Awareness of the risks of medicines-related harm in the elderly can enhance medicines safety in vulnerable patients. This article examines the risk factors for medicines-related harm and the recommended strategies to reduce these risks.

Medicines-related harm (MRH) is a global health challenge, caused by unsafe medication practices and medication errors. MRH has recently been announced as the third global patient safety challenge by the World Health Organization (WHO). Medicines are the most common form of health intervention used today. However, medicines can cause harm if they are not taken correctly, are insufficiently monitored, or as a result of errors.

In a recent UK study, it was estimated that post-discharge MRH in older people incurs an annual cost of £400 million to the NHS. MRH in the global population has been estimated to lead to a $42 billion burden on healthcare costs annually.

The common types of medicines-related harm
MRH is more likely to occur in the older population or in the presence of co-morbidity and polypharmacy. In older people following hospital discharge, a large-scale multicentre UK study found that the most prevalent forms of MRH were: adverse drug reactions (ADRs) (72.9%), non-adherence (10.9%) and medication errors (3.4%). Around 13% of patients in the study experienced more than one type of harm (see Figure 1). The authors described an example in which a study participant experienced a gastric bleed associated with an antithrombotic treatment due to non-adherence to their proton-pump inhibitor (i.e., an ADR and non-adherence).

These common MRH types are explored in more detail below.

Adverse drug reaction
An ADR is “an undesirable effect of a drug that goes beyond its intended therapeutic use”. ADRs are a huge clinical burden and account for nearly 6% of all hospital admissions and 20% of readmissions. A European review identified that the rate of ADRs on admission and during inpatient care in hospital is significant, but there were a limited number of studies conducted in the primary care setting. More importantly, ADRs are difficult to identify in older populations as presenting symptoms are very similar to those in people with multimorbidity and frailty, such as dizziness, delirium or falls.
Medicines harm post-discharge

Figure 1. Forms of medicines-related harm (MRH) in older people following hospital discharge, as reported by Parekh et al, 2018

Non-adherence

The rate of medication non-adherence globally has been consistently reported to be between 20% and 50%. Non-adherence is one of the biggest obstacles in prescribing as it can negatively affect health outcomes, clinician-patient relationships and the health budget. It is commonly associated with newly prescribed medications to treat chronic conditions such as hypertension, hyperlipidaemia and diabetes.

Non-adherence can be categorised into intentional or unintentional. Studies have shown that non-adherence to discharge medicines after leaving hospital is mainly unintentional, where legibility, inaccurate content, layout and ambiguous wording on discharge summaries are all thought to increase MRH risks. Another factor is delayed or misplaced discharge summaries. These factors can be particularly prevalent during weekend and public holiday discharges.

An audit found that even if discharge summaries were of good quality, 6% of patients in primary care had at least one incorrectly actioned change. GPs predominantly conducted medicines reconciliation post-discharge; however, it was found that a proportion was completed by various other team members, from pharmacists to reception staff.

The risk of failure to make changes on discharge summaries is highest with newly-started medicines. Prescribing errors such as incorrect dosages, medication duplication and drug interactions have been shown to account for 24% of MRH. Monitoring and follow-up advice on discharge summaries are often not completed in primary care, increasing the risk of MRH.

Patient-related risk factors such as lack of knowledge of medicines, non-adherence, age and cognitive impairment contribute to a large proportion of MRH. A recent Dutch study illustrated the need for patient education at the point of discharge on both medicines information (60.1%) and medication management (37.2%).

Polypharmacy is also a risk factor for MRH. Polypharmacy is common among older people, and is associated with

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increased drug-drug interactions, adherence and the likelihood of patient-induced medication errors. One study found that the risk of ADRs increases and a positive correlation is shown in patients on nine or more medications. Deprescribing initiatives and regular medication reviews can help to identify medication problems and reduce medication regimen complexities.

Patients who are taking high-risk medicines have an increased risk of experiencing MRH. High-risk medicines include those with narrow therapeutic index such as digoxin, warfarin and disease-modifying anti-rheumatic drugs (DMARDs), which require closer monitoring post-discharge. Other medicines likely to cause ADRs should also be closely monitored, such as opiates, antibiotics, benzodiazepines, antiplatelet drugs and loop diuretics (bleeding and renal impairment are common ADRs causing readmission).

The risk factors for MRH in primary care are summarised in Table 1.

