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Original Study

Potentially Inappropriate Drug Prescribing and Associated Factors in Nursing Homes

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A B S T R A C T

Importance: Polymedication is frequent in nursing home (NH) residents. This increases the risk of potentially inappropriate drug prescribing (PIDP), which can lead to adverse drug events, such as falls and hospitalization.
Objective: To identify PIDP in NH residents and to investigate subject-related and NH structural and organizational factors associated with PIDP.
Design: Cross-sectional study.
Setting: A total of 175 NHs in Midi-Pyrénées region, South-Western France.
Participants: A total of 974 subjects randomly selected from the 6275 NH residents participating in the IQUARE study.
Exposure: Patients with PIDP.
Main Outcomes and Measures: PIDP was the main outcome measure. It was defined using a specific indicator, based on the Summary of Product Characteristics, on the Laroche list, and on residents' clinical data. PIDP was defined as the presence of at least 1 of the following criteria: (1) drug with an unfavorable benefit-to-risk ratio; (2) drug with questionable efficacy according to the Laroche list; (3) absolute contraindication; (4) significant drug-drug interaction. Associated factors were identified by using multivariable logistic regression models.
Results: Among the 974 residents included, 71% had PIDP. PIDP was more frequent in patients without dementia, with several comorbidities and taking multiple medications. In the multivariable analysis, age (odds ratio [OR] 1.02; 95% confidence interval [CI] 1.01–1.03) and Charlson Comorbidity Index (CCI; $P = .003$, CCI = 1 versus 0: $OR_{1/0}$ 1.22; 95% CI 0.85–1.74, CCI $\geq$ 2 versus 0: $OR_{2/0}$ 1.72; 95% CI 1.23–2.41) were associated with an increased likelihood of PIDP. By contrast, dementia was associated with a lower likelihood of PIDP (OR 0.70; 95% CI 0.53–0.94). Among NH structural and organizational characteristics, the access to psychiatric advice and/or to hospitalization in a psychiatric unit (OR 1.36; 95% CI 1.02–1.82) and the presence of a reevaluation of drug prescriptions (OR 1.45; 95% CI 1.07–1.96) were associated with an increased likelihood of PIDP.

The authors declare no conflicts of interest.

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Conclusions and Relevance: Our work suggests that some NH characteristics are associated with an increased likelihood of PIDP. Gaining a better understanding of the factors influencing PIDP, especially structural and organizational NH factors, can help to determine the interventions that should be implemented.

Improving the quality of drug prescribing is an important challenge for nursing homes (NHs). Older people residing in NHs suffer from numerous comorbidities and functional decline.[1] Hence, polypharmacy is more frequent in NH residents than in community-dwelling elderly.[2,3] Polypharmacy increases the risk of potentially inappropriate drug prescribing (PIDP), which may lead to adverse drug events (ADEs),[4–7] such as falls[8] and hospitalization.[9] Moreover, the elderly are more likely to experience ADEs than younger populations because of age-related changes in pharmacokinetic and pharmacodynamic responses.[10,11]

PIDP is usually defined as *overuse* (ie, when the potential for harm of a medication exceeds its possible benefits or when there is no clear benefit), *misuse* (eg, inappropriate dose or duration, wrong indication), as well as *underuse* of potentially useful medications.[12,13] PIDP is highly prevalent among older people, ranging from 14% to 50%, and is higher in NH residents than in community dwellers.[14–19]

Several tools can be used to detect PIDP through explicit (criterion-based) or implicit (judgment-based) prescribing indicators.[12] The Beers criteria[20] and the Screening Tool of Older Person's potentially Inappropriate Prescriptions (STOPP) criteria are among the most widely used methods for identification of PIDP.[3,21] The Beers criteria[20] were updated and adapted to French medical practice by Laroche et al.[22] These methods are based on lists of medications to be avoided in older people. The Screening Tool to Alert to Right Treatment (START) criteria[21] take into account the underuse of potentially useful medications. All these methods remain essentially research tools and are not used in routine clinical context to any significant degree.[21] These tools define the quality of medication use too narrowly and do not account for the unique medication needs of individual patients. Therefore, combining explicit (drugs-to-avoid) and implicit (Drug Utilization Review [DUR],[23] which is an effective way to improve quality of care[24]) criteria, is probably a better approach to examine PIDP in NH residents.

