Potentially inappropriate prescribing and adverse health outcomes in community dwelling older populations

Frank Moriarty[1], Caitriona Cahir[2], Kathryn Richardson[3], Tom Fahey[1], Rose Anne Kenny[3], Kathleen Bennett[2]

[1]HRB Centre for Primary Care Research, Royal College of Surgeons in Ireland; [2]Department of Pharmacology & Therapeutics, St James's Hospital, Dublin, Ireland; [3]The Irish Longitudinal Study on Ageing, Trinity College Dublin

Background

Medication related morbidity and mortality is a major health care concern in older populations and a significant burden on health care resources. Older people often have numerous co-morbidities, limited physiological reserve, and are prescribed many medications, thereby increasing the risk of adverse drug events (ADEs), reduced health related quality of life (HRQOL), and hospitalisation. There is an increasing focus on potentially inappropriate medication use as a possible cause of adverse health outcomes in older populations and a number of criteria and screening tools have been developed to measure and assist prescribers in detecting potentially inappropriate prescribing (PIP). These measures consist of drugs to be avoided in older people independent of diagnosis or in the context of certain diagnoses. The most frequently used measure of PIP is the US Beers criteria with prevalence rates ranging from 14%-37% in community dwelling patients and up to 40% in nursing home residents in the US and Canada[1,2].

Recently, more comprehensive PIP measures have been developed including the Screening Tool of Older Persons' Prescriptions (STOPP criteria) and the Assessing Care of Vulnerable Elders (ACOVE) indicators[3,4]. STOPP consists of 65 indicators of PIP associated with ADEs in older populations and prevalence rates of 22% have been reported in the US, 35%-77% in Europe and 24%-36% in Asia[5,6,7]. The ACOVE indicators are a set of process-of-care quality indicators covering a number of domains including screening and prevention, diagnosis, follow-up, and treatment. With regard to prescribing, the indicators measure appropriate medication use and other aspects such as under-prescribing and monitoring certain drug therapies. A 3% prevalence rate was reported for drugs to avoid, 36% for medication monitoring and 50% for under-prescribing in a community dwelling older population in the US[8].

To date, there has been limited and conflicting evidence of an association between current measures of PIP and adverse patient outcomes. The focus has also largely been on older patients who are hospitalised, in nursing homes or attending outpatient clinics with few studies of primary care or community based patients.

Aim

The aim of this study is to: (i) estimate the prevalence of PIP in those aged ≥ 65 years in TILDA using the STOPP criteria, the Beers 2012 criteria and the ACOVE indicators; (ii) determine the association between PIP and patient reported adverse health outcomes including HRQOL and health care utilisation and (iii) compare the prevalence of adverse health outcomes associated with PIP as determined by the STOPP criteria, the Beers criteria and the ACOVE indicators.

Methods

Study Design

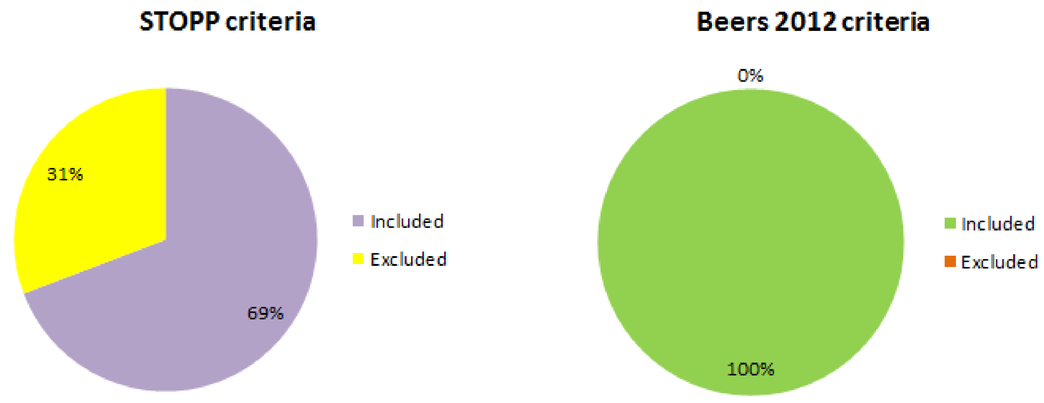
This is a prospective study of the association between PIP defined by the STOPP criteria, Beers 2012 criteria and ACOVE indicators and adverse health outcomes (HRQOL, health care utilisation) in a representative sample of community dwelling patients aged ≥ 65 years in Ireland in 2010-2013.

