MATHEWS Open Access Journals

Commentary Article | Mathews Journal of Immunology & Allergy

Changing Allergy Patterns in India

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Received Date: 20 Feb 2017
Accepted Date: 28 Feb 2017
Published Date: 01 Mar 2017

Citation: Rathi A and Sharma S. (2017). Changing Allergy Patterns in India. M J Immu. 1(1): 003.

ABSTRACT

Allergy occurs when the immune system of a person reacts to substances that are harmless to majority of people. About 20-30% of the world's population is known to suffer from allergic disorders, such as bronchial asthma, allergic rhinitis, atopic dermatitis and urticaria. It can be easily said that allergies are increasing in both developed and developing countries for the past 10-15 years and India is no exception. The prevalence of allergic rhinitis, asthma and atopic dermatitis has increased tremendously in the Indian sub-continent and the major reasons seem to be urbanization, changing lifestyles and increasing pollution. Major steps need to be taken at both personal and government levels to curb the rising pattern of allergies.

ALLERGY

Allergy occurs when the immune system of a person reacts to substances that are harmless to majority of people. The reaction is believed to be mediated by Immunoglobulin E (IgE), which is one of the major mediators of immediate hypersensitivity reaction that underlie atopic conditions such as urticaria, seasonal allergy, asthma and anaphylaxis. Allergic diseases caused by binding of IgE antibody to surface receptors present on cells like most mast cells and eosinophils [1]. The allergen might be in the air a person breathes, chemicals that one comes in contact with or the food that one eats. A food allergy is an "adverse health effect arising from a specific immune response that occurs reproducibly on exposure to a given food" [2]. Food might have toxins, but apart from that many foods produce adverse reactions in some individuals. It might be due to food allergy or food intolerance. Food allergy is an immunological reaction caused by IgE antibodies surge. Food intolerance is abnormal physiologic response to some undigested food but is not immunogenic but mainly caused by anaphylactoid reactions, metabolic disorders and idiosyncratic responses. The IgE mediated hypersensitivity to food can manifest as allergic rhinitis, atopic dermatitis, asthma, urticarial, oral symptoms like swelling of lips and tongue, gastrointestinal disturbances or even serious anaphylactic reactions [3]. So, anything that one eats can cause allergy that might manifest in any way. Allergies -specially mild ones are usually treated by primary physicians and pediatricians, however severe, chronic and critical cases, such as anaphylaxis, severe drug allergies, and occupational or food allergies, are treated under emergency conditions in tertiary hospitals [4].

PREVALENCE OF ALLERGIC CONDITIONS

About 20-30% of the world's population is known to suffer from allergic disorders, such as bronchial asthma, allergic rhinitis, atopic dermatitis urticaria, etc [5]. Asthma is the most common chronic disease of childhood and it is being increasingly diagnosed [6, 7]. The Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 report defined allergic rhinitis as a major systemic allergic disease that, along with asthma, causes major illness and disability worldwide [8]. Allergies are more common in children than in adults. Two of the most common non-communicable diseases among children in most countries worldwide are food allergies and eczema and despite of the commonality of the diseases, good quality data of the burden of these is lacking, specially in developing countries [9]. Few comparative studies have demonstrated that asthma and related allergic disorders are more common in westernized or urbanized societies than in rural or developing countries [10-12]. However, in a multi-national survey done in 2012, it was found that majority of countries did not have accurate food allergy data. However, it was seen that the prevalence of food allergy in preschool children in developed countries is now as high as 10% and that in developing nations like India is 7%. It can be easily said that food allergies are increasing in both de-

veloped and developing countries for the past 10-15 years [9, 13]. The International Study of Asthma and Allergies in Childhood (ISAAC) gave many useful insights about the changing trends in allergies in developed & developing countries. The study was done in 3 phases and as shown by Phase 3, within a period of 6-7 years, there have been significant changes in the prevalence of asthma and rhino-conjunctivitis across the regions. The highest rates of asthma symptoms were found in developed countries such as the United Kingdom, Australia and New Zealand. The regions with the lowest prevalence were areas in Africa and the Indian subcontinent [14-18]. Many other studies have also shown that the prevalence of asthma and allergic conditions have increased in various regions of the world [19-21]. Overall, allergies have increased everywhere, even the developing nations that were once immune from these diseases are now commonly afflicted.

Situation in India has changed over the last few decades. According to a report the prevalence of asthma and rhinitis - were 1% and 10% respectively in 1964 but now new data suggests that about 14% people now have asthma, while over 20% are suffering from allergic rhinitis [22]. Another study suggests that more than 25% of the population suffering from major allergic problem out of which respiratory allergy constitute 73.4%, while allergic rhinitis is about 3-4% [23, 24]. Various other studies from India have reported allergy prevalence ranging from 3.5 % up to 29.5% [6, 7, 25-28].

Progressively increasing prevalence of allergic contact dermatitis (ACD) has also been reported in children during the last decade [29]. It has been reported that prevalence of ACD in childhood has risen from 13.3% to 67% during the last decade [30-31]. A study conducted on 70 children revealed that relevant allergy was noted in 48.6% of the patients. Age and sex had no significant role on the prevalence of ACD. Common allergens were paraben (43%), potassium dichromate (27%) and fragrance mix (26%) [32].

