

Short Communication

From Plate to Airways: Dietary Influences on Asthma in South Asian Populations

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Abstract

Asthma is a common chronic respiratory disease with disproportionately high and rising burden among South Asian populations in South Asia and in diaspora communities such as Canada. While Western dietary patterns have been widely studied in relation to asthma risk and control, the potential influence of traditional and modern South Asian dietary patterns as modifiable factors remains underexplored. The purpose of this commentary is to highlight the potential role of South Asian dietary patterns as culturally relevant and modifiable factors in asthma prevention and management. Traditional South Asian diets, characterized by high intake of fruits, vegetables, legumes, whole grains and spices with anti-inflammatory properties, may reduce airway inflammation and oxidative stress. In contrast, modernization through increased consumption of refined grains, added sugars, saturated fats and processed foods may contribute to increased asthma risk or poor disease control. Understanding these dietary influences can support more culturally relevant asthma management approaches in South Asian Communities by emphasizing protective dietary changes.

Introduction

Affecting people of all ages, asthma is one of the most common chronic respiratory diseases in Canada [1]. In South Asian countries, this has become one of the leading causes of morbidity and mortality, with the prevalence of asthma cases reaching around 39.87 million people [2,3].

People with this disease experience inflammation and narrowing of their airways, presenting with observable symptoms [4]. Though there is currently no direct cure for asthma, it can be managed by taking advised steps and avoiding risk factors. Studies suggest there are many risk factors for asthma, including environmental stressors [4].

Previous research has focused on the nutritional effects of

the Western diet on asthma risk, but the impact of the South Asian diet remains underexplored. Understanding modifiable dietary factors may inform patient education and preventive strategies implemented by respiratory health providers.

Prevalence of asthma in South Asians

Respiratory diseases are a global health concern. In particular, asthma is one that is widespread, with its prevalence varying across different geographic locations and demographics. With this vast global prevalence, asthma is one of the major causes of mortality and morbidity [5]. Recently, South Asian countries have experienced a rising incidence of respiratory diseases, including asthma, due to urbanization, environmental pollutants and smoking [6]. In 2021, South Asia had the highest asthma burden, with an estimated 39.01



million prevalent cases, 6.16 million incident cases, 232,820 deaths, and 7.16 million disability-adjusted life years [7]. India alone accounts for over 32.05 million asthma cases, representing one of the largest national burdens [7].

Beyond regional patterns, similar disparities are observed in immigrant-receiving countries such as Canada. In 2010, the asthma prevalence among South Asians in Ontario was about 12.1% and increasing at a rate faster than the general population [8]. A cohort study found that individuals from South Asia have a higher asthma risk compared to non-immigrant Canadians [9]. Furthermore, Ontario born children from South Asian immigrants had a higher risk for asthma compared to children of non-immigrant parents, emphasizing the need to address growing asthma prevalence in this vulnerable population [9].

Given this disproportionate burden, understanding modifiable lifestyle factors such as diet can inform asthma prevention strategies and clinical management among South Asian populations. Diet is a relevant modifiable risk factor, yet one that is underexplored in current literature that largely focuses on Western diets [10]. Traditional South Asian diets that heavily rely on plant-based foods, fiber and unsaturated fats may offer protection against asthma or related inflammation. However, current dietary modernization may attenuate these protective effects. Thus, this commentary aims to highlight the potential role of South Asian dietary patterns as a modifiable, and culturally relevant factor in asthma prevention and management.

Dietary patterns and asthma

Rather than individual nutrients acting in isolation, evidence highlights that overall dietary patterns play a role in airway inflammation and asthma risk [11]. Diets rich in fruit and vegetables provide antioxidants that can rescue oxidative stress that is central to asthma pathophysiology [11,12]. Chronic inflammatory airway disease is characterised by excess reactive oxygen species that trigger pro-inflammatory factors and cause imbalance between oxidant and antioxidant systems [13]. This raises the possibility that plant-based foods rich in vitamins and antioxidants may help restore homeostasis and reduce inflammatory signaling [13]. Consistent with this perspective, higher fruit and vegetable consumption has been associated with reduced wheezing, allergic sensitisation, potentially through decreased pro-inflammatory cytokines [12].

