Medicines optimisation: impact of inappropriate prescribing on mortality and hospitalisation in older people

A Belgian cohort study involving people aged 80 years and over looked at underuse and overuse of medicines. It found that there was an increased risk of mortality and hospitalisation when medicines were potentially omitted or underused (as identified using the START criteria); those with more potential medication omissions were at the greatest risk. Potentially inappropriate or overuse of medicines (identified using the STOPP criteria) was not as associated with increased mortality or hospitalisation, although the study may not have been sufficiently powered to detect a difference. Shared decision making should be an integral part of all decisions regarding starting and stopping medications. The NICE guideline on medicines optimisation recommends that a screening tool (for example STOPP/START) should be considered in older people to identify potential safety incidents.

Overview and current advice

Prescribing of medicines safely and effectively to obtain the best outcomes is a challenge when caring for older people, especially if they have multiple long-term conditions (multimorbidity) and take many medicines (polypharmacy).

The NICE guidelines on medicines optimisation and multimorbidity provide recommendations to support the safe and effective use of medicines and suggest that using a screening tool to identify potential medicines-related patient safety incidents in some patient groups such as older people and those with polypharmacy may be beneficial. The NICE guideline on multimorbidity covers optimising care for adults with multimorbidity and provides recommendations to reduce a person’s treatment burden (polypharmacy and multiple appointments) and unplanned care. When reviewing medicines and other treatments, the guideline recommends that the database of treatment effects should be used to find information on the effectiveness of treatments, the duration of treatment trials and the populations included in treatment trials. It also suggests using screening tools in some patient groups, for example the STOPP/START criteria for older people, to identify medicines-related safety concerns and medicines the person might benefit from but is not currently taking.

The STOPP (Screening Tool of Older Persons’ Prescriptions) and START (Screening Tool to Alert doctors to Right Treatment) criteria were developed to identify potentially inappropriate prescribing in older people. A second version of the STOPP/START criteria was published in 2015 and includes more criteria than the previous version. The STOPP/START criteria review prescribing practice to identify those medicines that are potentially prescribed inappropriately. The STOPP criteria identify
those medicines that are potentially inappropriate and the START criteria identify where a person could be prescribed a medicine but is not, a potential prescribing omission. Few studies have used the newest version of STOPP/START to identify inappropriate prescribing in a trial setting.

New evidence

A prospective cohort study from Belgium reported on inappropriate prescribing and its effect on hospitalisation and mortality in people aged 80 years and more⁵.

The study used the Belfrail-Med cohort that consists of people aged 80 years and more living in the community. Participants were selected by their GPs between November 2008 and September 2009; people receiving palliative care and those with a diagnosis of dementia were excluded from the study. Inappropriate prescribing was identified using the STOPP/START criteria (version 2). Only 46/81 STOPP criteria and 13/34 START criteria were used by investigators due to limitations of the information in the database. The outcomes of interest were hospitalisation and mortality, reported for up to 18 months after inclusion in the cohort.

The study included 503 participants, with a mean age of 84.4 years; 61.2% were female and 43.3% lived on their own. The most common conditions in the cohort were hypertension (70.4%), osteoarthritis (57.1%), hyperlipidaemia (44.1%) and heart failure (38.4%). Participants received a mean of 5.4 medicines (range 0 to 16), with cardiovascular medicines being the most common (86.3%), followed by haematological (56.1%) and nervous system medicines (54.5%).

Polypharmacy (defined as 5 or more medicines) was present in 57.7% of the study population. Potentially inappropriate medicines (identified using 46/81 STOPP criteria) were present in 56.1% of participants and potential prescribing omissions (identified using 13/34 START criteria) were identified in 67% of participants. Nearly one-third of participants (31.4%) met the criteria in STOPP/START and also had polypharmacy. Only 9% of the population did not meet any of the STOPP/START criteria and were not receiving polypharmacy.

