Temporal trends in antibiotic prescriptions in the ambulatory health care sector in Germany between 2008 and 2012

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Abstract

Background:

Increasing resistance to certain antibiotics is observed in bacterial pathogens. This development is caused, among other factors, by the medical use of antibiotics and has been leading to an intensive and ongoing debate about the rational use of antibiotics and the risk of inappropriate antibiotic medications. Therefore, a continuing monitoring of antimicrobial drug utilization is needed - over time and at regional level. For the ambulatory health care sector, prescription data of statutory health insurance physicians provide respective information. The aim of the present study was to analyse temporal trends in population-based and drug-specific rates of antibiotic prescriptions in ambulatory health care. The study covers a five-year period, 2008-2012.

Method:

The analysis is based on the nationwide drug prescription data of the 17 regional Kassenärztliche Vereinigungen (KVen; engl. Associations of Statutory Health Insurance Physicians) in accordance with § 300 para. 2 SGB V (Sozialgesetzbuch V; engl. Social Code Book V) of the years 2008 to 2012. Antibiotic prescriptions including drug groups were identified by ATC codes of the group J01 ("anti-infectives"). Three indicators were calculated to estimate the population-based use of antibiotics:

1. The number of prescribed packages (prescriptions);
2. The number of defined daily doses (DDDs);
3. The number of patients with at least one antibiotic prescription.

These indicators were determined by region and year in relation to the total population of the statutory health insurees in Germany ("KM6-Statistik"). We computed both age-adjusted and age-specific regional prescription rates of antibiotics. Temporal trends of these rates were assessed using Joinpoint regression and quantified using the annual percent change (APC). The reported findings for the indicators 1 and 2 were additionally stratified according to antibiotic drug groups.

Results:

Overall, the examined indicators revealed a decline of antibiotic prescriptions in the ambulatory health care sector between 2008 and 2012. The observed effects were less pronounced for the number of patients treated with antibiotics than for prescribed packages or DDDs. In addition, a significant age-related difference in changes of prescription rates was observed. The strongest decline in prescription rates was found in the youngest age group (0 - 14 years) and in the elderly (70 years and older). The corresponding APC for indicator 1 and 2 were -4.5% per year (p<0.05) and -7.3% per year (p<0.05),

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respectively, for the age group 0 – 14 years and -2.6%/year (p<0.05) and -1.3%/year (p=0.05), respectively, for the 70+ age group. At regional level, the decline in prescription rates was most pronounced in the federal states of Mecklenburg-Western Pomerania, Saxony, Saxony-Anhalt and Thuringia. In contrast, no significant trend was found for the middle age group (15 to 69 years).

The drug-related analysis showed an overall absolute and relative increase of prescription rates of cephalosporins and declining prescription rates of first line penicillins. This trend was particularly evident in children under 15 years. The use of fluoroquinolones remained relatively stable over time. However, in the elderly age group this drug group accounted for about one third of all prescribed packages.

Conclusion:

Between 2008 and 2012, there was a persisting downward trend in prescription rates of antibiotics in the ambulatory health care sector in Germany, especially in younger and elderly patients. With regard to the examined indicators, there was a more pronounced decline in the number of prescribed packages and of DDDs than in the number of patients treated with antibiotics, indicating that the average amount of antibiotics prescribed per patient decreased over time.

The development by antibiotic drug groups showed despite the overall declining trend of antibiotic prescriptions a rather unchanged use of fluoroquinolones and an increasing role of cephalosporins. Both drug groups are more likely to be regarded as second line antibiotics and are particularly involved in the development of multidrug-resistance in gram-negative bacteria. To counteract the further spread of bacterial resistances, the use of these primarily second line antibiotic drugs should be limited in the ambulatory health care sector in Germany.