Diagnostic prevalence and incidence of asthma – analysis of claims data of all statutory-insured individuals in Germany (2009 – 2016)

Manas K. Akmatov • Jakob Holstiege • Annika Steffen • Jörg Bätzing

Abstract

Background
Data on the epidemiology of asthma from large-scale population-based studies are of great importance. The aim of this study was to estimate the current diagnostic prevalence and incidence of asthma across the lifespan and examine the regional variation in both epidemiological measures.

Methods
We used nationwide physician claims data from the years 2009 to 2016 (n = 70,417,019 in 2016). Asthma diagnoses were defined according to the ICD-10 classification (code J45.- "asthma"). We considered patients having asthma, for whom diagnoses of asthma had to be coded in at least two quarters of a calendar year. Diagnostic one-year-prevalences were calculated as a ratio of the number of asthma cases over the total number of insurants, who had at least one outpatient contact in the corresponding year. Spatial autocorrelation and spatial clusters/outliers were examined with Global and Local Moran's I, respectively. Incidence of asthma was estimated with Kaplan-Meier analysis. Parametric survival analysis was used to examine the simultaneous effect of variables of interest on asthma.

Results
The diagnostic prevalence of asthma was 5.73% (95% confidence intervals: 5.72 – 5.73%) in 2016. The prevalence was slightly higher in adults (5.9%) than in children and adolescents (5.1%). A previously reported interaction of sex and age interaction was replicated. The prevalence was higher among boys than girls, but at similar levels from early to middle ages. From the age of 35 years the prevalence was higher among women than men. There was an increasing secular trend in the prevalence among adults (4.3% in 2009 and 5.9% in 2016), but not among children and adolescents (4.9% vs. 5.1%). There were considerable prevalence variations across districts with estimates differing by a factor of 3 (prevalence range: 3.0 – 8.9%). The Global Moran's I showed a strong spatial autocorrelation (0.50, p < 0.0001). Local Moran's I showed the presence of spatial clusters with particularly high prevalence estimates located in larger parts of the Federal States of Lower Saxony, North Rhine-Westphalia, Schleswig-Holstein and Thuringia. Large clusters with particularly low prevalence estimates were observed in Baden-Württemberg, Bavaria, Brandenburg and Mecklenburg-Western Pomerania. The incidence rate was 6.2 per 1,000 person-years. The risk of asthma was higher among individuals living in large municipalities and those living in the Western federal states.

Conclusion
This is the first study that examined small-area variations in the diagnostic prevalence and incidence of asthma involving the full age ranges in Germany. The prevalence showed an increasing trend among adults from 2009 to 2016, but not among children and adolescents. In addition, we observed marked small-area prevalence variations. Further tailored studies are needed to examine the reasons of these observed variations.

Corresponding author: Dr. Manas K. Akmatov
Central Research Institute of Ambulatory Health Care in Germany (Zi)
Salzufer 8 – 10587 Berlin – Tel. +49-30-4005-2414 – E-Mail: makmatov@zi.de