Potentially inappropriate prescribing and its association with Instrumental Activities of Daily Living (IADL) impairment in older people

Frank Moriarty[1,2], Caitriona Cahir[3], Tom Fahey[2], Kathleen Bennett[3]

[1]HRB PhD Scholars Programme in Health Services Research
[2]HRB Centre for Primary Care Research, Royal College of Surgeons in Ireland , Dublin, Ireland
[3] Department of Pharmacology and Therapeutics, Trinity Centre for Health Sciences, St James's Hospital, Dublin, Ireland

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Introduction

Older people are particularly vulnerable to adverse effects of prescribed drugs. Certain medicines, durations of use, drug-drug and drug-disease combinations should be avoided in older people due to an unfavourable risk-benefit ratio. Potentially inappropriate prescribing (PIP) of such medicines can lead to increased adverse drug events and morbidity. There has been little research on the relationship between PIP and non-clinical outcomes, such as functional impairment[2].

This study aims to measure the prevalence of PIP in an older Irish population (using three explicit measures of PIP) and to investigate its association with Instrumental Activities of Daily Living (IADL) functional impairment.

Methods

Study design

This was a retrospective cohort study of 2,051 community-dwelling participants in Wave 1 of The Irish Longitudinal Study on Ageing (TILDA) aged ≥ 65 years with linked medication dispensing history from a national pharmacy claims database. TILDA is a representative cohort of over 8,000 people resident in Ireland aged ≥ 50 years charting their health, social and economic circumstances. Medication data, classified by WHO Anatomical Therapeutic Chemical codes, was obtained from the Health Services Executive Primary Care Reimbursement Services (HSE-PCRS) pharmacy claims database, which details monthly medications dispensed to persons eligible for the General Medical Services (GMS) scheme in Ireland.

Exposure

Data on medications dispensed to participants in the 12 months preceding their TILDA interview was extracted from the HSE-PCRS pharmacy claims database. Exposure to PIP in this period was determined using:

- Screening Tool of Older Persons' Prescriptions[3] (STOPP): 44/65 criteria included.
- Beers criteria[4]: 44/52 criteria included.
- Assessing Care of Vulnerable Elders (ACOVE) indicators relating to inappropriate medications[5]: 17/24 indicators included.

Example of criteria include long-acting benzodiazepine for >1 month or a non-steroidal anti-inflammatory drug (NSAID) prescribed with warfarin[1].

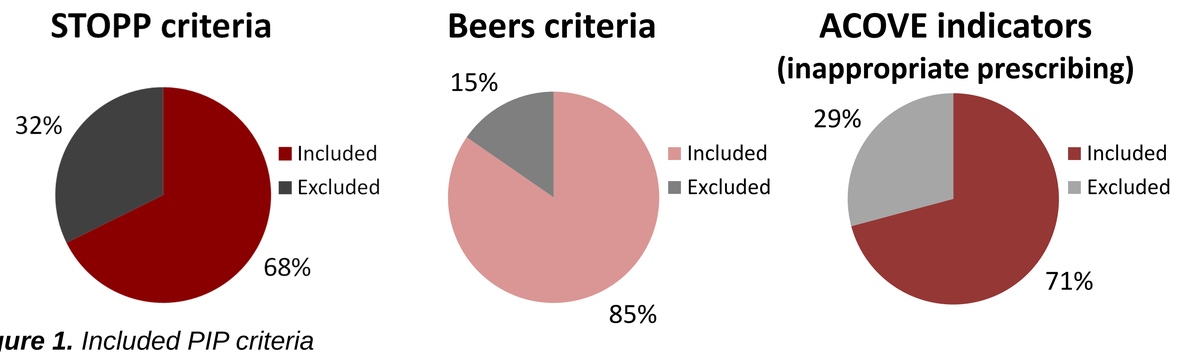

Figure 1. *Included PIP criteria*

Outcome

IADL disability measures competency in activities critical to independent living in older adults. In TILDA, functional impairment was assessed by asking participants if they had difficulty carrying out any IADL, e.g. doing household chores, managing money or making a telephone call. For this analysis, participants were classified as those with functional impairment (reporting difficulty with ≥1 IADL) and those without functional impairment.

Data analysis

Logistic regression was used to determine the association between exposure to PIP (defined by all three PIP measures together) and functional impairment, adjusting for age, sex, socioeconomic status, number of repeat drug classes, co-morbidity and medication adherence. Further analysis was performed defining exposure using each individual PIP measure alone. Co-morbidity was defined as the number of diagnosed chronic conditions reported by participants at the time of their TILDA interview. Adherence was measured by the medication possession ratio (MPR) calculated from participants' pharmacy claims data. Observations were weighted using participants' TILDA sampling weights and analysis was performed using STATA version 12.

Results

Overall prevalence

The percentage of participants with at least one instance of PIP during the study period was 66.9% (Table 1). Of the individual measures, PIP defined by the STOPP criteria was most prevalent, followed by the Beers criteria and ACOVE indicators.

Table 1. *Prevalence of PIP according to each measure*

Measures of PIP	Participants with PIP	
	N	%
STOPP criteria	1,175	61.17
Beers criteria	772	37.64
ACOVE indicators	482	23.50
All three measures of PIP	1,372	66.9

Of those with a PIP, 514 (25% of study participants) had one instance of PIP while 858 (41.8%) had two or more (Figure 2).

