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AUTHOR(S)

Karen Cardwell

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Medication errors and transitions of care

Karen Cardwell.

Northern Ireland Centre for Pharmacy Learning & Development, School of Pharmacy, Queen's University Belfast, 97 Lisburn Road, Belfast BT9 7BL, Northern Ireland.

HRB Centre for Primary Care Research, Royal College of Surgeons, Dublin, Ireland.

World population demographics are changing rapidly. This phenomenon, referred to as population ageing, is occurring throughout the world, resulting in a population that consists of an increased proportion of older people (1). Prescribing for older people is complex, due to the increased likelihood of developing multiple long-term conditions which require the prescribing of multiple medications. The prescribing of multiple medicines for older people is further complicated by the effects of physiological ageing (e.g. increased blood-brain-barrier permeability, increased inter-individual variability, unpredictable pharmacokinetics and pharmacodynamics) (2). Moreover, due to the exclusion of older multimorbid patients from clinical trials, the true safety and effectiveness of medicines in older people may be unknown. Subsequently, this vulnerable population group are at an increased risk of medication-related problems such as potentially inappropriate prescribing (PIP), drug–drug interactions, drug–disease interactions, adverse drug reactions (ADRs) and medication errors (3). In this issue, Liew et al. conducted a multilevel meta-analysis of the prevalence and impact of potentially inappropriate prescribing among older persons in primary care settings (4). The authors report that 1 in 3 older people are affected by PIP and that 7.7-17.3% of adverse outcomes (i.e. emergency room visits, functional decline and hospitalisations) were linked to PIP (4). Moreover, also reported in the issue, Murphy et al. found that potentially inappropriate medicines use is highly prevalent in patients with mild-to-moderate Alzheimer's Disease and is associated with adverse events and unscheduled healthcare utilisation (5). In a recent systematic review of the prevalence and preventability of drug-related hospital admissions, the rate of readmissions due to drugs ranged from 3% to 64%, of which 5% to 87% were deemed preventable (6). Unplanned readmissions escalate healthcare costs and it has been estimated that unplanned hospital readmissions in the United States (US) cost approximately $17 billion per year. For that reason, rates of hospital readmission are increasingly used as a measure of healthcare quality globally (7).

As mentioned previously, increasing age is a risk factor contributing to the occurrence of medication-related problems. Such problems are common following hospitalisation as patients' medications are often changed during their in-patient stay. Changes are not always communicated appropriately to the patient or primary healthcare providers (e.g. community and general practice pharmacists, general practitioners and nurses) which leads to incorrect medicines use and inappropriate management of patients' conditions (7). Methods through which to reduce such problems include education (e.g. structured training in prescribing for older people), medicines reconciliation (particularly on admission to hospital), utilisation of clinical pharmacists, utilisation of electronic prescribing systems and utilisation of screening tools (e.g. the Beers Criteria, Medicines Appropriateness Index and Screening tool of older people's prescriptions (STOPP) and Screening tool to alert to right treatment (START) criteria) (8). Whilst there are various methods through which to reduce medication-related problems, few have been implemented as part of routine clinical practice. Currently, there is a paucity of evidence on interventions to improve appropriate polypharmacy and patients' clinical outcomes (9). However, there is a general consensus that multifaceted interventions are more likely to be effective (10). In this issue, Tomlinson et al. conducted a systematic review and meta-analysis of the effects of interventions that support medication continuity in older people (11). The authors reported that multicomponent interventions that bridged the transition for up to 90 days, were more likely to support successful transitions and reduce adverse outcomes (11). Moreover, they concluded that self-management coaching or education was the most effective intervention component (11). Self-management is particularly challenging for older people with low levels of social, cognitive, and physical functioning (12). Thus, when developing interventions to reduce medication-related problems, strategies to improve self-management should be prioritised. Tomlinson et al. also reported that no interventions described a method through which primary care providers communicate with secondary care providers (11). This results in discontinuity of care, which is an important public health issue, and often leads to preventable medication-related problems (13). Moreover, for multimorbid patients this is exacerbated by health systems that deliver disease-specific management of chronic conditions meaning care may be disjointed (14).

Pharmacists are recognised as experts in medicines use. In Northern Ireland, the Medicines Optimisation Quality Framework (15), a roadmap for improving the use of medicines across Health and Social Care, advocates the optimisation of medicines by a multidisciplinary workforce that includes pharmacists at each stage. This emphasises the need to advance the

role of pharmacists through wider adoption of prescribing rights, development of clinical leadership and expansion of consultant roles in primary and secondary care. In 2015, the National Health Service (NHS) England launched a pilot scheme to support clinical pharmacists working in general practice (GP). Currently, there are over 1000 whole time equivalent pharmacists working in general practice as a result of this pilot (16). Similar initiatives are being piloted in the rest of the United Kingdom. Pharmacists, co-located in GP clinics, have positively affected various areas of chronic disease management and the quality use of medicines (17). Subsequently, the role of pharmacists within the GP team is being investigated internationally (18-22). Pharmacists core roles and responsibilities are focused on improving safety, quality, efficiency and cost-effectiveness of prescribing, as well as governance and record keeping. They optimise medicines use through managing caseloads of patients, reviewing medications, auditing prescribing and building effective working relationships that cross the primary-secondary care interface (23), the latter may be fundamental to reducing the prevalence of PIP and ensuring successful transitions of care as described by Liew et al. (4), Murphy et al. (5) and Tomlinson et al. (11) in this issue. Whilst pharmacists working in general practice has the potential to improve the clinical and cost-effectiveness of prescribing there is still a paucity of evidence relating to this. Given the pressures facing global healthcare systems, researchers should endeavour to further explore this role through randomised controlled trials which are conducted with appropriate economic and process evaluations.

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