

Does Healthy Diet Matter in Asthma Prevention and Control?

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Asthma is a global public health problem with substantial burden, particularly in terms of disability and limited quality of life. Asthma affects millions of people of all ages worldwide, with some data showing increased prevalence in recent years, especially among children in low- and middle-income countries [1]. Among a multitude of possible contributing factors, changes in diet composition and worsening nutritional quality have been implicated in the epidemiology of asthma [2]. Previous studies have suggested that some individual nutrients (e.g., long-chain polyunsaturated fatty acids, vitamin D, and antioxidants) or individual food groups (e.g., fruits, vegetables, and fish) may be associated with the etiology and biophysiology of asthma [3-6]. Because diet is a complex combination of foods from various groups and human nutritional status is dependent on the interplay of the nutrients that are naturally present in the whole-food admixture, there is an increasing interest in examining the impact of overall dietary patterns on asthma development and progression [7].

The study by Halpern-Silveira and colleagues [8] in this issue of *Indian Pediatrics* focused on this important emerging topic. This cross-sectional case-control study was designed to investigate the association of specific foods, food groups and a Mediterranean diet with asthma severity in 268 children with persistent asthma and 126 age-matched controls with intermittent asthma. The children were 3 to 12 years old and recruited from 2 teaching hospitals in Brazil. Performed by pulmonologists specialized in childhood asthma, diagnosis of asthma was based on the 2009 British Thoracic Society Guidelines, and severity classifications included intermittent and persistent asthma (mild, moderate, or severe) according to the 2007 US Guidelines for the Diagnosis and Management of Asthma. The consumption frequency of specific foods or food groups in the past 12 months among these children was classified as frequent (≥ 3 times/week) or infrequent (< 3 times/week) as per interviews with their parents or guardians using a standard pre-coded questionnaire. Two dietary patterns were defined based on consumption of at least five foods in each group, 3 times

or more per week: a pro-Mediterranean diet (fruit, vegetables, fish, fruit juices, root vegetables and tubers and grains) and a contra-Mediterranean diet (milk, meat, eggs, processed foods, soft drinks, butter). The results showed no significant association of asthma severity either with the consumption frequency of the specific foods and food groups, or with pro- or contra-Mediterranean diet.

Several recent reviews have suggested potential beneficial effects of certain nutrients, foods, and dietary patterns on asthma. A systematic review and meta-analysis by Nurmatov, *et al.* [5] assessed the relationship between childhood and maternal diets and asthma in children aged ≤ 16 years. The authors concluded that while the available epidemiologic evidence was weak, vitamins A, D and E, fruits and vegetables, and Mediterranean diet appeared to be protective for the prevention of asthma in children. Two other systematic reviews and meta-analyses specifically evaluated the relationship between dietary patterns and asthma [7,9]. Garcia-Marcos, *et al.* [9] investigated the association of Mediterranean diet with ever asthma, current wheeze and current severe wheeze, and if present, whether the relationship was specific to the Mediterranean regions. Their meta-analysis showed that adherence to Mediterranean diet was negatively associated with current wheeze and current severe wheeze in Mediterranean regions, but with ever asthma in non-Mediterranean regions; it was unclear why geographic regions had such a modifying effect. When considering all regions together, adherence to Mediterranean diet appeared to be protective against current wheeze and ever asthma, but not against current severe wheeze. Our group recently published a systematic review of studies investigating the impacts of dietary patterns on asthma in adults, children, and pregnant women-child pairs [7]. We included six additional studies in children that were not in the review by Garcia-Marcos and company. Five of these studies [10-14] reported either a beneficial effect of Mediterranean diet or a detrimental effect of an unhealthy dietary pattern (e.g., Western pattern) on asthma outcomes, such as prevalence, symptoms and lung function, in children. Thus, these studies lend support to the conclusion that Mediterranean diet may be beneficial for children with asthma.

The generally consistent finding of possible beneficial effects of Mediterranean diet on both the prevention and management of asthma in pediatric populations is encouraging, but there are also important caveats. The studies included in these reviews used differing methods to define and measure Mediterranean diet (*e.g.*, categorical vs. continuous Mediterranean diet variables generated from dietary instruments of varying reliability and validity), and assessed heterogeneous asthma outcomes (*e.g.*, prevalence of ever or current asthma or wheeze, asthma symptoms, and lung function), which made it challenging to draw a unanimous conclusion. Furthermore, the quality of the evidence is weak overall because most studies to date were cross-sectional, precluding investigation of temporal or causal relationship between diet and asthma. Because of the lack of experimental studies, it remains unclear whether healthy eating can indeed prevent and/or treat asthma. On the basis of encouraging epidemiologic data, well-designed and well-conducted randomized controlled trials are needed to examine the efficacy of Mediterranean diet for asthma prevention and control, and to elucidate the underlying mechanisms.

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