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Research paper

Potentially inappropriate medication in older persons in Austria: A nationwide prevalence study

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ABSTRACT

Background: Potentially inappropriate medication (PIM) is associated with adverse outcomes like hospitalisation and death. The aim of this study was to assess the nationwide prevalence of PIM among aged Austrians in 2012.
Methods: We analysed pseudonymised claims data of all 19 Austrian Statutory health insurances including all prescriptions of beneficiaries aged ≥ 70 years which were reimbursed by the insurances in 2012. Drugs priced ≤ € 5.15 (which equals the co-payment demanded per prescription) could only be included in the analysis if persons were exempted from co-payment. Potential inappropriateness of prescriptions was assessed by means of a recently published Austrian PIM list containing 73 drugs to be avoided in older patients.
Results: In the full survey of persons aged ≥ 70 years, 52.4% of all 1,123,832 insurants were prescribed at least one reimbursed PIM prescription, with higher rates in women (56.9%) than in men (45.8%). The three most often identified PIM groups were non-steroidal anti-inflammatory drugs (28.9%), vasodilators (16.0%) and psychotropic drugs (12.5%). The three most often prescribed inappropriate single drugs included diclofenac (18.3%), ginkgo biloba (12.5%), and tramadol (8.9%). In insurants who were exempted from co-payment, PIM prevalence was 71.6% and 73.3%. In this person group, high prevalences were found for psychotropic PIM; 33.3% in permanently and 28.3% in temporarily exempted insurants.
Conclusions: PIM prescription has a high prevalence in the older Austrian population. Thus, Austria urgently needs a nationwide strategy to reduce the high overall prevalence of PIMs and especially of psychotropic PIMs.

1. Background

Medication in older patients can become a complex challenge because potential benefit and harm have to be carefully weighed. Older patients have a higher risk of unfavourable medication-related events because of their vulnerable health status with impaired organ function, physical and cognitive impairment, comorbid conditions, and polypharmacy [1,2]. Significant safety concerns result from the increased risk of adverse drug events due to prolonged duration of drug effects, diminished or increased drug effects, greater risk for toxicity, and due to disease-drug and drug-drug interactions [3,4]. Certain drugs carrying a particularly high risk of adverse events are considered inappropriate or potentially inappropriate. Although a consensus definition does not exist, potentially inappropriate medications (PIMs) are commonly described as medicines, which do not have sufficiently proven therapeutic effects and/or have an unfavourable ratio of risk of harm to intended benefit, and/or could be substituted by a safer drug [5].

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Since 1997, geriatric experts from different countries have published lists of PIMs, taking into account local drug market situations and prescribing habits of physicians [5–11]. Several studies demonstrated that use of PIMs is associated with an increased risk of morbidity [12,13], higher likelihood for hospitalization [14–17], and higher health care costs [18,19]. PIM lists might increase the awareness of the risks associated with certain drugs when prescribed to older persons with multiple diseases and multiple medications. However, drugs judged as inappropriate or potentially inappropriate are not necessarily contraindicated as PIM lists do not take into account the individual risk or benefit within the social and clinical context, in which a drug is prescribed.

The prevalence of PIMs assessed by claims data of certain health insurances varies between 21% for adults of 65 years and older in Switzerland within a quarter year period [20] and 25% for German people of the same age within a one year period [21], both using the PRISCUS list for judgement of inappropriateness [9]. When applying the French PIM list, a PIM prevalence of 53.6% has been reported in older persons aged $\geq$ 75 years in France [22].

Up to now, the prevalence of PIMs in Austria has only been assessed in nursing homes [23]. Cross-sectional data indicate a 70% point prevalence of residents with at least one PIM. Therefore, the aim of our study was to assess the prevalence of PIMs among all people aged $>$ 70 years in Austria using claims data from the Austrian statutory health insurance system.

2. Methods

2.1. Context and source of data collection

The analysis is based on claims data of the 19 statutory health insurance providers. For prescription analysis, we included all pseudonymized prescriptions of beneficiaries at the age of 70 years and above brought to account with the insurance providers from January 1 to December 31, 2012. Data were retrieved from the data warehouse FOKO (FOlgeKOstenTool), a standardized patient-oriented database, which is implemented in all Austrian health insurances. The Austrian social insurance system is characterised by compulsory insurance, including practically all retirees, employed or self-employed individuals and their dependents.

