

Childhood Asthma Risk with Moderate Exercise: Good News for Most!



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The past 2 years of the COVID pandemic have significantly limited opportunities for exercise in children kept indoors by the quarantine. Even before the pandemic, public schools, in efforts to improve standard test scores, increasingly reduced the amount of time allocated to organized physical activity. Today, children are preoccupied by sedentary activities such as social media, video games, and live stream entertainment. The World Health Organization reports that worldwide obesity has tripled since 1975, affecting 340 million children and adolescents since 2016 alone.¹ The prevalence of obesity is greater in individuals with current asthma than it is in those without asthma (38.8% vs 26.8%).² Obesity is widely recognized as a risk factor for the development of asthma, and once established, obesity increases breathlessness and exercise impairment. The interaction of obesity and exercise level on asthma risk in children is an important question in that sedentary lifestyle clearly promotes obesity, obesity promotes asthma risk, but whether exercise per se decreases asthma risk is poorly understood.

In this issue of *JACI in Practice*, Lu et al³ present a retrospective longitudinal analysis of the impact of moderate-to-vigorous physical activity on asthma risk with body mass index (BMI) as an interacting factor. The study involved over one-half million children enrolled in a large southern California managed care organization during a 7-year span wherein moderate physical activity and incident asthma were assessed at routine visits. On the basis of Cox proportional hazards regression models with factors adjusted for race/ethnicity, socioeconomic status, and air pollution exposure, the investigators found that different levels of physical activity inform asthma risk in children and adolescents. Children who reported relatively low levels of exercise at baseline had lower asthma risk with an increase in moderate-to-vigorous physical activity, whereas children reporting high levels of exercise at baseline experienced greater asthma risk with moderate-to-vigorous physical activity. Although the net level of moderate-to-vigorous physical activity decreased with increasing body weight category, unexpectedly there was no significant interaction with exercise activity and BMI on asthma risk.

Unique features of the Lu et al study population should be considered in applying their results to other populations. Lu et al studied a managed care population enriched in Hispanic children, approximately one-third overweight/obese, with a relatively low asthma incidence rate of 7.7 per 1000 person-years. By comparison, in the general US population, approximately one-fifth of children are overweight/obese,⁴ with a self-reported crude asthma incidence rate of 27.5 per 1000 person-years.⁵ The marked difference in asthma incident rate likely stems from the rigorous definition of asthma in the Lu et al study, which required physician diagnosis and treatment. However, to validate their findings, Lu et al conducted a sensitivity analysis with an internal control sample of eligible children who had similar features to the analytical cohort.

The finding of greater asthma risk in children engaged at relatively higher levels of exercise is not unexpected. Certainly, vigorous exercise per se is a widely recognized trigger for bronchospasm. Reporting of exercise-associated symptoms in heavy exercisers likely resulted in new diagnoses of asthma in the study sample, thereby accounting for the interesting results of Lu et al.

The results of Lu et al can be applied to clinical practice. Foremost, as a general principle of preventive health, allergists, pulmonologists, and primary care providers can encourage sedentary children to exercise as means to lower both asthma risk and obesity. Lucas and Platts-Mills⁶ proposed in 2005 that a direct effect of electronic media and entertainment resulted in children spending greater time indoors. These forms of entertainment promote exposure to indoor allergens, convenient access to soft drinks and rich snack foods, and likely are relevant to the increase in asthma prevalence and severity in at-risk populations.⁶ Sedentary behaviors have increased even more with the COVID-19 lockdown, which, in addition to masking and restricted outdoor exercise, has promoted anxiety in many children. Clinicians must be aware of the role of behavioral factors in the health of children and promote safe exercise outdoors despite COVID restrictions.

Further supported by the results of Lu et al,³ clinicians faced with a sedentary obese child with established asthma can encourage increased physical activity as an overall health strategy. The investigators found no significant interaction between BMI and moderate-to-vigorous physical activity in the analysis. However, overweight and obese children are often reluctant to start an exercise program because of anxiety related to perceived dyspnea. Sah et al⁷ found that obese children with asthma can present with increased symptoms that are not associated with airflow limitation but due to dyspnea from deconditioning. Often breathlessness and cough manifest at school with organized activity. Obese children with asthma should not be excused from organized physical activity at school, but according to treatment guidelines, they should use albuterol and leukotriene

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No funding was received for this work.

Conflicts of interest: The author declares that he has no relevant conflicts of interest. Received for publication October 11, 2021; accepted for publication October 11, 2021.

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J Allergy Clin Immunol Pract 2022;10:240-1.
2213-2198

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<https://doi.org/10.1016/j.jaip.2021.10.009>

modifiers to prevent symptoms pre-exercise. This means contending with those school forms that allow the child access to his or her rescue inhaler. Another helpful strategy is to use combination inhaled corticosteroids/long-acting beta-agonists administered at a time when the child is expected to participate in vigorous exercise so as to prevent troublesome exercise-associated symptoms. Finally, growth charts including BMI percentiles are highly important in the assessment of the child with poor symptom control, with exercise and nutrition having as important a role as appropriate anti-inflammatory medications in the treatment of childhood asthma.

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