The most common STOPP criteria were:

1. Benzodiazepines for 4 weeks or more (35.2%).
2. Any duplicate medicine class prescription, for example 2 concurrent non-steroidal anti-inflammatory drugs (NSAIDs), selective serotonin reuptake inhibitors (SSRIs), loop diuretics, angiotensin converting enzyme (ACE) inhibitors, or anticoagulants (12.5%).
3. Antimuscarinic medicines with dementia, chronic cognitive impairment, narrow-angle glaucoma, or chronic prostatism (10.7%), although it should be noted that the clinical indicator dementia was an exclusion criteria for this study.
4. Use of regular (as distinct from 'when required') opioids without concomitant laxative (7.8%).
5. Concomitant use of 2 or more medicines with antimuscarinic/anticholinergic properties, for example bladder antispasmodics, intestinal antispasmodics, tricyclic antidepressants, or first generation antihistamines (3.4%).

The most common START criteria were:

1. ACE inhibitor with systolic heart failure or documented coronary artery disease (26.2%).
2. Antiplatelet therapy (aspirin, clopidogrel, prasugrel or ticagrelor) with a documented history of coronary, cerebral or peripheral vascular disease (24.3%).
3. Statin therapy with a documented history of coronary, cerebral or peripheral vascular disease, unless the patient's status is end-of-life or age is over 85 years (14.9%).
4. Regular inhaled beta-2 agonist or antimuscarinic bronchodilator (for example, ipratropium, tiotropium) for mild to moderate asthma or chronic obstructive pulmonary disease (10.5%).

5. Vitamin D and calcium supplement in patients with known osteoporosis or previous fragility fracture(s) or bone mineral density T-scores more than −2.5 in multiple sites (9.1%); note the only clinical indicator used for this criterion was osteoporosis.

After 18 months’ follow-up, 45/503 (8.9%) participants had died and 156/503 (31.0%) had been hospitalised. Causes of death included cardiovascular or cerebrovascular related events (48.9%), cancer (20.0%), respiratory related events (13.3%) or general deterioration (6.7%).

The authors found that underuse of medicines (identified using START) was associated with increased mortality (hazard ratio [HR] 1.39, 95% confidence interval [CI] 1.10 to 1.76) and increased hospitalisation (HR 1.26, 95% CI 1.10 to 1.45). People meeting 3 or more of the START criteria were nearly 3 times more likely to die (HR 2.91, 95% CI 1.28 to 6.61) and twice as likely to be hospitalised (HR 2.08, 95% CI 1.29 to 3.36) compared to people with no START criteria.

Additionally, the authors found that potentially inappropriate prescribing, identified using STOPP criteria, was not associated with a statistically significant increase in mortality or hospitalisation.

**Commentary**

**Commentary provided by NICE**

Since their development in 2008 a number of studies have used the STOPP/START criteria to identify potentially inappropriate prescribing and estimate its impact on people. This new study by Wauters et al. is of particular interest because it focuses on people living in the community (rather than hospital inpatients), uses patient-orientated outcomes and employed the second version of the STOPP/START criteria.

Many of the findings reported by Wauters et al. are broadly in line with those of other studies in this area: the prevalence of inappropriate medicines was high at 56%, as was medication omission at 67%. A meta-analysis by Hill-Taylor et al. found that the prevalence of people with at least 1 STOPP criteria ranged from 21.4% to 79.0%, and with at least 1 START criteria ranged from 22.7% to 74.0%

In their prospective cohort study, Moriarty et al. found that 57.0% and 41.8% of their cohort met STOPP and START criteria respectively; the results of this study are discussed in the Medicines Evidence Commentary - Medicines optimisation: adverse outcomes from potentially inappropriate prescribing in older people living in the community.

Wauters et al. did not show an association between the presence of STOPP criteria and increased mortality or hospitalisation. In contrast, Moriarty et al. reported that people with any STOPP criteria visited their GP or emergency department more frequently than those people who did not meet any STOPP criteria. Moriarty et al. did not report on mortality.

The Wauters et al. study has some limitations. As an observational study, causation cannot be demonstrated, and the results cannot be generalised beyond the study population (people aged 80 years or more without a diagnosis of dementia and living in the community). As the dataset available was limited, researchers were only able to apply approximately half of the STOPP/START criteria (59/115), meaning the actual level of potentially inappropriate prescribing may be underestimated. The authors also noted that the study may have been underpowered to show an association between the STOPP criteria and the outcomes.
When considering the results of studies on potentially inappropriate prescribing, it is important to remember the importance of patient involvement and shared decision making. The shared decision making page on the NICE website and the NICE guideline on medicines optimisation discuss the benefits of shared decision making and describe how NICE can support this through guidance and tools, such as patient decision aids.

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**References**


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