In principle, a co-payment of € 5.15 (as of 2012) has to be paid for every prescription by the patients themselves. All costs exceeding € 5.15 per prescription are covered by the health insurances. Prescriptions costing € 5.15 or less have to be paid entirely by the patients and therefore, were not available for inclusion in the present analysis unless the patient was exempted from co-payment. Exemptions from the co-payment are granted permanently to people with low income. For these patients all prescriptions are fully covered by the health insurances, and therefore all their prescriptions could be included in the present analysis. In addition, there are patients who are temporarily exempted from the co-payment for prescriptions for the rest of the calendar year as soon as cumulated costs of co-payments exceed 2% of their annual net income.

In this paper, the term drug is used as a synonym for active ingredient, agent or compound. The term prescription(s) is equivalent to package(s) of a drug. Each pharmaceutical (brand) is coded by a unique identifier (Pharmazentralnummer PZN, a nationwide standardised identification number for medicines and pharmaceutical products). For each eligible person, information on age, gender, drug prescriptions, PIM prescriptions, and cumulated defined-daily-doses per year (DDD) of each drug on the PIM list was collected as defined by the WHO. For combination drugs containing PIM, where no DDD was available from the WHO, DDDs of each drug were defined by the authors following WHO principles and descriptions.

The project is in accordance with the principles of the Declaration of Helsinki. This analysis of pseudonymised claims data, according to respective regulations and laws, does not require approval of an ethics committee.

2.2. Definition of PIM

Appropriateness of medication was analysed using the Austrian PIM list [11]. It was developed through a two-step Delphi method and covers 73 drugs to be avoided in older patients because of an unfavourable benefit-risk profile, unproven effectiveness, or existence of another but safer drug for the same indication. Inappropriateness was rated independently of diagnosis, daily dosages or length of use except acetylsalicylic acid, which was considered as potentially inappropriate only if the dosage exceeds 100 mg. In addition, for the substances nifedipine, tolterodine and oxybutinine only the immediate release forms were classified as potentially inappropriate.

2.3. Statistical analysis

Characteristics of the study population were described by frequency tables and means depending on their distributions. Prescription prevalences for 2012 were estimated by relative frequencies (percentages) including two-sided 95% confidence intervals (Pearson-Clopper). Numbers of different drugs per patient were counted with respect to their ATC code at the fifth level. Mean numbers (standard deviations, SD) and medians (interquartile ranges IQR) of drugs and prescriptions per year were calculated. Cumulative DDDs per patient per year within PIM drug classes were calculated as sums over all documented DDDs of this patient in the drug class. The value of the cumulative DDD is missing, if any single DDD in a documented drug of the patient in this drug class is missing. Mean DDDs (SD) and medians (IQR) were calculated. The analyses were stratified by gender. Some analyses were performed additionally in the subpopulation of drug users (in 2012) using further stratification by exemption (permanent, temporary, no). No statistical tests were performed, because the study population represents nearly the entire population of all persons aged $\geq$ 70 years in Austria. Furthermore, the power is very large, such that also small differences would be detected by statistical tests as indicated by narrow confidence intervals. Statistical analyses were performed by SAS version 9.3 (TS1M2).

3. Results

3.1. Total study population

In 2012, 1,123,832 persons aged $>$ 70 years were covered by the Austrian statutory health insurance; 59.9% were women. Fig. 1 displays the age group and gender-related distribution of insurants.

3.2. Overall medication

Out of the entire study population, 1,076,429 persons [95.8% (95% CI 95.7–95.8)] received at least one reimbursed drug in 2012. Estimated prevalence was slightly higher for women [96.4% of insurants (96.4–96.5)] compared to men [94.8% (94.8–94.9)]. The mean number (SD) of different drugs (active compound on ATC level 5) per person was 9.0 (SD 7.1); 7.9 (SD 6.4) in men and 9.7 (SD 7.4) in women; median (IQR) was 7.0 (4.0–12.0), 6.0 (3.0–11.0) in men and 8.0 (4.0–13.0) in women. At least five different drugs were administered in 70.4 (95% CI 70.3–70.5) percent of all insurants; in 73.7 (95% CI 73.6–73.9) percent of women and 65.4 (95% CI 65.3–65.6) of men, respectively.