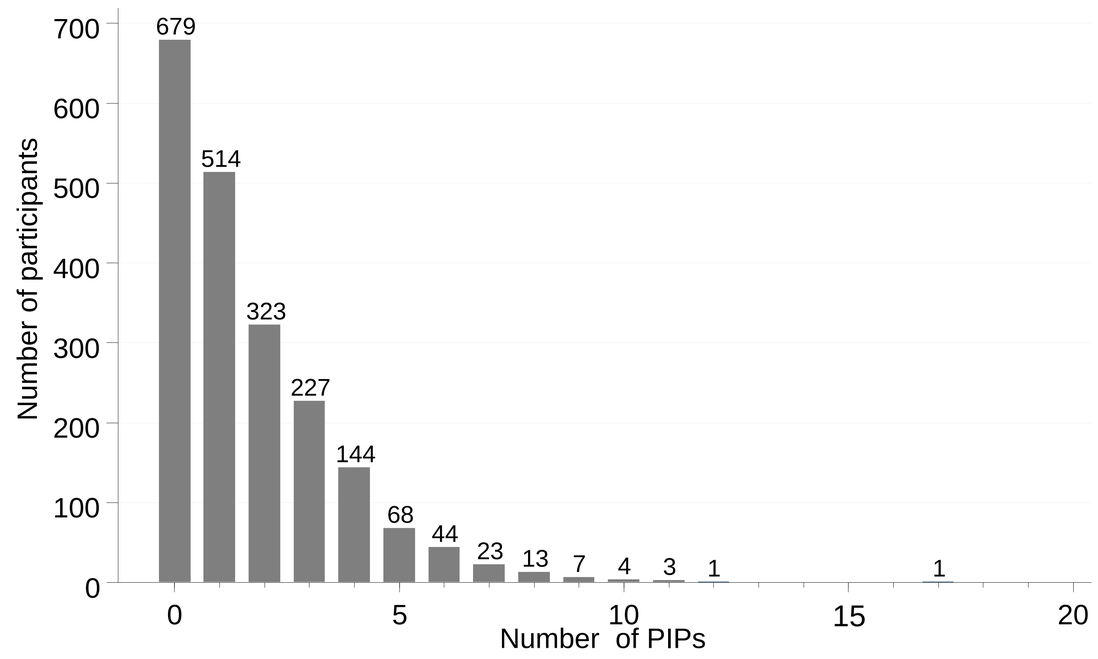

Figure 2*. Number of PIPs* per participant*

*PIP defined by all three measures and number adjusted for overlapping PIP criteria between measures

Prevalence per PIP indicator

The most prevalent PIP indicators in the study population were:

- Aspirin with no history of coronary, cerebral or peripheral arterial symptoms or occlusive arterial event (23.2%; STOPP criteria).
- Proton pump inhibitor at full therapeutic dosage for > 8 weeks (17.4%; STOPP criteria)
- Drugs to be avoided in those with a history of falls/fractures (15.9%; Beers criteria)

Logistic regression

- Two hundred and sixty participants (12.7%) reported having an IADL impairment.
- In the multivariate analysis (Table 2), those with ≥ 2 PIPs (defined by all three measures) were significantly more likely to have an IADL impairment (adjusted OR=1.91; 95% CI=1.15-3.18).
- Analysis using individual measures showed similar adjusted odds ratios for participants with ≥ 2 STOPP criteria (1.95; 1.27-2.98), ≥ 2 Beers criteria (1.78; 1.19-2.65) and ≥ 2 ACOVE indicators (1.88; 1.07-3.32).
- Female sex, age, number of repeat drug classes and chronic conditions were significantly associated with IADL impairment.

Table 2. *Univariate and multivariate (adjusted) logistic regression predicting IADL impairment*

	IADL impairment	
	Unadjusted OR (95% CI)	Adjusted OR (95% CI)§
PIP		
0	1	1
1	1.51 (0.97-2.35)	1.31 (0.76-2.27)
≥ 2	3.44 (2.38-4.98)	1.91 (1.15-3.18)
Sex (female)	2.16 (1.62-2.88)	1.54 (1.11-2.14)
Age (in years)	1.11 (1.08-1.13)	1.09 (1.06-1.11)
Highest level of education		
Primary or none	1	1
Secondary	0.53 (0.39-0.73)	0.67 (0.47-0.94)
Tertiary or higher	0.48 (0.32-0.72)	0.69 (0.44-1.09)
Number of repeat drug classes	1.29 (1.22-1.37)	1.12 (1.04-1.21)
Number of chronic conditions	1.60 (1.47-1.75)	1.38 (1.24-1.54)

§ Adjusted sex, age, education, number of repeat drug classes, co-morbidity and medication adherence (only covariates with significant associations are reported in table).

Conclusion

PIP in the elderly is highly prevalent and exposure to PIP is independently associated with increased risk of having IADL impairment. This relationship persists when determining PIP using STOPP, Beers criteria or ACOVE indicators alone. This suggests the importance of considering appropriateness when prescribing for older people in order to minimise adverse outcomes.

References

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Corresponding author: Frank Moriarty, frankmoriarty@rcsi.ie

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