
The Current Evidence of Integrative Approaches to Pediatric Asthma



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Asthma is a complex, multifactorial, and inflammatory chronic condition, and many children who are diagnosed with asthma integrate complementary therapies into their overall care. Due to the chronic nature of asthma, potentially negative side effects of long-term use of allopathic medications, and desire for natural approaches, patients and their families turn toward

complementary therapies. Up to 89% of parents use complementary and alternative medicine (CAM) to treat their child's asthma. This article reviews the current evidence on the most commonly used complementary therapies for pediatric asthma.

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Introduction

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Maternal In-Utero Dietary Influence

A mother's diet during pregnancy affects her child's development of disease. The risk of asthma in offspring can be lowered by decreasing maternal consumption of fast food and artificially sweetened soft drinks.^{2,3} Maternal diet during pregnancy as well as a childhood diet rich in antioxidants and omega-3 fatty acids could protect against allergic diseases in childhood.⁴ Interestingly, a maternal high-fiber diet results

in a specific gut microbiome her offspring that may be protective against asthma.⁵ Clinicians should counsel pregnant women to consume a healthy diet rich in fruits, vegetables, whole grains, and legumes like the traditional Mediterranean diet.

Early Childhood Exposures

A child's early dietary exposures may alter the immune system and affect future development of inflammatory conditions. Longer duration of breastfeeding is protective against the development of asthma; and early introduction of cereals, fish, and egg appears to decrease the risk of asthma.⁶ On the other hand, use of paracetamol in the first year of life as well as prenatal and postnatal exposure to antibiotics is associated with increased risk of wheezing.^{7,8}

Childhood Diet and Lifestyle

Diet

Following a traditional Mediterranean diet during childhood is protective against asthma; in particular, a high consumption of *nuts* is associated with a 50% reduction in the risk of wheezing. Unlike olive oil, margarine doubles the risk of both wheeze and allergic rhinitis.⁹ A high consumption of vegetables is associated with less wheezing, whereas a higher intake of high-fructose corn syrup-sweetened beverages increases the risk of wheezing and asthma.^{10,11}

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Elimination Diets

Elimination diets can help prevent asthma exacerbations in children sensitive to specific foods. Dairy is commonly reduced or eliminated because it is believed that milk increases the production of mucous. Although one study showed improvement in respiratory tract mucus production with milk avoidance, another study showed that dairy and egg consumption may actually decrease wheezing.^{7,12} Overall, there is insufficient evidence to restrict milk in asthmatic children.¹³ However, allergic symptoms may trigger asthma exacerbations, and it is appropriate to reduce or eliminate foods in a child's diet that trigger allergic symptoms.

Sedentary Lifestyle, Obesity, Sleep, and Hydration

Parents often restrict their asthmatic child's physical activity due to fear that exercise will induce an asthma exacerbation. However, obesity and a sedentary lifestyle increase asthma symptoms in children.¹⁴ Although exercise is an asthma trigger for some children, limiting physical activity is not recommended. Children should be encouraged to exercise to the best of their ability, and clinicians should optimize symptom control so that children can engage in physical activity successfully. Interestingly, in school-age overweight, asthmatic children, dietary intervention can induce weight loss and improve lung function and asthma symptoms.¹⁵ Adequate sleep is also important in asthma control.¹⁶ Good hydration has positive effects in exercise-induced asthma sufferers.¹⁷ Clinicians should pay careful attention to promoting healthy diet and exercise for pediatric asthma patients.

Mind-Body Therapies

Stress contributes to asthma exacerbations through promotion of inflammation and through its effects on the autonomic nervous system. Diverse mind-body therapies, including autogenic training, biofeedback, guided imagery, and meditation can help children manage stress, including the stress of having a chronic condition such as asthma. For example, self-hypnosis can help children manage asthma symptoms and improve their quality of life.¹⁸ Clinicians should recommend effective stress management strategies for both patients and caregivers. Mind-body therapies are safe and can be provided by physicians, psychologists, social

workers, and professional counselors. A growing number of smart device applications promote cost-effective home practice of these therapies.

Breathing Exercises

Breathing exercises may benefit asthma patients. The Papworth method which uses integrated breathing and relaxation exercises appears to ameliorate respiratory symptoms but has not been studied in children. The Buteyko method, based on the theory that asthma is due to chronic hyperventilation, involves a series of reduced-breathing exercises that focus on nasal breathing, breath-holding, and relaxation. The Buteyko method also has not been studied in children. Yogic breathing, or *pranayama*, encourages use of the rib cage, chest, diaphragm, throat, and nasal cavity to improve oxygen and carbon dioxide exchange. Common yogic breathing techniques for children include rabbit breathing, rapid abdominal breathing, alternate nostril breathing, and sectional breathing. Yoga postures such as back bending postures (Cow Pose and Camel Pose) help open the chest and clear mucous from the airways. Poses that synchronize breath and movement such as Mountain Pose and Swan Dive may also be beneficial in pediatric asthma.¹⁹

Dietary Supplements

Omega-3 Fatty Acids

Omega-3 fatty acids, docosahexaenoic acid (DHA), and eicosapentaenoic acid (EPA), found in fish oil, have anti-inflammatory properties. However, the benefit of omega prenatal fatty acid supplementation for preventing asthma is controversial. Early childhood intake of omega-6 PUFAs is linked to risk of allergic diseases including asthma.²⁰ The overall weight of evidence suggests a potential benefit of omega-3 fatty acid supplements in preventing and treating asthma.²¹ Fish oil is generally safe and is a reasonable supplement to offer asthmatic children.

Vitamins, Minerals, and Amino Acids

Consumption of fruit rich in *vitamin C* can reduce wheezing symptoms in childhood,²² but there is insufficient evidence to recommend supplemental vitamin C for children with asthma.²³ Low *vitamin D* has been an identified culprit in many inflammatory

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