

Impact of Air Pollution and Nutrition on Allergic Airway Diseases

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Abstract

The relations of air pollution and Nutrition in airway allergies and measures to mitigate are focussed.

Introduction

Indian Health Profile of 2018 shows, non communicable diseases are increasing from 30 to 55 % but Communicable diseases are decreasing from 61 to 33% between 1990 to 2016¹

Allergic airway disease is the earliest onset non communicable diseases globally. The available scientific consensus points towards air pollution, global warming and climate change which are inter-related and are the defining issues in the 21st century. Nutrition plays a multifaceted role in shaping the global trends of allergic airway diseases.

The Magnitude of Allergic Airway Diseases in Children

Our observation for the past 4 decades show there is significant increase which is correlated with air pollution, change in climate and demography^{2,3} as shown in table

Allergy Rhinitis	22.5 %	(1994)	40%	(2018)
Asthma	9.0 %	(1979)	26.1%	(2014)
Chronic Cough	8.0 %	(1999)	21.5%	(2017)

Table 1. Observation for the past 4 decades

Allergic Airway Diseases

Air Pollution on Allergic Airway Diseases

In the developing countries the indoor air pollution, far outweigh the outdoor air pollution in impacting the allergic airway diseases. Air pollution has the impact from womb to tomb and affects the growth and structure of fetal lung development later on lung functions⁴.

Among the air pollutants the suspended particulate matter (SPM) 2.5 μ , tobacco smoke and Ozone have greater impact on airway allergies by changing the immunologic balance and oxidative stress⁵.

Management of Allergic Airway diseases

For the past 5 decades the concept of management of allergic airway diseases like asthma has changed from relieving bronchospasm to managing airway hyper responsiveness, inflammation, remodelling, united Airway concept, phenotypes and genetics. Now we are focussing more on dietary habits to control and prevent the airway allergies.

The Dietary practices to prevent and control Airway Allergies

The dietary practices are discussed in the following headings

- Nutrition of pregnant mothers
- Breast feeding practice and other diet for infants
- Nutrition of children with environment of upbringing
- Dietary habits in children
- Role of Obesity on asthma

Nutritional Practices

The environmental factors of the mother constitute the prenatal epigenetic changes to genes and signalling pathways of fetal immunity that may have lasting effects during the child's life like, air pollution, agriculture, micro biology and **nutritional environment**⁴

Recent observations reveal that maternal intake of meat before and after pregnancy increase the risk of allergic airway diseases. The maternal obesity and weight gain in pregnancy increases incidence of childhood asthma⁵

Mother's Breast Feeding Practices and starting of the solid foods

In general as a tradition we do recommend breast feeding up to 9 months and longer and initiate homemade solids at 6 months of age. The recent observation by American Academy of Paediatrics report 2019 shows⁶:

- Any breast feeding beyond 4 months protects the child against wheezing in the first 2 years of life
- Longer duration of breast feeding protects against asthma over and above 5 years
- There is lack of evidence that partially or extensively hydrolysed formula prevent atopic disease in children

There is evidence that early introduction of infant safe forms of peanut reduces the risk of peanut allergy. The delayed peanut ingestion increases the risk of sensitisation.

Nutrition and upbringing of children's environment decreases airway allergies

- Children raised in farms, stables and bedroom with high bacterial , fungal lipopolysaccharide endotoxin
- House with more than 2 dogs or cats⁵
- Normal vaginal delivery
- Non use of unnecessary paracetamol, higher antibiotics in infancy and
- Avoiding obesity in infancy to prevent fixed airway obstruction.

The Dietary habits of children with Airway Allergies

The ISAAC phase 2 studies in children of 8-12 years has shown that there is reduction of wheeze in people who take fresh fruits, cooked green vegetables and using of fish. The food additives do triggers asthma .The hamburgers and soft drinks, salty snacks food with preservatives or colorants increases wheezing, bronchial hyper reactivity and allergic rhinitis

The Impact of Obesity on Airway way Allergies

The decrease lung function is proportionately related to obesity, girls are at risk for obesity. The obesity in India is increased, in boys 15 to 20.01%; girls 13.7 percent to 18 % between 2002 to 2011. It is observed in our study that obesity is a local problem than a national problem in India.

Recent EAT-Lancet commission diet and Food Safety Standards Authority of India in 2019 are almost similar and recommended⁷

- To EAT **Adequately** : Wholesome food 70-80% of food of the menu
- To EAT **Moderately** : Packed foods in small proportions
- To EAT **Sparingly**: High fat, Sugar and salty snacks

The Dietary Recommendation to Airway Allergy In Children

- Eat more fruits, vegetables, butter, curds, fish and other foods with omega 3 fatty acids
- Prefer homemade foods
- Relax while eating with family members on dining table
- To get energy eat before you are too hungry
- Eat smaller frequent meals so that your diaphragm work better and chances of gastroesophageal reflux is less
- Please keep your regular physical activity.

Conclusion

Air pollution and Nutrition are the major contributors for airway allergies. We focussed on nutritional management of mothers and children in the control and prevention of airway allergies. As per the Hippocrates Statement **"Let food be thy medicine and medicine be thy food"**

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