**Strategies to reduce medicines-related harm**

In a UK study, ADRs occurred more commonly in the first week post-discharge, highlighting the need for a strong focus on empowering patients and their informal carers to self-monitor for ADRs post-discharge and to improve medicines adherence as well as a greater understanding of medicines information and management. Self-monitoring and reporting of ADRs by patients can be useful, especially as patients and their family members are often the first to observe any ADRs.

Previous studies have also shown that the quality of self-identified ADRs by patients was as accurate as those identified by clinicians. However, it has also been shown that only 54% of patients who experienced and subsequently recognised potential ADRs reported them to their doctor. In addition, only 23% of the symptoms relating to ADRs that patients claimed to have reported to their doctors were documented in their primary care records. It is therefore valuable that self-reported ADRs are investigated and recorded to avoid non-reporting of potentially serious ADRs and the repeat prescribing of medicines causing harm. Crucially, if a patient has stopped taking a medicine, the emphasis should be on why, rather than focusing on promoting adherence, as it may be due to an ADR.

Changes to medication frequently occur during hospitalisa-

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**Figure 2.** Patient journey from hospital admission to post-discharge and the type and scale of medication error during the journey. Adapted from Garfield et al, 2009

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tation of older adults, and there is a need for careful reconciliation and prompt review within primary care following discharge. Older patients are more vulnerable to MRH during the 30-day period after hospital discharge. In view of the high risk of MRH in older people during this short period post-discharge, clinicians and prescribers should closely monitor patients, particularly those at high risk or those taking high-risk medicines. To date, there is no validated risk prediction tool to help identify patients at a high risk of MRH post-discharge. There is a clear need for this, as clinicians' predictions or 'gut instinct' is not a tool with high sensitivity or specificity.

As polypharmacy is a risk factor for MRH in older people, useful deprescribing guidelines and tools are available to reduce the prescribing of inappropriate medicines in this patient group, such as those from deprescribing.org, the STOPP/START and STOPP/Frail tools. While it remains unclear if medication review on its own reduces MRH in older adults, multi-component interventions incorporating patient education have demonstrated success during transitions of care.

Effective communication, either between hospital and primary care clinicians or between clinicians and patients, is crucial in reducing MRH during transitions of care. Several initiatives have been designed to try to overcome these issues, such as effective medicines reconciliation following admission and discharge from hospital, and the use of summary care records. Primary care clinicians have an important role in ensuring that a clear and up-to-date medication record is maintained to enable effective medicines reconciliation post-hospital discharge. Pharmacist's completion of medicines reconciliation in the community post-discharge has been proven to help identify and resolve medication discrepancies. Closer monitoring of high-risk patients on high-risk medications requires proactive management in primary care. This can be done by ensuring there is a system in place at GP surgeries to flag up discharges that require a quicker follow-up or discharges that are higher risk, so any gaps in communication can be addressed.

Last but not least, close liaison and involvement with patients and their family members is crucial in the post-discharge phase, with active engagement to empower the self-management and self-monitoring of medicines post-discharge. NHS England's initiative to embed clinical pharmacists into general practices provides opportunities for these medicines experts to take a lead on improving shared decision-making about medicines, as well as improving medication monitoring and review.

**Conclusion**

MRH is prevalent in older people, especially in the primary care and transition settings, leading to poor patient outcomes and increased economic burden. There is scope for primary care clinicians to identify high-risk patients and monitor them closely in the 7-30 day post-discharge period. Better quality discharge communication and liaison with secondary care colleagues is vital to reduce MRH, alongside reinforcement of patient education after discharge.

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**Declarations of interest**

None to declare.

V-Lin Cheong is a Doctoral Research Fellow at the School of Pharmacy and Medical Sciences, University of Bradford in collaboration with Sheffield Teaching Hospitals Foundation Trust and is a practice pharmacist in Sheffield; Justine Tomlinson is a Doctoral Research Fellow at the School of Pharmacy and Medical Sciences, University of Bradford in collaboration with Leeds Teaching Hospitals NHS Trust and is a registered pharmacist; Sarah Khan is a Doctoral Research Fellow at the School of Pharmacy and Medical Sciences, University of Bradford in collaboration with Sheffield Teaching Hospitals Foundation Trust and is a lecturer in pharmacy practice; and Duncan Petty is a Research Practitioner in Primary Care Pharmacy at the School of Pharmacy and Medical Sciences, University of Bradford. All authors are affiliated with the Medicines Optimisation Research Group at the University of Bradford.