In contrast, dietary patterns with high fat and low fiber intake, which is increasingly common in modernized diets have been associated with worsened airway inflammation and asthma risks. Such diets are linked with increased airway inflammation, airway eosinophilia and cytokine production [12]. Experimental data suggest that saturated fat intake activates pro-inflammatory pathways in the airways, with reduced competition has been associated with

lower neutrophil airway inflammation in males with asthma [14]. This highlights that dietary fat quality can influence inflammatory asthma.

High intake of refined carbohydrates and added sugars is another potential modifiable dietary factor. Diets with high sugar consumption such as through sweetened beverages, and refined grains have been associated with adult onset asthma and chronic inflammatory states [15]. Such states can indirectly exacerbate asthma through metabolic dysfunction and systemic inflammation [16].

Plant based protein sources typically contain soluble fiber which may result in anti-inflammatory benefits through gut fermentation and production of short-chain fatty acids that suppress airway inflammation through G-protein-coupled receptor signaling [12,16]. In contrast, high consumption of cured and processed meats have been associated with worsening asthma control in adults and increased wheeze-related mobility in children [12,17,18]. Such findings suggest that protein sources and processing may play a role in long-term respiratory outcomes.

Overall, it is evident that dietary patterns featuring plant-based foods, fiber and unsaturated fats may promote a less inflammatory airway environment, whereas modern diets with refined carbohydrates, saturated fats and processed meats may contribute to poorer asthma outcomes. These mechanisms suggest that dietary interventions with antioxidant and fiber rich foods can be integrated in asthma management plans to potentially reduce symptom severity.

South Asian dietary patterns

South Asian dietary patterns are diverse and traditionally include vegetable or meat based curries, rice, flatbreads such as roti or naan, and protein sources including lentils, legumes, and fish [19]. Vegetarian dietary practices are common across South Asia due to cultural and religious traditions, emphasizing the use of grains, dairy products, legumes, and a wide variety of vegetables [20]. Traditional South Asian cuisine is also characterized by the reliance of spices such as turmeric, ginger, cumin, coriander, fenugreek, garlic, and chilies which contribute to flavor and potential anti-inflammatory properties [20].

However, ongoing dietary transitions with urbanization and globalization have significantly changed traditional South Asian dietary patterns. Modern South Asian diets increasingly rely on refined grains, carbohydrates with high-glycemic properties, processed foods, and added sugars [20]. In addition, reliance on saturated fats such as ghee with a reduced consumption of fruits and high quality protein sources has increased in prevalence, potentially limiting nutritional value and increasing risk of inflammatory conditions like asthma [21].



South Asian diet and asthma

As South Asian diets evolve under the influence of modernization, the balance between traditional protective and emerging pro-inflammatory dietary components may shift. These changes provide an important context for understanding how dietary practices within this population may influence asthma risk and disease control. The following section examines the evidence linking South Asian dietary patterns to asthma-related outcomes.

Protective factors

Several factors of traditional South Asian diets may confer protection against asthma by reducing inflammation and oxidative stress [11]. High intake of fresh fruits and vegetables can provide essential vitamins and carotenoids that can act as antioxidants, neutralizing reactive oxygen species that drive asthma-related airway inflammation [12]. In addition, these diets can be rich in flavonoids, commonly found in fruits, vegetables, herbs, and spices, which also have anti-inflammatory and anti-allergic properties that may modulate immune reactions found in asthma pathogenesis [12].

Traditional South Asian dietary patterns also emphasize the intake of legumes such as dal, lentils, and chickpeas, which are rich in dietary fiber, that contribute towards suppressing airway inflammation through cytokine modulation [12]. Furthermore, consumption of whole grains such as whole wheat flour (or “Atta”) has been associated with lower odds of asthma and reduced concurrent and atopic wheezing with bronchial hyperresponsiveness [12].

