals, such as 60 minutes of moderate physical activity per day. Monitoring the child’s progress through engaging and motivating applications or activity logs is also beneficial. Parents should additionally remember the importance of positive reinforcement, such as rewarding even small achievements. The recommendations also include dietary advice, such as consuming five portions of fruit and vegetables per day, fibre intake exceeding 25 g/day from wholegrain products, eliminating sugar-sweetened beverages (fewer than one serving per week), and having daily protein-rich breakfasts. It is vital to involve the child in meal planning to prevent the perception of a restrictive diet, which may lead to resistance or rebellion. These lifestyle modifications enhance the production of short-chain fatty acids (SCFAs) by the gut microbiota, which in turn inhibits NLRP3, decreases IL-1β, and reduces AHR in the airways. When effectively and clearly implemented by parents with appropriate support, these measures improve adherence to inhaled corticosteroids (from 40-60% to over 80%), facilitate BMI reduction by up to 10% within six months, and strengthen asthma control (FEV<sub>1</sub>/FVC increase by 5-8%) [15].

It should also be noted that physical exercise continues to evoke fear and anxiety among parents of children with asthma. A study conducted among parents of 8-10-year-old children attending New York schools revealed key issues and barriers related to physical activity. The complexity of these challenges arises from both interpersonal and community-level factors. Participants reported that the most common concern was exercise-induced asthma. One of the main reasons for this fear was a lack of awareness of symptoms in their children. Consequently, parents frequently reported restricting sports involving running, fearing an episode of breathlessness in their absence.

During play, as many as 50% of children ignored symptoms of dyspnoea, refusing to use their inhalers due to frustration associated with interrupting playtime.

Another significant barrier was parents' concern about potential hyperactivity following medication use, which contributed to poor adherence to pharmacotherapy recommendations. From a broader social perspective, a prevailing issue among parents was a lack of trust in schools. Caregivers often expressed concerns that physical education teachers were unfamiliar with asthma management and that school nurses were not consistently available to their children [16].

A study based on qualitative interviews with 20 caregiver-adolescent pairs demonstrated the crucial role caregivers play in facilitating and encouraging PA among children with asthma and overweight/obesity. Family-level processes and behaviours were identified as key determinants. The lack of modelling within families of children with asthma—resulting from caregivers' limited time, fatigue, or health problems—hindered the children's engagement in PA. In contrast, emotional support from the family, such as motivation on difficult days, and a balanced level of adolescent independence were factors that promoted participation. Key processes included appropriate reminders and discussions about PA, praise combined with rewards, as well as behaviours such as joint family physical activity and provision of necessary resources, all of which reinforced PA in this high-risk group. It should be noted, however, that excessive reminding often led to resistance and opposition among affected adolescents [17].

A study of 147 ethnically diverse children showed that better adherence to medication and collaboration with healthcare providers was positively associated with meeting PA recommendations. In contrast, more restrictive environmental control strategies (e.g., allergen avoidance) were linked to lower activity levels. Interestingly, these associations varied by ethnicity but not by weight status, underscoring the importance of culturally tailored interventions [18].

### **Perspectives from Healthcare Professionals and Families**

Interviews with healthcare providers, parents, and young children in the UK revealed that while physical activity is recognized as beneficial for asthmatic children, systemic barriers hinder its promotion. Time constraints among health staff, poor parental education, and limited access to inhalers at school were cited as key challenges. Participants emphasized the need for programs that educate parents to distinguish between asthma symptoms and exertional dyspnea, ensure proper inhaler use, and teach practical symptom-management strategies [19].

Parental involvement is a pivotal determinant of physical activity among children with asthma. Emotional, behavioral, and management-related factors within the family unit significantly affect whether children remain active. Effective interventions should not only target the child's medical condition but also address parental beliefs, anxieties, and support strategies. Incorporating education, emotional support, and family-based asthma management into treatment plans may enhance both symptom control and activity engagement.

### **Asthma, BMI and lifestyle**

Numerous studies have investigated the complex interplay between asthma, body mass index (BMI), and physical activity (PA) in children. While asthma alone

does not always lead to inactivity or obesity, it can influence lifestyle behaviors through symptom severity, environmental limitations, and psychosocial perceptions.

