Polypharmacy – what is it and how common is it?

Martin Duerden BMedSci, DRCOG, DipTher, DPH, MRCGP and Rupert Payne PhD, MRCP, MRCGP

In the first of a series of articles the authors of a King’s Fund report on polypharmacy outline the scale of the issue and how medicines optimisation could be used to mitigate against the problem.

Polypharmacy is an expression that has been used for at least the last 150 years. Even when it was mentioned in the medical literature in the mid-19th century there was a recognition that it could do harm, and that care should be taken when prescribing several drugs. Up until the last few decades polypharmacy was mostly frowned upon and considered harmful. There is now acceptance that it is an inevitable and growing part of modern medicine and, when a large number of medicines are prescribed to one individual, extra care needs to be taken to avoid harm.

We were asked to prepare a King’s Fund report on polypharmacy with a remit to agree a definition, describe the scale of the issue, and explore how medicines optimisation (previously described as...
Appropriate polypharmacy is prescribing for an individual for complex conditions or for multiple conditions in circumstances where medicines use has been optimised and the medicines are prescribed according to best evidence. The overall intent for the combination of medicines prescribed should be to maintain good quality of life, improve longevity and minimise harm from drugs.

Problems polypharmacy is where multiple medications are prescribed inappropriately, or where the intended benefit of the medication is not realised. The reasons why prescribing may be problematic may be that the treatments are not evidence-based, or the risks of harm from treatments is likely to outweigh benefit, or where one or more of the following apply:

- the drug combination is hazardous because of interactions
- the overall demands of medicine-taking, or ‘pill burden’, are unacceptable to the patient
- these demands make it difficult to achieve clinically useful medication adherence (reducing the ‘pill burden’ to the most essential medicines is likely to be more beneficial)
- medicines are being prescribed to treat the side-effects of other medicines where alternative solutions are available to reduce the number of medicines prescribed.

Towards a definition
In its simplest form polypharmacy is prescribing more than one medication to an individual to take at the same time. In the UK, prescriptions may include items other than medication (feeds, blood testing strips, etc) but for this article we consider prescribed drugs only. Furthermore, it is important to recognise that over-the-counter remedies, including herbal products, may have relevance for polypharmacy, with potential for confusion and drug interactions.

There is no clear agreed definition of polypharmacy, and the term is often used somewhat loosely. Some policies have used the number of prescription items to describe a threshold for polypharmacy; for example, the Quality and Outcomes Framework (QOF) previously advocated medication reviews for those on four or more repeat prescriptions. The need for a clearer definition was therefore a key aim of the King’s Fund report. Considerable deliberation, including input from a seminar attended by clinicians, policy makers and academics, led to the published definition (see Table 1) which acknowledged the potential for both appropriate and problematic polypharmacy, which can of course co-exist.

Do the guidelines help?
The evidence-based medicine movement may be partly to blame for the growth in polypharmacy. The guidelines derived from the evidence describe the use of treatments to improve quality of life, prevent disease events and prolong life, including prescribing preventative therapies for people who as yet have no symptoms. In the UK, the use of evidence-based guidelines in primary care is often incentivised through the QOF payment-for-performance system. This inevitably leads towards polypharmacy, as demonstrated by the case study (see Table 2). However, much of the evidence is derived from carefully controlled studies, in persons with limited risk factors, conditions or drug therapy. This may not reflect the inevitability of polypharmacy.

Table 1. The definition of polypharmacy used in the King’s Fund report

<table>
<thead>
<tr>
<th>Reason for polypharmacy</th>
<th>Example treatments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regimen complexity</td>
<td>Thiazides, beta-blockade</td>
</tr>
<tr>
<td>Lack of adherence</td>
<td>Metformin, sulfonylureas</td>
</tr>
<tr>
<td>Undesirable drug burden</td>
<td>Statins, corticosteroids</td>
</tr>
<tr>
<td>Adverse drug reactions</td>
<td>Antihypertensives, anti-muscarinics</td>
</tr>
<tr>
<td>Drug interactions</td>
<td>Antihypertensives, NSAIDs</td>
</tr>
<tr>
<td>Prescription errors</td>
<td>SSRI antidepressants, antipsychotics</td>
</tr>
<tr>
<td>Patient confusion</td>
<td>Oral anticoagulants, antithrombotics</td>
</tr>
</tbody>
</table>

Table 2. The inevitability of polypharmacy: A case example

John is a 65-year-old heavy cigarette smoker, who is obese (BMI 34kg/m²) and has recently been found to have type 2 diabetes (HbA1c 6.2% mol/mol). He does not have established cardiovascular disease, but does get short of breath on mild exertion with frequent episodes of ‘bronchitis’ in the winter, and his mobility is further impaired by osteoarthritis of both knees. His blood pressure is 156/94mmHg and total cholesterol is 6.4mmol/litre.