CAUSES OF ALLERGIES

It is assumed that one of the major reasons of increasing prevalence of allergies both in developed and developing economies is due to the increasing urbanization and changing lifestyles of populations. There are protective factors associated with traditional rural environment and risk factors associated with modern urbanized living. The change of societies to urbanized ones has brought about a reduction in these protective factors and upsurge in risk factors even in developing economies like Asia [33]. There is declining biodiversity which is occurring because of multiple things like growing pollution, rising temperature and change in lifestyle [34].

These environmental changes are affecting pollen counts and presence of molds that further increases one's susceptibility to allergies [34]. There is now convincing scientific evidence that climate change is spurring increased pollen concentrations, resulting in increased allergen exposure and ever-more allergy sufferers [34]. Tree pollens, including alder, oak, birch, and hazel, are abundant in the air in spring and cause hay fever and asthma. Grass pollens, including Bermuda grass, timothy, and rye grass, are prevalent in early summer and autumn, whereas weed pollens, including mugwort, ragweed, and Hop J pollens, are prevalent in autumn [35]. Among food items, tomato, egg, prawn, pork and beef are already known to cause allergy [36, 37].

Even the microenvironment having microbes have changed with time. Apart from the much evident drug resistance that we see, they are also contributors to change in allergy patterns. Urbanization has also led to increased time spent indoors and often the indoor-air quality is poor due to lack of cross ventilation. It can be because of the changing climatic conditions and comfort that people seek by keeping the indoors air-conditioned all the time. Also, even outdoor air is not clean enough to provide proper ventilation. Indoor exposure to allergens is important in the development of allergy and asthma as most people spend more than 90% of their time indoors, more than half of which is spent at home [38]. Fungal spores are one of the most common sources of indoor allergens [39]. Sensitization of the major indoor allergen, house dust mite (HDM), is considered an important risk factor for the development of asthma [40]. The most important indoor allergens for pediatric and adult patients are two house dust mites: Dermatophagoides farinae and D. pteronyssinus [41, 42]. Indoor and outdoor airborne pollutants are major factors in the allergy epidemic, with a defined link between the increase in air pollution and the prevalence of allergic diseases [43]. Excessive consciousness about hygiene can be another factor that deprives the children from early sensitization to allergens.

The hygiene hypothesis on autoimmune and allergic diseases stated that exposure to allergens in the environment early in life reduces the risk of developing allergies by boosting immune system activity [43]. However the allergic symptoms manifested in poor and lower middle class people could be due to meager diet and negligence in health care which could further lead to the reduction in immunity against environmental allergens [44].

Another interesting yet ambiguous relationship has been studied between breastfeeding/ weaning and susceptibility to allergies. Overall there are few studies supporting the role of breastfeeding in either preventing or delaying the onset of specific food allergies [45, 46]. Timing of the introduction of complementary/ solid foods has also been seen as a factor in the prevention of food allergy in children. However, there is no evidence supporting that delaying introduction beyond 4

to 6 months of age will affect atopy or development of food allergy. Studies looking at early weaning and the development of food allergy in children have actually found a potential protective effect in early weaning [47]. In one study, children introduced to solids at or after 16 weeks of age were more likely to have food hypersensitivity and sensitization at one year of age than those weaned prior to 16 weeks [48]. More recent data also suggest that delaying the introduction of foods considered highly allergenic may in fact increase the incidence of allergy to these foods [49, 50]. A study done on 114 Asian Indian children with food allergies gave some useful insights. The mean age at the time of the first allergy diagnosis was 3.3 years, and 66.7% of the children were boys. There were a lot of fruit and vegetable allergies, and these were more common than seafood allergies, which was unusual. For instance, some of the Asian Indian children were allergic to chickpea flour, capsicum, which is a variant of green pepper, and Indian lentils, which are used in tur and masoor dals. Other allergens considered unique were avocado, banana, beef, bulgur wheat, coconut, corn, eggplant, food dye, garlic, ginger, green peas, jalapeno peppers, kiwi, melon, rice, and tomato [51].

In the perspective of developing countries like India, westernization of life style has resulted in an increase in exposure to cosmetics, hair and other dyes and packed foods. With the overall increased exposure to these allergens, direct and indirect transfer of allergen from parents or caregivers to children has also increased. The rapid process of urbanization and construction works has resulted in a noticeable increase in the incidences of air-borne contact dermatitis (ABCD) [32].

Many patients are found to have seasonal allergic problems and winter season is found to trigger the allergic reaction in maximum cases [44]. It could be due to the fact that during winter (dry) seasons the atmospheric condition favors the prevalence of maximum bio-components in the atmosphere as compared to summer due to which there is a greater possibility of patients getting sensitized to different kinds of allergens [52].

CONCLUSIONS & SUGGESTIONS

The rising allergy among the population is alarming and calls for action. The increasing prevalence of asthma in children and the elderly requires active intervention. Allergic rhinitis is often ignored, under-diagnosed and under-treated. However, AR causes lot of physical discomfort and reduced quality of life among patients. Also, AR associated with asthma is more dangerous and increases the severity of the later. Therefore, allergic rhinitis should be evaluated properly in asthmatics; moreover, in asthmatics that also have rhinitis, both conditions should be managed to improve asthma control. Hence, allergies specially a common allergy like AR should not be ignored and should be properly treated. Importance must be placed on proper diagnosis which may at times be difficult given the limitations of current available testing [47]. At the personal level, people should aim to improve air quality in their homes by improving cross ventilation. New devices like air-purifiers can also be used; however the usefulness of the same is still being studied. The government should institute environmental control measures by lowering indoor and outdoor air pollution, tobacco smoking and allergen and drug exposures.

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