A study utilizing actigraphy in children aged 9–11 found no significant differences in overall PA or BMI between children with and without asthma. However, children with asthma more frequently reported activity limitations due to respiratory symptoms. After controlling for gender, BMI, and symptoms, asthma was associated with lower moderate and vigorous activity levels. The study concluded that BMI may moderate the effect of asthma on physical activity, highlighting the need for future research focusing on symptom severity and obesity as mediators [7].

Similarly, another study comparing children with asthma (n=56) to those with ENT or dermatological conditions (n=61) revealed higher mean BMI and obesity rates in the asthma group (21.4% vs 6.6%). These children also reported fewer daily physical activities and more emotional health difficulties. Notably, 66.1% of children and 60.7% of parents considered asthma a barrier to exercise—compared to approximately 11% in the control group [20].

A longitudinal urban study involving 142 children aged 7–9 explored how asthma, weight, and social context affect moderate-to-vigorous physical activity (MVPA). Results showed that poorer asthma control correlated with lower MVPA, especially among Latino and African American children and those with normal BMI. Perceived neighborhood safety and fear of asthma symptoms further weakened the asthma–PA relationship [21].

Interestingly, in a large U.S. preschool cohort (n=547), physical activity—measured via accelerometry—did not significantly differ by asthma symptom status after adjusting for demographic factors. Yet, physical activity was highest in warmer seasons, among boys, and children whose mothers were U.S.-born or not employed. These findings underscore the influence of socioeconomic and seasonal contexts on PA more than asthma status itself [22].

An analysis of over 270,000 children and adolescents from the ISAAC study found a clear association between overweight/obesity and asthma symptoms. However, intense physical activity increased symptom prevalence among adolescents but not younger children. Excessive screen time (TV >5 hours/day) also elevated asthma risk in younger children, suggesting a multifactorial relationship between sedentary behaviors, PA, and respiratory health [23].

Several studies affirm that children with poorly controlled or severe asthma face greater physical limitations, which are often exacerbated by excess weight. For instance, in a U.S. cohort of 324 children with persistent asthma, only 39% met the daily PA recommendation. Many lacked access to safe play areas, and activity limitations more than doubled the risk of overweight or obesity [24]. In Norway, logistic regression revealed that asthma severity and overweight were the strongest predictors of perceived effort limitations, even when accounting for lung function and socioeconomic status [25].

Other research found that even though asthma and obesity individually did not predict PA levels, fewer than 20% of children met step-count recommendations, indicating that broader behavioral interventions may be

necessary regardless of clinical status [26]. Among urban children with persistent asthma, only 29% displayed both good lung function and high PA. Parents of children with poorer lung function but higher PA expressed more concerns, suggesting that tailored interventions should consider family attitudes and symptom perception [27].

Encouragingly, some findings highlight that asthma is not always seen as a barrier. In one survey, over 93% of children with asthma participated in physical education classes, and 56.5% took part in additional sports. Only a small proportion of parents (6.5%) felt that asthma frequently limited their child's functioning, and just 12% viewed PA as inappropriate—pointing to a knowledge gap rather than real restrictions. The study emphasized the need for educational initiatives targeting parents, teachers, and coaches to dispel myths and promote active lifestyles in children with asthma [28].

The relationship between asthma, BMI, and physical activity is dynamic and influenced by clinical, environmental, cultural, and psychological factors. While some children with asthma maintain adequate activity levels, others—particularly those with poorly controlled asthma or obesity—experience significant limitations. Interventions must be multifaceted, targeting asthma control, family education, environmental safety, and behavioral reinforcement to effectively support physical health in this population.

#### **Benefits and risks of physical activity in children with asthma**

Physical activity (PA) is widely recognized as a critical factor in promoting physical and psychological health in children, including those with chronic conditions like asthma. However, the relationship between asthma and PA is nuanced, with both beneficial and potentially adverse consequences depending on environmental, physiological, and psychosocial conditions.

One of the clearest benefits of physical activity is its positive impact on health-related quality of life (HRQoL). A study of Spanish children aged 8–14 years with asthma found a significant correlation between the frequency of physical activity and HRQoL, with no notable gender differences. Regular PA was associated with better overall well-being and life satisfaction, confirming its therapeutic value in pediatric asthma management [29].