In addition, there have been studies evaluating the protective nature of spices used in South Asian cuisine, including turmeric. Curcumin, a pigment found in turmeric, has been found to have anti-inflammatory properties that may contribute to reduced smooth muscle constriction in airways and hypersensitivity reactions [22]. A study has found that curcumin capsules in asthmatic patients improved mean forced expiratory volume at one second (FEV₁) and airway obstruction [22]. In addition, other spices utilized in South Asian cooking, including pepper, ginger, clove oil, and black cumins have anti-inflammatory properties and can modulate factors involved in immunity, positively contributing to airway remodeling and inflammation that is protective against asthma [23]. There has also been research on South Asian diets as a whole, with a British systematic review of South Asian children finding that traditional Asian diets were inversely associated with airway hyperreactivity [24]. In addition, dietary beliefs within South Asian cultures have also been associated with asthma management. For example, cases have been documented among South Asians that believe a reducing dairy products and chilled liquids in diet for asthmatic children can be protective in reducing triggers for asthma and mucus production [10]. Another qualitative interview study found that South Asian families

heavily emphasized making dietary modifications such as avoiding cold foods, increasing consumption of warmer foods, and using herbal supplements such as turmeric to alleviate their children’s asthma symptoms [10].

Although many components of a traditional South Asian diet appear protective, dietary practices among South Asian populations have shifted substantially in recent decades due to urbanization, globalization, and acculturation, potentially attenuating these benefits [2,25].

Risk factors

Although traditional South Asian diets emphasize whole grains, legumes, and fresh fruits and vegetables, modern South Asian dietary patterns increasingly integrate refined grains, sweetened beverages and high-carbohydrate foods characterized by higher glycemic index and glycemic load [19,26]. These dietary shifts are often accompanied by reduced fiber intake, which may limit suppression of airway inflammation and contribute to poorer asthma control [12]. Free sugars and refined grains are increasingly becoming integrated within diets have been found to contribute towards inflammation and oxidative stress, which could increase asthma risk [27]. In addition, vitamin D deficiency, which is widely common among South Asian communities living in Western countries, has been associated with increased asthma risk and poor asthma control [28,29].

Additionally, high consumption of ghee and other sources of saturated fat has been associated with noneosinophilic airway inflammation [16]. Many modern South Asian foods, such as pickles, fried snacks, and packaged convenience foods, also contain high levels of sodium which has been associated with increased bronchial hyperresponsiveness [30]. Furthermore, frequent consumption of processed and street food contain preservatives and food additives that may promote inflammation and exacerbate asthma symptoms [31].

Overall, shifts in dietary patterns toward refined grains, added sugars, and processed foods may increase asthma risk, highlighting the need to preserve protective traditional dietary practices.

Recommendations for asthma prevention among South Asian communities

Understanding ongoing dietary modernizations and their potential associations with asthma risk, prevention strategies with South Asian communities should consider nutrition as a modifiable and culturally relevant factor. Targeted approaches may help preserve traditional dietary elements that have been found to be protective while minimizing proinflammatory factors.

Dietary screening can be an entry point of nutrition in clinical settings, as brief dietary assessments or food diaries may help identify shifts away from traditional plant-

based dietary patterns towards increased intake of refined carbohydrates, added sugars and processed foods that can exacerbate asthma symptoms.

Culturally tailored nutritional substitutions can also offer a feasible strategy to reduce inflammatory dietary factors without changing cultural food practices. For example, replacing refined grains with traditional high-fiber alternatives like millet, ragi or bajra in commonly consumed disease may improve dietary choices. Evidence suggests that substitution-based dietary recommendations can positively influence food purchasing and improve dietary quality [32,33].

Targeted nutritional counseling may be beneficial for individuals with higher risk of asthma exacerbations including those with genetic predisposition, higher body mass index, tobacco exposure or environmental triggers. Early nutrition interventions in these groups may mitigate chronic airway inflammation and support long-term asthma control.

Clinicians managing asthma in the South Asian population may consider diet as a modifiable, culturally relevant factor in routine care. Brief dietary screening and culturally tailored nutrition counselling may complement standard pharmacological management and support improved asthma control.

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