Nationwide and small-area morbidity data of Lyme borreliosis in Germany based on outpatient claims data, 2010 – 2019

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Abstract

Background

Data on frequency and spatiotemporal trends of Lyme borreliosis in Germany are important for evaluation of public health measures. The aim of the present study is to estimate the number of borreliosis cases in Germany based on the currently available outpatient claims data as well as to examine regional variations and temporal trends. In addition, we evaluated borreliosis case numbers in two data sources, outpatient claims data and notification data.

Methods

We used nationwide outpatient claims data according to §295 of the Social Code Book V from the years 2010 to 2019. The study population consisted of all statutory health insured (SHI) individuals treated in ambulatory care (N = 71,412,530 in 2019). For the analysis we considered individuals who were diagnosed with Lyme borreliosis in at least one quarter of a year (ICD-10 code A69.2 with a modifier "confirmed" diagnosis). We calculated the diagnostic prevalence and incidence of borreliosis per 100,000 insurees. Small-area variations were examined at the level of rural and urban districts. Spatial analysis included Global and Local Moran's I tests. By means of hierarchical cluster analysis we identified districts with similar temporal trends in incidence of Lyme borreliosis over the period of 2010 – 2019. Incidence data from the current study were compared with notification data from nine federal states with a mandatory notification (https://survstat.rki.de).

Results

About 306,000 insurees were diagnosed with Lyme borreliosis in 2019. This corresponds to a diagnostic prevalence of 429 per 100,000 insurees. The proportion of diagnosed individuals increased by age in both, females and males. The highest proportion was observed among individuals in the age group of 70 – 79-years (males, 771; female 863 per 100,000). Overall, females were more likely to be diagnosed with borreliosis than males (455 vs. 398 per 100,000). The occurrence of borreliosis was observed in all districts. However, there were strong regional variations differing by a factor of 17 in 2019 (89 in Herne, Westphalia-Lippe; 1,481 per 100,000 in Saale-Orla-district, Thuringia). The Global Moran's I showed a strong spatial autocorrelation (I = 0.70, p < 0.0001). We observed the presence of three spatial clusters. The biggest cluster consisted of 45 districts extended across several federal states, including Brandenburg, Saxony, Saxony-Anhalt, Thuringia and Bavaria. The second cluster with eight districts was observed in the eastern part of Bavaria. In addition, significantly higher frequency of borreliosis was seen in the district Birkenfeld (Rhineland-Palatinate). Over the period of 2010 to 2015 we observed a decreasing trend in incidence both among children and adolescents as well as adults.

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In the years thereafter the incidence stagnated. Compared to the available notification data available from nine federal states, the annual patient numbers in the claims data were up to 6 times higher than those from notification data — most recently in 2019 69,623 cases compared to 12,263 reported cases.

Conclusion

The present study provides nationwide morbidity data on the frequency of Lyme borreliosis in Germany. Over 300,000 SHI patients are diagnosed with borreliosis every year. There are considerable regional differences with the presence of a large spatial cluster in southeast Germany comprising several federal states and another cluster in eastern Bavaria, which borders the Czech Republic. There is a slight downward trend in both children and adolescents as well as adults. The present findings represent an important source for population-based prevention measures.

Keywords

Diagnostic prevalence and incidence; Lyme borreliosis; small-area variations; spatial autocorrelation; spatial clusters; temporal trends

Citation