However, children with asthma may face increased risks when exercising, particularly in polluted environments. A qualitative study involving 25 children and adolescents revealed that although most participants recognized outdoor pollutants (e.g., traffic and industrial emissions), only about half were aware of indoor air pollution. Notably, 44% believed that exercising in polluted areas was more harmful than beneficial, and only 24% considered the health benefits of PA to outweigh environmental risks. These findings emphasize the need for education to help children make informed choices about physical activity in relation to air quality [30].

Importantly, improved asthma control alone does not necessarily lead to increased physical activity. A longitudinal study of 30 children with initially uncontrolled asthma showed no significant changes in MVPA levels, even after clinical control was achieved. This suggests that psychological barriers, such as fear of symptoms, or external factors like lack of motivation or

access to safe spaces, may prevent children from becoming more active—despite improved health status [31].

Another critical yet underappreciated factor is sleep quality. In a study of 97 urban children with asthma, frequent nighttime awakenings were associated with reduced moderate to vigorous physical activity. These associations varied depending on ethnicity and weight status, indicating that sleep quality may mediate the relationship between lung function and daytime activity [32]. A related study on 147 children confirmed that increased nighttime awakenings predicted lower daytime activity and that decreased PA was paradoxically associated with a lower risk of asthma exacerbation—suggesting avoidance behavior [33].

Despite these complexities, systematic reviews of objective measurements (e.g., accelerometers) reveal minimal differences in PA levels between children with and without asthma. A meta-analysis of 12 observational studies reported a non-significant mean difference in activity level, suggesting that, when properly managed, asthma may not inherently limit a child's physical capacity [5].

The current evidence underscores a dual narrative regarding physical activity in children with asthma: it offers substantial quality-of-life benefits but may be hindered by environmental threats, disease-related fears, or behavioral factors. Promoting activity requires a multifaceted approach that includes asthma control, education on air quality and pollution exposure, behavioral support, and attention to broader determinants such as sleep quality and mental health. Ensuring children feel safe and empowered to be active is key to unlocking the full benefits of physical activity in asthma care. The data discussed in this paragraph [5, 29-33] are summarized in Tabel 2.

**Table II.** Benefits and risks of physical activity in children with asthma

Benefits	Risks
positive impact on health-related quality of life	Pollution exposure
Better overall well-being	Disease-related fears
Better life satisfaction	

Table prepared on the basis of sources 5, 29-33.

#### **Interventions Supporting Physical Activity in Children with Asthma**

Despite the well-documented benefits of physical activity (PA) in managing asthma symptoms and improving overall health, children with asthma often remain less active than their healthy peers. This inactivity is not always a direct result of the disease itself but frequently stems from a combination of psychosocial, environmental, and institutional barriers. Therefore, tailored interventions are needed to promote PA safely and effectively in this population.

A technologically supported intervention called Foxfit was developed to address this gap. Created through the “intervention mapping” (IM) method, the program was designed in collaboration with children with asthma, their parents, and healthcare professionals. It combines a wearable activity monitor with a child-focused app and a web-based dashboard for clinicians. Foxfit includes behavior-change techniques such as goal-setting, gamification, coaching, education, and individual adaptation. Preliminary outcomes suggest it can effectively support healthcare workers in encouraging physical activity among children aged 8–12 [34].

Another s-based intervention, the InPACT program, introduced short, in-class physical activity breaks (five 4-minute MVPA sessions daily). Implemented in Detroit classrooms where 31% of students had asthma, the program was shown to be safe: only six mild asthma incidents (cough) were reported, all resolving spontaneously. Interestingly, children with asthma participated more frequently in vigorous activities and spent less time sedentary than their non-asthmatic peers [35].

Understanding the lived experiences of children and their caregivers is crucial in designing effective interventions. A concept mapping study involving children, parents, and healthcare professionals identified 26 influencing factors—17 environmental (e.g., supportive surroundings, facility access) and 9 personal (e.g., asthma control, motivation). The most critical factors included good asthma control, environmental support, and tailoring physical activity opportunities to the child's abilities [36].

Complementing these findings, large-scale population data from the Millennium Cohort Study (UK) revealed that while most children with asthma are as active as their peers, those recently hospitalized for asthma exhibited reduced PA and were less likely to meet the 60-minute MVPA guideline. Notably, children with active symptoms spent less time in sedentary behavior, suggesting complex behavioral adaptations to symptom severity [37].

