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Editorial

Association between Maternal Diet during Pregnancy and Childhood Asthma

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Abstract

Over the past four decades, the prevalence of asthmahas markedly increased among the developed countries and specially for those countries transitioning to their lifestyle. It has been assumedthat these increases are a consequence of changing due to environmental and/or behavioral factors. The modificationof dietary habits (ie, decreased intake of fruits/vegetablesand increased intake of "Westernized" processed foods) and decreased intake of antioxidant vitamins due to a decrease in sun exposure and fatty acids and as well as decreased circulatinglevels of vitamin D, and might have been anticipated to explicate therise in asthma prevalence. The aim of this article was to explore whether there is an association between maternal diet during pregnancy and development of atopic disorders like asthma in childhood or not.

INTRODUCTION

In the global childhood health perspective, asthma and atopic diseases are considered as one of prime challenges [1]. Recent research shows, over the last 20 years, prevalence of Allergic diseases has increased alarmingly (rate of 20%) in most developed countries yet the chance of developing allergic diseases remains significantly high (one in every three are being affected). Subsequently, children become prime sufferers of the common allergic manifestations such as allergic rhinitis or hay fever, asthma, eczema or atopic dermatitis, and food allergies [2]. Sometimes the disease could come genetically, for example, individuals could be affected if the first-degree relatives (parents or siblings) become atopic and around 70% have chances if both of the parents become atopic [3]. Allergy expression pattern differs with age and food propensities, and atopic eczema topping at the age of 1year. Conversely, asthma and allergic rhinitis continue to increase until 15 years of age. In respect with childhood asthma sufferers, hay fever is a common symptom (50% and 80%) that continues up to adulthood [4]. The rapid increase in allergic disease incidences can be considered as outcome of population genetic changes, early life dietary facts, farming environment, microbial exposures, obesity, maternal smoking, and viral infections [5-7]. Nonetheless, there is still limited scope in measuring risk factors and understanding implementation strategies of primary prevention of childhood asthma.

There might be a possible effect of 'Westernized diet and lifestyle' in increasing asthma and atopic disease. Consequently, atopic predisposition develops where the infant has an innate tendency to produce immunoglobulin (Ig)E antibodies (sensitization), which can even progress to allergic disease [8]. Moreover, many infants, at their early infancy, develop allergic symptoms, and exposure to allergens may be responsible for developing food allergies. Intensive curiosity in maternal dietary approaches during pregnancy and lactation might have some noteworthy outcome on prevention of childhood allergies to influence the burden of disease [9].

DISCUSSION

Recent studies [10] have highlighted that there is an association between childhood asthma and intake of certain foods (e.g., fish, fruits and vegetables) and nutrients (e.g., vitamin E, vitamin D, zinc and polyunsaturated fatty acids) during pregnancy. People become aware of maternal diet habits during pregnancy as it has a potential influence on fetal immunity and airway development during contingencies with long-term irreversible consequences, such as childhood asthma. Epidemiological and immunological studies suggested that there are opportunities to reduce the development of atopic disease in fetal life through dietary modification or supplementation. In addition, early-life diet may control the possibility of childhood asthma by affecting fetal airway development and/or persuading the early-life interactions between allergens and immune system. So, dietary alteration is considered as one of the possible solutions to prevent childhood asthma.

Up to 2009, five studies had been publishedregarding assessing relationship between maternal diet with childhood asthma [11,12]. Three longitudinal studies reported no connection in-between dietary patterns and adult-onset asthma. However, one cross-sectional study reported a strong association between the Mediterranean diet score and asthma control among asthmatics. Similarly, other study (conducted in Japan) reported a positive and significant association between wheeze and the fast food and quick sugar pattern [13].

Table 1: Comparison related tomaternal diet during pregnancy and childhood asthma between developed and developing countries.

Maternal diet & childhood asthma	Developed countries	Developing countries
Awareness	Well enough	Not well enough
Knowledge	Adequate	Inadequate
Intervention for implementation	Easy	Difficult
Research studies to facilitate knowledge and spread awareness	On processing	Not yet

To comprehend the linkage between diet and asthma, four research reports (one case-control study, two cross-sectional studies, one longitudinal study have been published since 2009. The case-control study reported a borderline significant positive association between the vegetarian dietary pattern (high intake of cream, macaroni and cheese, chick peas, hummus, lentils, vegetables, and nuts) and asthma (OR, 1.43 [95% CI, 0.93-2.20]), and a negative association between traditional pattern (high intake of vegetables, pork, beef, liver, and lamb, and a low intake of carbohydrates) and asthma (OR, 0.68 [95% CI, 0.45-1.03]). However, no association was observed with asthma severity. According to the first cross-sectional study, there is no relationship between respiratory phenotypes (current asthma, asthma symptoms score) and dietary patterns. The second cross-sectional study showed a high intake of the cosmopolitan diet pattern that was associated with a small increased prevalence of wheeze (OR, 1.3 [95% CI, 1.0-1.5]) and asthma (OR, 1.4 [95% CI, 1.0-2.0]). Therefore, longitudinal study comes with insignificant relationship between dietary patterns and asthma incidence [13-15].

A population based study reported that regular maternal consumption of fast food during pregnancy amplified relative risk for subsequently assessed wheeze/asthmatic symptoms and associated consequences in a dose-dependent manner. One systematic review suggested a shielding effect of maternal intake of each of three vitamins or nutrients (vitamin D, vitamin E, and zinc) against childhood wheeze which is questionable due to an effect on asthma or other atopic conditions. After adjusting the potential confounders, a study on the association between maternal intake of antioxidants and allergic outcomes found that, maternal intake of any of the food-based antioxidants was not significantly associated with the risk of asthma, rhinitis or eczema in the offspring, except for the intake of magnesium. Maternal intake of dietary magnesium during pregnancy may protect against atopic eczema in the offspring. Another study entitled "maternal intake of sugar during pregnancy and childhood respiratory and atopic outcomes" suggested that, higher maternal intake of sugar in pregnancy may have intensified the risk of allergy and allergic asthma in the offspring. Another study which was conducted in Japan found higher maternal consumption of green and yellow vegetables, citrus fruit, and b-carotene during pregnancy causing defensive syndromes against the development of eczema in the offspring. Higher maternal vitamin E intake during pregnancy may reduce the risk of infantile wheeze. Another study (conducted in northeastern United States) described that a higher maternal intake of vitamin D during pregnancy may diminish the risk of recurrent wheeze in early childhood [10,14,15].

CONCLUSION AND RECOMMENDATION

Above discussion clearly indicates a noteworthy relationship between maternal diet and childhood asthma that is getting worldwide interest, especially in developed countries. Further research, particularly intervention studies are needed to be carried out to ensure whether dietary intervention during pregnancy can be used as a healthy, low-cost, public health measure to reduce the prevalence of childhood asthma.

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