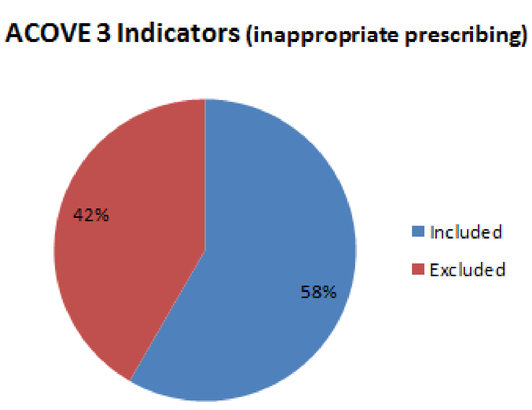
Data Linkage

The Health Services Executive Primary Care Reimbursement Services (HSE-PCRS) pharmacy claims database was linked to data from the Irish Longitudinal Study on Ageing (TILDA) for those aged ≥ 65 years at the time of Wave 1 data collection. The HSE-PCRS general medical services (GMS) scheme provides free health services, including medications, to eligible persons in Ireland. The HSE-PCRS GMS scheme is means tested, and was free to all those aged ≥ 70 years between July 2001 and December 2008. It is estimated that over 97% of this age group nationally avail of the scheme. The HSE-PCRS pharmacy claims database provides details on monthly dispensed medications for each individual within the scheme. Prescription claims are classified using WHO ATC code and details of every drug dispensed and claimants' demographic data are available. TILDA is a representative cohort of over 8,000 people resident in Ireland aged ≥ 50 years charting their health, social and economic circumstances over a 10-year period.

Exposure

45 (69%) of the 65 STOPP criteria, the Beers 2012 criteria and 14 (58%) of the 24 ACOVE indicators relating to inappropriate medication use are to be applied to patients' dispensed medication for the study period. Participants' dispensed medications data for the 12 months preceding date of interview in Wave 1, in the 12 months following Wave 1 and in the 12 months preceding date of interview in Wave 2 data collection will be extracted from the HSE-PCRS pharmacy claims database.





Outcomes

HRQOL to be measured using the CASP-19, activities of daily living (ADL) and instrumental activities of daily living (IADL). Health care utilisation, includes GP visits, hospital visits (A&E, inpatient, outpatient) and use of therapies.

Covariates

Covariates include age, sex, socioeconomic status, comorbidity, number of repeat drug classes, adherence, frailty, social support, depression and cognitive health and baseline measurement of the dependent variable and exposure to PIP. Adherence will be measured using the medication possession ratio (MPR) .The MPR will be calculated using the HSE-PCRS pharmacy claims data for the 12 months preceding date of interview in Wave 1, in the 12 months following Wave 1 and in the 12 months preceding date of interview in Wave 2 data collection.

Data analysis

The overall prevalence of PIP and the prevalence per individual PIP criteria will be calculated as a proportion of all eligible participants aged ≥ 65 years. Mixed effect regression models will examine how HRQOL and health care utilisation vary by PIP after adjusting for covariates.

Further Research

Future research will estimate the prevalence of prescribing omissions as defined by ACOVE indicators and START criteria, the association between such omissions and adverse health outcomes and the predictive validity of these measures of prescribing omissions will be compared.

References:

1. Aparasu RR, Mort JR. Inappropriate prescribing for the elderly: beers criteria-based review. Annals of Pharmacotherapy. 2000;34(3):338-46.
2. Liu GG, Christensen DB. The continuing challenge of inappropriate prescribing in the elderly: an update of the evidence. Journal of American Pharmacy Association. 2002; 42(6):847-57.
3. Gallagher P, Ryan C, Byrne S, Kennedy J, O'Mahony D. STOPP (Screening Tool of Older Person's Prescriptions) and START (Screening Tool to Alert doctors to Right Treatment). Consensus validation. Int J Clin Pharmacol Ther. 2008 Feb;46(2):72-83.
4. Wenger NS, Solomon DH, Roth CP, MacLean CH, Saliba D, Kamberg CJ, et al. The Quality of Medical Care Provided to Vulnerable Community-Dwelling Older Patients. Annals of Internal Medicine 2003; 139(9):740-7.
5. Cahir C, Fahey T, Teeling M, Teljeur C, Feely J, Bennett K. Potentially inappropriate prescribing and cost outcomes for older people: a national population study. Br J Clin Pharmacol 2010; 69(5):543-52.
6. Gallagher P, Lang P, Cherubini A, Topinková E, Cruz-Jentoft A, Montero Errasquín B, et al. Prevalence of potentially inappropriate prescribing in an acutely ill population of older patients admitted to six European hospitals. Eur J Clin Pharmacol. 2011: 67(11):1175-88.
7. Liu C-L, Peng L-N, Chen Y-T, Lin M-H, Liu L-K, Chen L-K. Potentially inappropriate prescribing (IP) for elderly medical inpatients in Taiwan: A hospital-based study. Arch Gerontol Geriatr. 2012;55(1):148-51.
8. Higashi T, Shekelle PG, Solomon DH, Knight EL, Roth C, Chang JT, et al. The Quality of Pharmacologic Care for Vulnerable Older Patients. Annals of Internal Medicine 2004; 140(9):714-20.

Funding: This work was funded by the Health Research Board in Ireland under Grant No. PHD/2007/16 . **Corresponding author:** Frank Moriarty, frankmoriarty@rcsi.ie