Posture-related outcomes were also investigated. A study of 192 children (90 with asthma and allergies) found a significant association between physical activity and correct body posture. Among both healthy and asthmatic children, those who were more physically active had a higher prevalence of normative postural alignment, indicating additional musculoskeletal benefits of PA in this group [38].

Finally, a qualitative meta-analysis synthesized insights from 238 children with asthma across 16 studies. It highlighted both supportive and limiting themes. Positive aspects included feelings of connection with others, skill development, and emotional well-being. On the other hand, children also reported exclusion, embarrassment, and emotional distress linked to PA. This divergence suggests that whether a child engages in or withdraws from physical activity is strongly mediated by social support and external perceptions [39].

Interventions aimed at increasing physical activity among children with asthma must go beyond simple encouragement. Successful programs integrate behavioral science, education, environmental design, and empathetic understanding of children's lived experiences. From technology-based platforms like

Foxfit [34] to classroom-based movement strategies [35], and from community-level data to individual-level insights (paras. [36-38], a comprehensive and child-centered approach is essential. Interventions should not only promote activity but also dismantle the psychological and structural barriers that prevent children with asthma from fully engaging in healthy movement.

### **Socioeconomic and Ethnic Disparities in Physical Activity Among Children with Asthma**

Asthma disproportionately affects children from urban, low-income, and racially marginalized communities, particularly African American and Latino populations. These groups often face additional challenges, such as higher obesity rates, limited access to physical activity (PA), and environmental or psychosocial barriers. The intersection between asthma, physical activity, and socioeconomic or ethnic background is therefore a critical area of research.

In a study involving 97 urban children aged 7–9 with persistent asthma, only 29% exhibited both good lung function and high levels of moderate to vigorous physical activity (MVPA). Other children showed suboptimal combinations, such as low lung function despite high MVPA. Interestingly, parents of physically active children with poor lung function expressed more concerns about asthma, regardless of their child's actual respiratory status. These findings support the need for individualized interventions based on nuanced clinical and behavioral profiles [27].

Another study of 324 children with poorly controlled asthma found that nearly half had very poor asthma control, while 31% were classified as obese and only 39% achieved the recommended 60 minutes of daily activity. Limited opportunities for PA were prevalent: 85% of children did not walk to school, 38% had no outdoor recess, and 35% lacked access to safe exercise spaces. Activity limitations significantly increased the risk of overweight or obesity [24].

A longitudinal analysis of 142 children aged 7–9 from diverse ethnic backgrounds revealed that poorer asthma control correlated with lower MVPA, particularly among Latino and African American children and those with normal BMI. Perceived neighborhood safety and caregiver anxiety about asthma symptoms further moderated the relationship between asthma severity and activity levels [21].

Family asthma management practices also influence physical activity. In a cohort of 147 children with asthma, better adherence to medication and collaboration with healthcare professionals were positively associated with meeting PA guidelines. In contrast, stricter environmental control measures (e.g., allergen avoidance) were linked to lower activity levels. These associations varied by ethnicity but not by body weight [18].

Findings from the ALSPAC cohort in the UK (n = 6,473) showed that asthma and eczema were not significantly associated with decreased activity in adolescents. However, obesity was a clear predictor of lower MVPA, especially among boys (–11.1 minutes/day) and girls (–5.0 minutes/day), highlighting the independent role of weight status in activity patterns [40].

A Danish national study involving 4,824 children found that lower physical activity levels were associated with both lifetime and current asthma prevalence, particularly in boys. These associations were most pronounced in children with active symptoms, suggesting that physical inactivity may be both a consequence and a contributing factor to asthma development or persistence [41].

Finally, a review of 34 studies (21 quantitative, 13 qualitative) revealed that psychosocial and socioeconomic factors—such as self-efficacy, enjoyment of PA, social support, and perceived health—were significantly related to physical activity levels in children with asthma. A recurring theme in qualitative research was the desire to feel "like their peers," underscoring the importance of inclusion and empowerment in intervention design [42].

Disparities in physical activity among children with asthma are closely tied to socioeconomic status, race/ethnicity, and contextual factors such as neighborhood safety and school infrastructure. While asthma itself may not universally reduce activity levels, it interacts with broader structural and psychosocial conditions in ways that disproportionately disadvantage already vulnerable populations. Public health strategies should prioritize equity-focused interventions that address these layered determinants—empowering children across all backgrounds to lead active, healthy lives.

