Review

Pharmaceutical strategies towards optimising polypharmacy in older people

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ABSTRACT

This paper focuses on the issue of polypharmacy in older people and potential pharmaceutical strategies to optimize the use of multiple medicines. Although polypharmacy has long been viewed negatively, increasing emphasis is being placed on the difference between appropriate and inappropriate polypharmacy. This is largely being driven by the increasing prevalence of multimorbidity and the use of evidence-based guidelines. In this paper, we outline a number of key considerations that are pertinent to optimizing polypharmacy, notably prescribing appropriate polypharmacy, pharmaceutical formulations, the involvement of older people in clinical trials and patient adherence.

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1. Background

The use of medicines in older people (conventionally designated as those over the age of 65 years) has been described as the 'single most important health care intervention in the industrialized world' (Avorn, 2010). 'Polypharmacy' has often been used to describe the use of multiple medications and has been noted as 'one of the most pressing prescribing challenges' (Payne and Avery, 2011). There is no accepted definition as to what number of drugs constitutes polypharmacy, with some authorities proposing four or five medications (Linjakumpu et al., 2002; Rollason and Vogt, 2003). However, a recent report has advocated that the focus should move from numbers of medicines, to identifying those patients who may be at risk from inappropriate prescribing and adverse drug events (Duerden et al., 2013).

Conventionally, polypharmacy has also been viewed negatively, and has been described as the 'administration of more medicines than are clinically indicated, representing unnecessary drug use' (Montamat and Cusack, 1992). However, there is growing recognition that polypharmacy can be entirely appropriate, as evidence-based guidelines advocate the use of more than one drug in the management of long-term conditions e.g. hypertension (National Institute of Clinical Excellence, 2011). This situation may be compounded further by the presence of two or more long-term conditions i.e. multimorbidity (Barnett et al., 2012). A recent study has shown that 65% of those aged over 65 years are multimorbid,

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while more than 80% of those over 85 years are multimorbid (Barnett et al., 2012), all of these conditions may require drug treatment. Table 1 summarises clusters of disease i.e. those diseases that occur together, giving rise to multimorbidity and the categories of drugs that may be used to manage multimorbidity.

Further evidence is emerging that association between hospitalisation and number of prescribed medications is reduced when patients' clinical context (i.e. number of conditions) are taken into consideration (Payne et al., 2014). Therefore, polypharmacy is arguably the new paradigm for prescribing in older people (Gurwitz, 2004), being driven by multimorbidity and the plethora of evidence-based guidelines for the management of long-term conditions.

Aronson has described polypharmacy as having a dual meaning: 'too many drugs', or 'many drugs', and in the case of the latter, this may be entirely appropriate (Aronson, 2004). Hence, there has been a call for a change in emphasis from inappropriate polypharmacy ('too many drugs') to the prescribing of appropriate polypharmacy ('many drugs'), and thinking beyond the number of drugs prescribed (Hughes et al., 2014). This is the challenge that faces all those involved in health care, from the scientists who oversee the development and formulation of medicines to the healthcare professionals who prescribe and dispense these products. This paper examines the issues pertinent to optimising the prescribing of multiple medicines and achieving appropriate polypharmacy, specific formulation considerations when optimising polypharmacy for older people, the role of clinical trials in informing treatment decisions in older people, and the challenges faced by patients in adhering to polypharmacy.

2. Prescribing appropriate polypharmacy

As noted previously, achieving appropriate polypharmacy is not about ensuring the number of medicines prescribed is within a certain numerical threshold, but rather it is the task of ensuring that the safest, most effective medicines are prescribed to maximise patient benefit and minimise patient harm, while ensuring that all clinical indications are treated (Hughes et al., 2014).

There has been much emphasis in the literature on inappropriate prescribing for older people, i.e. when errors of commission and omission are present in a patient's medication list (O'Connor et al., 2012). There are several reasons for this, including the complexity of prescribing for older patients due to changes in pharmacokinetics and pharmacodynamics that occur with increasing age. However, one of the main risk factors for inappropriate prescribing, including underprescribing, is the number of medicines prescribed, despite the fact that undertreatment is also common (Tommelein et al., 2015).

Consequently, several studies aimed at improving prescribing have involved targeting patients' existing drug lists as well as existing clinical diagnoses to ensure all indicated medicines are prescribed (Patterson et al., 2014). The majority of these studies are complex interventions, involving a range of health-care professionals (e.g. prescribers and pharmacists) and adopting varied pharmaceutical care approaches. Studies have shown that targeted pharmaceutical care interventions can improve appropriate prescribing of polypharmacy, however, the overall quality of evidence for of these interventions is weak. In addition, few trials to date have looked at clinically relevant outcomes e.g. morbidity and mortality (Patterson et al., 2014). Increasingly, pharmaceutical care-based interventions are adopting specific screening tools as part of the process, either as the entire intervention, a component of the intervention or as an outcome measure to test the effectiveness of the intervention (Patterson et al., 2014). The purpose of screening tools is to provide prescribers with some explicit prescribing rules, which should be applied to individual patient profiles in conjunction with the prescriber's own clinical judgement (Spinewine et al., 2007). They list medicines that should be avoided in older populations, doses and treatment durations that should not be exceeded and medicines that should be prescribed to help prevent or delay the progression of existing disease. Screening tools are usually based on the best available evidence (acknowledging the lack of inclusion of older people in clinical trials), the known pharmacology of drugs, their anticipated mechanisms of action and clinical effects, and are derived using a Delphi consensus methodology. Examples include Beers' criteria (American Geriatrics Society, 2012), STOPP/START (O'Mahony et al., 2015), PRISCUS (Holt et al., 2010), NORGEP (Rognstad et al., 2009) and LaRoche (Laroche et al., 2007) criteria. There is considerable evidence to support the use of screening tools in clinical practice; their use has been shown to improve medication appropriateness and prevent or reduce the occurrence of adverse drugs events (Gallagher et al., 2011; Hamilton et al., 2011). Indeed, some screening tools e.g. Beers' criteria, have been identified as important quality measures by several stakeholders, including the National Committee for Quality Assurance and the Pharmacy Quality Alliance in the United States (American Geriatrics Society, 2012).

Despite the potential clinical benefits of using screening tools, few, if any, provide guidance on the selection of appropriate formulations which is of particular importance when prescribing for older people.

3. Pharmaceutical formulations

As mentioned above, when optimising polypharmacy for older people, it is necessary to consider their ability to take various pharmaceutical formulations as they are prescribed. Specific age-related conditions may preclude the use of particular formulation types for individual patients, thus highlighting the need to tailor pharmacotherapy to the individual patient.

For example, dysphagia, or difficulty in swallowing, is common amongst older people, with the prevalence rates reported ranging from 11 to 40% depending on the healthcare setting and assessment technique used (Miller and Patterson, 2014). A variety

Table 1
Common clusters of diseases and their therapeutic management.

Common clusters of diseases (Islam et al., 2014)	Categories of drugs that may be used in the management of common disease clusters (Joint Formulary Committee, 2015)
Asthma, bronchitis, arthritis, osteoporosis and depression	Bronchodilators, steroids, non-steroidal anti-inflammatory drugs, bisphosphonates, calcium supplementation, Vitamin d, antidepressants
Hypertension and diabetes	ACE[a] inhibitors/angiotensin II receptor antagonists, diuretics, calcium channel blockers, sulphonylureas, biguanides, statins, anti-coagulants
Cancer, heart disease and stroke	Chemotherapeutic agents, analgesics, ACE inhibitors, statins, beta-blockers, anti-coagulants

[a] ACE = angiotensin converting enzyme.