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ORIGINAL ARTICLE

Respiratory allergy in immigrants to a highly industrialised area in Italy according to area of origin and time period

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Abstract
Background: Migrants from developing to Western countries tend to become more sensitised to host than to origin country allergens, although substantial changes in migration patterns have occurred in recent decades.
Methods: We investigated adult immigrants with respiratory allergy, first tested for allergic sensitisation between 1985 and 2012 in a highly industrialised area in Italy. A comparison was made of the sensitisation pattern between immigrants and a random sample of native-born subjects affected by a respiratory allergy, and among immigrants according to macro-region of origin and time period.
Results: Between 1985 and 2012, 480 immigrants with respiratory allergy had a first positive allergy test. Immigrants were sensitised mainly to grass (67.1%), house dust mites (HDM) (38.5%) and birch (27.5%), with a pattern of sensitisation very similar to that observed in Italians (native-born). An increase in the proportion of subjects with asthma and of subjects with polysensitisation was observed from the first (1985–2002) to the middle (2003–2007) and the most recent period (2008–2012). In recent years, the proportion of subjects with polysensitisation in immigrants is higher than in Italians (native-born) (53.3% vs. 40.1%). Among immigrants, the risk of sensitisation to grass was higher in those from Sub-Saharan Africa (odds ratio, OR = 2.76) and Latin America (OR = 2.49), whereas risk of sensitisation to HDM was higher among immigrants from South Asia (OR = 2.71), compared to immigrants from Eastern Europe.
Conclusions: Immigrants develop multiple sensitisations more frequently than native-born people, and are especially sensitised to local allergens; the country of origin seems to play a role.

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Introduction

Atopy and asthma result from the effects of environmental factors on genetically susceptible subjects, and their prevalence varies markedly throughout the world, not just between regions and countries but even between locations in the same country and the same city.[1,2]

Nearly 5% of the world population are migrants. Migration involves social as well as intriguing medical issues. It involves not only exposure to a new set of pollutants and previously unknown allergens, but also several socioeconomic and cultural issues, such as housing conditions, diet and accessibility to medical services.[3]

Various studies have evaluated the prevalence of atopy and respiratory allergic diseases in child and adult immigrants in Western countries using either a questionnaire or clinical-based data.[3] Overall, they showed a higher prevalence of allergic diseases among immigrants compared to their countries of origin, which is independent of ethnicity.[3] This phenomenon is time- and age-dependent, since immigrants born on arrival in the host country tend, in their early years, to have a similar prevalence of atopy to that of native-born people.[3] The pattern of sensitisation seems to depend on both host country and country of origin features.[3] Some studies in the past decade have investigated the frequency of allergic diseases in immigrants to Italy using clinical data,[4–7] but only one of them evaluated the pattern of allergen sensitisation by macro-area of origin[4] and none of them evaluated the temporal changes in allergic pattern in immigrants to Italy in the last few decades.

We aimed to investigate the frequency of allergic respiratory diseases and sensitisation in adult immigrants who attended the main Allergy Unit in a highly industrialised area in North Italy between 1985 and 2012.

Methods

Patient population

Immigrants who were born outside the European Union (EU), had a respiratory allergy, were aged 15 years and over, lived in the province of Brescia and were first tested for allergic sensitisation at the Allergy Unit of the Spedali Civili hospital in Brescia, the main centre for allergic diseases in the area, between 1985 and 2012, were included in the study. The local Ethics Committee approved the study design and protocol.

The immigrants were referred by their general practitioners (GPs) or, more rarely, by an Emergency Unit. All patients were able to speak Italian or were accompanied by an Italian-speaking relative.

They were grouped into six macro-regions, based on the immigrants' country of origin: Eastern Europe, North Africa, Sub-Saharan Africa, Latin America, South Asia (including India, Bangladesh, Sri Lanka and Pakistan) and Far East Asia (including China, Vietnam and the Philippines).

Respiratory allergy was defined by the presence of respiratory allergic symptoms (rhinitis and asthma) and a positive skin prick test or serum-specific IgE.

Skin prick tests (STPs) were done using a panel of commercial extracts of the allergens (Lofarma, Milan, Italy) of the most common allergens responsible for respiratory symptoms in Italy: pollens (*Graminaceae mix* 5: grass; *Compositae mix*; *Parietaria mix*: pellitory; *Betula pendula*: birch; hazelnut; olive, cypress), house dust mites (HDM: *Dermatophagoides pteronyssinus* and *D. farinae*), animal danders (dog, cat), feather mix and moulds (*Alternaria alternata, Aspergillus fumigatus, Cladosporium herbarum, Penicillum mix*). All SPTs were performed and read in accordance with standard methods.[8] Serum-specific IgEs were detected by currently available commercial laboratory methods (RAST and ImmunoCAP; Pharmacia AB, Uppsala, Sweden, formerly Phadia AB, now Thermo Fischer Scientific).

In order to investigate temporal trends of sensitisation in immigrants, we classified patients according to the year of first diagnosis of respiratory allergy into the two most recent five-year periods (2003–2007 and 2008–2012) and the previous period (1985–2002).

For each subject, we collected data on age, gender, allergic symptoms, pattern of sensitisation, and country of origin. Furthermore, a random sample of immigrants with respiratory allergy, diagnosed from 2006 to 2012, were interviewed by telephone and were asked the year of their arrival in Italy and the year of onset of symptoms. In order to compare the pattern of sensitisation between immigrants and native-born population, we retrieved data on a random sample of Italian (native-born) patients with respiratory allergy admitted to our centre in the same period.

Official data on the immigrant population living in the province of Brescia in 2003–2011 were collected from the ISTAT web site.[9]

Statistical analysis

Common statistical methods were used for the analysis of proportions and associations between demographic and clinical features.

Some allergens which few people were reactive to (hazelnut, olive, *Compositae*, mould and cypress) and immigrants from Far East Asia were excluded from the statistical analysis owing to small numbers.

A comparison of the sensitisation pattern was performed among immigrants and between immigrants and native-born patients according to age, gender and macro-regions of origin. The associations between macro-region of origin, gender, age and sensitisation to some allergens were also analysed using logistic regression models. The results are reported as odds ratios (ORs) and their 95% confidence intervals (95% CIs).

For statistical tests, *P* values lower than 0.05 were considered significant in two-tailed tests. All the computations were carried out using the STATA programme for personal computer, version 12.0 (STATA Statistics/Data Analysis 12.0 – STATA Corporation, College Station, TX, USA).

Results

Between 1985 and 2012, 480 immigrants (49.2% males; mean age ± SD: 33.6 ± 8.6 years) with respiratory allergy had their first positive test at our centre. The majority of them were aged 35 years or less. The macro-regions of origin, in decreasing order, were Eastern Europe (22.5%), South-East