**Discussion of the Previous Literature**

Previous studies indicate that asthma, when adequately controlled, does not inherently limit physical activity in children. Systematic reviews and population-based studies show that children with asthma often achieve physical activity levels comparable to their healthy peers, particularly when objective assessment methods are used [4,5,31,37,41].

Nevertheless, reduced activity is reported in specific subgroups, including children with poorly controlled or severe asthma, comorbid overweight or obesity, and those living in disadvantaged or urban environments [20,24–27]. Rather than complete inactivity, children with asthma tend to avoid vigorous or high-intensity exercise, suggesting selective limitation influenced by symptom-related concerns [23,25].

Psychosocial factors play a major role in shaping physical activity behaviors. Parental anxiety, fear of exercise-induced symptoms, and overprotective practices frequently restrict children’s participation in physical activity, while children may develop reduced confidence and negative self-perceptions related to exercise [8,14,16–18,39]. Environmental barriers, such as limited access to safe play spaces, school constraints, and concerns about air pollution, further limit activity opportunities [21,22,30].

The relationship between asthma, physical activity, and body mass index is bidirectional. Physical inactivity may contribute to overweight and obesity, which can worsen asthma symptoms and reinforce avoidance of exercise [15,20,26]. Evidence from intervention studies indicates that physical activity can be safely promoted in children with asthma through family-centered, school-based, and technology-supported approaches that address both medical and behavioral factors [13,19,34–36].

The literature suggests that asthma itself is not the primary barrier to physical activity. Instead, activity levels are determined by an interplay of clinical control, psychosocial perceptions, family dynamics, and environmental conditions, highlighting the need for multidimensional strategies to support active lifestyles in children with asthma [4,5,20,36,39,42]. A summary of the data presented in this paragraph is provided in Table 3.

**Table III.** Previous literature

Children with asthma often achieve physical activity levels comparable to their healthy peers	4,5,31,37,41
Children with asthma in specific subgroups have reduced levels of physical activity.	20, 24-27
Children with asthma avoid high-intensity exercises	23,25
Parental anxiety reduces physical activity levels in children with asthma	8,14, 16-18, 39
Environmental barriers reduce physical activity levels in children with asthma	21,22,30
Asthma, physical activity, and BMI are linked bidirectionally	15, 20 ,26
Strategies to promote physical activity in children with asthma	13,19, 34-36
Activity level in children with asthma are determined by many factors	4,5,20,36,39,42

Table based on the section Discussion of the Previous Literature.

This review was written with information from such databases as PubMed, ResearchGate and Google Scholar. To contextualize findings and support broader discussion themes, the review incorporated evidence from original studies, systematic reviews, meta-analyses. The search strategy combined free-text keywords related to asthma and physical activity. Keywords included: “pediatric asthma”, “childhood asthma”, “physical activity”, and “asthma management”. The search included studies published in the last 20 years, ensuring inclusion of both foundational and recent evidence. Only studies published in English were considered. Overall, the search strategy ensured inclusion of a robust, representative, and up-to-date evidence base, supporting comprehensive analysis of the associations between asthma and physical activity in pediatric populations.

## Conclusions

This review underscores that while asthma—when properly managed—does not necessarily impede physical activity in children, numerous other factors can limit their participation. Psychological elements such as fear of triggering symptoms, concerns from caregivers, and environmental limitations like inadequate access to safe play areas often play a more significant role than the disease itself.

Children from underserved communities, particularly those facing economic hardship or ethnic disparities, often contend with a combination of asthma-related challenges, obesity, and restricted activity options. Still, evidence shows that with appropriate support and management, these children are capable of maintaining physical activity levels similar to their non-asthmatic peers.

To promote healthy activity in this population, interventions must be holistic and individualized. They should combine effective asthma treatment with family education, behavioral guidance, and environmental or institutional support. Promising strategies include digital tools, school-based programs, and culturally tailored approaches that account for the child's social and clinical context.

Ultimately, empowering children with asthma to remain physically active requires not only good disease control but also addressing the broader emotional, social, and structural barriers they face.

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## DISCLOSURE

### Author contributions

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