The aim of this study was to identify the prevalence of PIDP in a sample of NH residents in France, combining explicit and implicit criteria, and to identify which NH characteristics were associated with PIDP.

Methods

Data Source

The IQUARE study (Impact d'une demarche QUAlité sur l'évolution des pratiques et le déclin fonctionnel des Résidents en EHPAD) is a multicentric individually tailored controlled trial performed in NHs in the Midi-Pyrénées area, South-Western, France (trial registration number: NCT01703689). IQUARE's research protocol has been fully described elsewhere[25] and several analyses related to specific drug use have been previously published.[26–28] IQUARE followed the principles of the Declaration of Helsinki and complied with ethical standards in France; study protocol was approved by the Consultative Committee for Treatment of Research information on Health (CNIL: 07–438).

Participants

A total of 6275 residents were initially enrolled in the IQUARE study. Because of time constraints, we were not able to perform DUR for all residents. We randomly selected a subset sample of 1000 residents. NH residents who were defined by the NH physicians in charge of the patient to be at the end of life (based on medical expertise and medical experience) were excluded because the objectives of their drug therapy are very specific. According to the frequency of PIDP in NH residents in the literature, and considering a P value of .05, the number of individuals required to reach a sufficient power for this study was 186. Baseline data were collected between May and July 2011.

Procedures

All drug prescriptions of NH residents, for the week of inclusion, were sent by the NH coordinating physician to researchers. Drugs were coded according to the Anatomical Therapeutic Chemical classification system.[29] For each drug, name, dosage form, and strength were completed.

To determine PIDP, we undertook a comprehensive DUR of residents' drug prescriptions. To be closer to real conditions, we created an Access spreadsheet to reconstruct the context of a DUR as it unfolds in the daily practice of clinical pharmacy. This form comprised the entire drug prescription and all available patients' clinical data recorded in the database: demographic characteristics (age, gender), weight, stature, creatinine clearance, and patient's comorbidities. The DUR was conducted by 9 experienced pharmacists (a coordinating pharmacist [CC] and 8 other pharmacists). All potential Drug Related Problems (DRPs) were identified and classified for each included individual. The DUR was conducted in 2 steps. First, the 9 pharmacists analyzed together the first 100 prescriptions of the study sample to align and standardize the analysis method. Then, the remaining prescriptions were analyzed independently by pair. Each pair of pharmacists was composed of the coordinating pharmacist and 1 of the 8 other pharmacists.

Outcome Measure

The assessment of PIDP was done through DUR and based on the summary of product characteristics[30,31] of each drug for contraindications and drug-drug interactions; the Laroche list,[22] which contains medication agents and classes that place older patients at unnecessary risk for ADEs, for drugs with an unfavorable benefit-to-risk ratio and for drugs with questionable efficacy; and the recommendations of good clinical practice provided specifically for the elderly by the French High Authority of Health (HAS).[32]

The primary outcome (PIDP) was defined by the presence of at least 1 of the following criteria: (1) drug with an unfavorable benefit-to-risk ratio, according to the Laroche list and to available patients' clinical and biological data; (2) drug with questionable efficacy (ie, drugs with insufficient medical benefits); (3) absolute contraindication; and (4) significant drug-drug interaction (ie, relative contraindication). The primary outcome was dichotomously coded (ie, a resident had PIDP or did not have PIDP).

The secondary outcomes were defined by each component of the primary outcome: (1) presence of drug with an unfavorable benefit-to-risk ratio, (2) drug with questionable efficacy, (3) absolute contraindication, and (4) significant drug-drug interaction. All of them were dichotomously coded (ie, yes versus no).