Inevitable polypharmacy – what might be prescribed for John’s problems?

- Antihypertensive drugs: potentially two or three (but thiazides and beta-blockade may worsen glycaemic control)
- COPD: inhaled beta² agonist, anti-muscarinic and corticosteroids (possibly combination inhaler)
- Statin
- Hypoglycaemics: metformin, potentially sulfonylurea and others
- Smoking cessation interventions
- Orlistat
- Analgesia – paracetamol, NSAID (topical or oral)

This potential long list of possible medications for such a person is not unusual. These may seem appropriate and reflect current guidelines and policy, however, the potential for problems is also significant. This includes the risk of adverse drug reactions, drug interactions, prescribing errors and patient confusion due to drug regimen complexity, lack of adherence, and undesirable drug burden. One should consider how such risks can be minimised, whether compromises are necessary, and indeed how these treatments might differ if the patient was older or frailer.
real world where complex co-morbidity is increasingly common, and many people receive drugs for several conditions at one time. Indeed, more pragmatic clinical trials would be helpful for establishing overall benefits for people receiving a cocktail of treatments for different conditions. Guidelines which describe how to manage people who have several common co-morbidities are required, and NICE are currently looking at this.5

**How common is multimorbidity and associated polypharmacy?**

Polypharmacy is widespread and increasingly common, occurring in primary and secondary care, and in care homes for older people. It has become a global issue particularly, although not exclusively, in Western countries. It is driven by the growth of an ageing population and by the increasing prevalence of multimorbidity. Population projections produced by the Office for National Statistics point towards significant further increases in the population of older people in the next two decades, due to increased longevity and the current ‘bulge’ of people aged between 40 and 60 years growing older.4

Recent research from Scotland showed that among older people, patients with multimorbidity are the norm rather than the exception.5 In a cross-sectional analysis based on medical records of over 1.75 million people registered with medical practices in Scotland, multimorbidity was defined as the presence in an individual of two or more disorders from a list of 40 specified long-term disorders. Almost a quarter of all patients, and more than half of those with a chronic disorder, had multimorbidity and this multimorbidity occurred at an earlier age in areas where there was socio-economic deprivation. Fewer than 30 per cent of people did not have at least one condition by the time they reached the age of 60, and many had two or three.

As an example, only nine per cent of all people with coronary heart disease had no other common conditions; 52 per cent had hypertension and 22 per cent had diabetes. An important finding is that there were greater numbers of younger people (aged less than 65 years) with multimorbidity than there were older people; this is explained by the fact that although prevalence of disease is less, there are considerably more people in the population under this age.5

In the UK there has been little published information on the scale of polypharmacy, but it clearly relates directly to multimorbidity. This dearth of information is slowly being remedied. For example, one recent analysis of growth of prescribing in more than 300,000 patients on a primary care database in Scotland found an increase in the mean number of drugs dispensed, from 3.3 in 1995 to 4.4 in 2010. This corresponded to a 3.1-fold increases in the numbers of patients receiving 10 or more medications from 1.9 per cent to 5.8 per cent.6 Another recently published study from Scotland looked at around 181,000 patients and the relationship to age and multimorbidity.7 Overall, 16.9 per cent of the adults assessed received four to nine medications, and 4.6 per cent received ten or more medications. This increased with age (see Figure 1) and was directly related to the number of morbidities, in those patients with six or more co-morbidities 41.7 per cent received 10 or more medications (see Figure 2).

**Conclusion**

These data show that polypharmacy is a growing and significant issue, driven by ageing, multimorbidity and numerous clinical guidelines. For many people, appropriate polypharmacy will extend life
expectancy and improve their quality of life. However, there is also the increased risk of prescribing errors, adverse drug reactions and drug interactions. Polypharmacy may cause patients confusion, is likely to lead to reduced adherence, and the burden of drug taking may in itself reduce quality of life. There is also the risk of dispensed medicines remaining unused and wasted.

The challenges of dealing with these issues are considerable, and there is a pressing need for research and guidance that covers commonly associated co-morbidities together with polypharmacy. It is also essential that clinicians, pharmacists and other prescribers work alongside patients experiencing polypharmacy to enable them to make informed choices about treatments and the burden of pills we expect them to consume.

References

Declaration of interests
None to declare.

Dr Duerden is a part-time GP in North Wales, and clinical senior lecturer, Bangor University and Dr Payne is clinical lecturer in general practice, University of Cambridge, and honorary consultant clinical pharmacologist.

prescriber.co.uk Prescriber 5 November 2014 47