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Inappropriate polypharmacy: reducing the burden of multiple medication

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Medication use increases with age. About 57% of dispensed prescriptions are given to those over 60 years of age[1] who constitute only 19% of the population.[2] In 2003, those aged over 60 were dispensed an average of 35 prescriptions per head compared with 7.7 for those under 60.

Polypharmacy is the term used to describe multiple drug use by patients, although it has come to imply excessive or inappropriate prescribing.[3] It commonly refers to patients taking four or more medications, although there is no formally accepted definition. Polypharmacy is relatively common in older people: the average number of medications taken increases by 0.4 for every 10 years of age, with about 20% of people aged over 70 taking five or more medications.[4]

A distinction needs to be made between appropriate and inappropriate polypharmacy. Many patients are, quite correctly, receiving multiple drug therapy for their multiple coexisting medical problems.

The National Service Framework (NSF) for Older People recommends that older people undergo a regular medication review to reduce the complications associated with multiple drug therapy.[5] Patients taking more than four medications should be reviewed six-monthly, those with four or less annually.

Inappropriate polypharmacy has cost implications for the health service. The total annual spending on prescription drugs in primary care in England is £8 billion – a 60% increase in the last decade.[6] The cost of inappropriate medication has not been calculated, but the cost of drug wastage in primary care has been estimated at £100m.[6] Therefore, there is increasing interest in ways to decrease the cost of unnecessary drugs.

How does polypharmacy occur?

Polypharmacy has a number of underlying causes (Table 1). Older patients often suffer from multiple medical problems, each requiring differing treatments from the ever-expanding list of available therapies. This group of patients has previously been under-represented in trials of new drugs but there is now an increasing evidence base for the use of some of the newer treatments in this population.[7–10]

Patients can remain on the same treatment, sometimes unnecessarily, for some time if their treatment needs are not reviewed regularly. However, even when there is a drug review, it can be chal-

Table 1. Causes of polypharmacy.

May be appropriate	Usually/always inappropriate
Multiple medical problems	Multiple drug prescribers
Using further medication to treat ADRs (eg laxatives with opiods)	No regular medication review Using further medication to treat ADRs (eg analgesia for a drug-induced headache) Prescribing of drugs that are not indicated

ADR = adverse drug reaction.

Key Points

- Polypharmacy is the term used to describe multiple drug use by patients and is not necessarily inappropriate
- Inappropriate prescribing covers not only inappropriate prescriptions but also the failure to recommend medication for which an indication exists
- Patients on multiple drug treatments should have a regular medication review
- Reducing inappropriate drug treatment improves drug compliance, reduces adverse drug reactions and costs

KEY WORDS: adverse drug reactions, falls, inappropriate prescribing, medication review, polypharmacy

lenging to determine why a patient is on a certain medication and therefore whether it is safe to discontinue it. In the UK, most prescribing is done by general practitioners (GPs). In some countries, patients are often cared for by several different healthcare professionals, each prescribing medications for separate conditions. It is not surprising to find a direct relationship between the number of prescribing physicians and the incidence of adverse drug reactions (ADRs).[11] The introduction of non-medical prescribing will further increase the number of prescribers. The impact that this will have on polypharmacy and ADRs is not known.

A further problem is the inappropriate treatment of some ADRs with medication, such as analgesia for a drug-induced headache. In some situations, using an additional medication is entirely appropriate such as prescribing laxatives in combination with opiates to treat constipation.

Another, more worrying, possible cause of polypharmacy is the prescribing of drugs that are simply not indicated. This includes drugs for which there is no evidence of efficacy, such as ferrous sulphate for non-iron deficiency anaemia.

Associations of polypharmacy

Polypharmacy is associated with a number of deleterious effects. The incidence of ADRs and drug interactions increases with advancing age,[4] partly due to changes in the pharmacokinetics and pharmacodynamics associated with ageing but also to the presence of multiple disease states and their consequent drug treatments. One study of inappropriate medication use demonstrated that 11.5% of elderly patients admitted to hospital were prescribed medications despite having a specific contraindication for those drugs. An ADR was experienced by 27% of them, about half of which were due to contraindicated medications or drugs felt to be unnecessary.[12]

Drug compliance decreases in proportion to the increased number of drugs prescribed.[4] Patients on multiple medications are also more likely to be admitted to hospital, have a longer length of stay, an increased mortality rate and to be readmitted after discharge.[4,13,14] Polypharmacy may also be a predictor of nursing home placement, malnutrition, fractures and impaired mobility.[14] However, in these situations it is likely that polypharmacy is merely a marker of multiple pathology or frailty.

