

Prevalence and Predictors of Polypharmacy and Potentially Inappropriate Medications in a Large Community-dwelling Older Population in Italy

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Background

- Polypharmacy, the simultaneous use of multiple drugs for one or more conditions, is a common phenomenon in the older adult population, and can lead to dangerous drug interactions, toxicities, and worsening of health conditions.¹ It has been reported that about 39% of older adults are exposed to this phenomenon.² Studies show that polypharmacy in the older adult population is directly correlated with potentially inappropriate medications (PIMs), which are medications associated with significant risk of ADEs when safer alternatives are available.³
- Since 2007, the Local Health Authority (LHA) of Parma in Italy has invested resources to increase awareness of primary care physicians (PCPs) about the appropriateness of prescribing in the elderly in order to improve their prescribing and reduce exposure to PIMs.⁴
- As changes in prescribing patterns evolve, timely information on the prevalence of polypharmacy and PIMs in the elderly is necessary.

Objectives

- To analyze the prevalence of polypharmacy and potentially inappropriate medications (PIMs) in the older population of the Parma Local Health Authority (LHA), Italy, and to evaluate their associations with patients’ and primary care physicians (PCPs) characteristics.

Methods

Study design

- A one-year retrospective cross-sectional study using the 2018 Parma LHA healthcare data.

Data collection

- Pharmacy data included all medications reimbursed by the 2018 National Pharmaceutical Formulary (PFN, Prontuario Farmaceutico Nazionale).
- Patients characteristics included age, sex, and geographic location (i.e. mountain, hill, and plain), while PCPs characteristics included age, sex, number of patients, and proportion of older adults.

Study population

- Non-deceased older adults (≥ 65 years) who resided in the Parma LHA for the entire year of 2018 and filled at least one medication prescription.
- Only PCPs with more than 100 patients and with at least 20 elderly patients were included.

Study Variables

- Polypharmacy was defined as ≥5 medications, and excessive polypharmacy as ≥10 medications. The total number of medications were added per quarter and averaged over four quarters.
- PIMs exposure was defined based on the updated 2017 Maio criteria.

Statistical Analysis

- Frequencies and percentages were used to analyze patients and PCPs characteristics.
- Modified Poisson regression models were constructed to estimate the relative risks (RR) for exposure to polypharmacy and PIMs.
- All models were adjusted for time-invariant covariates including patients and PCP-specific characteristics to identify the factors associated with the dependent variables of interest. The models were also adjusted for 16 Chronic Condition Drug Groups (CCDGs) identified by the medications prescribed. The model for exposure to PIMs were adjusted for a number of distinct medications, excluding PIMs, prescribed over the entire year.
- All analyses were performed using SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Study population and prevalence of polypharmacy and PIMs

- Out of 92,146 older patients (91.5% of total) with a mean age of 76.7 (±7.8), 40% were exposed to polypharmacy, 5% to excessive polypharmacy, and 34% to at least one PIM. 277 PCPs (98.9% of total) were included in the study.

Table 1: Demographics of Study Population (N= 92,146)

Age group (years)	
Mean ± SD	76.7 ±7.8
65-74, %	44.4
75-84, %	37.8
≥85, %	17.8
Sex	
Female, %	56.9
Male, %	43.1
Location	
Plain, %	59.0
Hill, %	31.6
Mountain, %	9.4
Number of Medications	
0-3, %	25.3
4-6, %	29.1
7-9, %	22.1
≥10, %	23.5
Characteristics of patients’ general practitioners	
Age group (years)	
Mean ± SD	61.4 ±7.2
≤60, %	28.1
>60, %	71.9
PCPs sex	
Female, %	23.2
Male, %	76.8
Number of patients	
<1200, %	23.3
1200-1500, %	33.8
>1500, %	42.9
Proportion of older patients	
<27%, %	28.4
27%-35%, %	57.4
>35%, %	14.2

Conclusions

A substantial number of older adults in Parma LHA were exposed to polypharmacy and PIMs. The insight into patients’ and PCPs’ characteristics associated with polypharmacy and PIMs may help to enhance the prescribing strategies in this vulnerable patient population.

References

1. Cadogan, C.A., Ryan, C. & Hughes, C.M. Appropriate Polypharmacy and Medicine Safety: When Many is not Too Many. Drug Saf 39, 109-116 (2016).

2. Kantor ED, Rehm CD, Haas JS, Chan AT, Giovannucci EL. Trends in Prescription Drug Use Among Adults in the United States From 1999-2012. JAMA. 2015;314(17):1818-1831.

3. Rambhade S, Chakarborty A, Shrivastava A, Patil UK, Rambhade A. A survey on polypharmacy and use of inappropriate medications. Toxicol Int. 2012;19(1):68-73.

4. Amos, T.B., Keith, S.W., Del Canale, S., Orsi, P., Maggio, M., Baccarini, S., Gonzi, G., Liu, M. and Maio, V. (2015), Inappropriate prescribing in a large community-dwelling older population: a focus on prevalence and how it relates to patient and physician characteristics. J Clin Pharm Ther, 40: 7-13