Polypharmacy and falls

The use of multiple medications is associated with an increased falls risk for two main reasons:

- polypharmacy is a marker of underlying comorbidity
- the more medications a patient is taking, the more likely it is that one of them will be a high-risk medication such as a long-acting benzodiazepine.

Underlying comorbidity

As with the other associations of polypharmacy, the increased risk of falls and consequent increase in morbidity and mortality seems likely to be predominantly because polypharmacy is a surrogate marker of comorbidity and frailty.

High-risk medication

It is clear that some individual drugs are associated with an increased falls risk as a direct result of their pharmacological effect, such as long-acting benzodiazepines. One study suggested that it is the presence of high-risk drugs in a patient's medication that increases falls risk rather than the total number of medications.[15] In this study patients on multiple medications but taking none of the higher risk drugs did not appear to have an increased risk of falls.

There is no evidence that simply reducing the total number of medications reduces the risk of falling, although discontinuing culprit drugs may reduce falls.[16]

Decreasing the burden of inappropriate medication

Given all the adverse consequences of inappropriate medication, reducing the drug burden has several potential benefits (Table 2).

Medication review

The main approach to reducing inappropriate prescribing is to undertake a regular medication review. This seeks to identify not only unnecessary and potentially harmful medications but also indications for appropriate medication not already prescribed. Both types of change should be discussed with the patient in order to help them come to a decision regarding discontinuing or adding medication.

Medication review can be undertaken by a variety of healthcare professionals

Table 2. Potential benefits of reducing inappropriate polypharmacy.

- Reduced ADRs
- Improved drug compliance
- Improved patient quality of life
- Reduced hospital admissions
- Lower risk of drug interactions
- Fewer drug errors
- Reduced prescribing costs

ADR = adverse drug reaction.

including GPs, pharmacists and geriatricians. Each can bring different skills and experience to the task.

Several studies have examined whether a detailed medication review by a pharmacist decreases the number of prescribed medications. Most of them found a small reduction in the total number of medications used, an increase in compliance and a reduced chance of ADRs, and generally demonstrated an overall cost benefit of undertaking a drug review.[4,17] However, reported improvements in a patient's quality of life were more variable and the impact on patients' overall health has not been studied.

Telephone counselling

A recent study suggested that a regular telephone counselling service by a pharmacist both increased compliance and reduced all-cause mortality in patients taking multiple medications.[18] This suggests that it may be the poor compliance associated with polypharmacy that increases mortality as opposed to the number of medications. A medication review, by telephone or other method, provides the opportunity to educate patients and reinforce the need to take medications regularly, which may explain the observed increase in compliance seen in this and other studies.

Reducing the burden of medication taking

Simple methods to decrease the burden of tablet taking include using once daily or once weekly formulations and fixed-dose combinations. Such agents are frequently used in the treatment of hypertension where multiple therapy is commonly employed. In this situation the use of non-pharmacological treatments, such as reducing salt intake, are also of proven value.[19]

Treatment algorithms

Another option to reduce inappropriate polypharmacy is to introduce treatment algorithms for common conditions that may result in multiple medications. This has been used in some psychiatric units where polypharmacy is common, resulting in a reduction in overall drug usage.[20]

Audit

Regular audit is required in order to ensure best practice in prescribing. We have developed prescribing indicators covering purely descriptive indicators, indicators of unnecessary or potentially harmful medication and evidence-based indicators.[21]

Conclusions

Polypharmacy in elderly patients is a common and perhaps growing problem. When discussing multiple drug usage a distinction should be made between inappropriate and appropriate prescribing. Reducing the drug burden has potential benefits for individual patients, in that they can take less medication and are therefore less likely to suffer ADRs or drug interactions.

The NSF for Older People suggests a regular medication review for elderly patients.[5] All prescribers should take the opportunity to review the medication list whenever possible, but this may require specialist help for many patients. The overall aim is to ensure that, through careful prescribing, patients are advised not only on reducing unnecessary drugs but also on starting drugs with a proven indication.

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