PROCESS AND SYSTEMS

Establishing a service to tackle problematic polypharmacy

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ABSTRACT

Introduction

Polypharmacy is increasingly common and can increase the risk of adverse drug reactions (ADRs), accounting for a significant proportion of hospital admissions. It may also impair functional status and quality of life. Current efforts to improve polypharmacy take place largely in primary care, but there may be a role for increased support from medicines specialists in the secondary care setting.

Methods

We developed a pilot polypharmacy clinic in secondary care, led by clinical pharmacologists and pharmacists. Medicines were deprescribed as appropriate, based on clinical need and symptoms suspected of being ADRs. An ADR symptom burden was recorded pre- and post-intervention to identify any clinical changes following deprescribing.

Results

Twenty-four individuals were reviewed. The total number of medicines prescribed to each patient was reduced by a median of 4 (interquartile range (IQR) 2–5), resulting in annual savings in discontinued medicines of £4,957.44. The ADR burden fell from a median of 15 (IQR 14–17) to a median of 7 (IQR 4–11).

Conclusion

Our pilot clinic reviewed a small number of patients, but demonstrated the potential of such a service to offer both clinical improvements and cost savings. This service could be extended, integrated and sustained to improve care for people taking multiple medicines.

KEYWORDS: Polypharmacy, medicines optimisation, rational therapeutics, deprescriptions, clinical pharmacology

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Introduction

Primary care doctors traditionally provide a longitudinal and holistic view of their patients' prescriptions, but there are barriers to general practitioners (GPs) carrying out effective reviews in complex patients with polypharmacy. These include unawareness of inappropriate prescribing; fear of the consequences of making changes to prescriptions; lack of self-efficacy (insufficient confidence to make changes); and lack of resources.[1] GPs regularly carry out medication reviews for those taking multiple medicines, often with the support of pharmacists, but report a need for onward referral options to physicians specialising in multimorbidity and polypharmacy.[2]

One solution is to adopt an integrated approach to caring for these patients. Clinical pharmacologists are physicians with specialist training in rational therapeutics. This requires the assessments of both the benefits of treatment and its harms. These include adverse drug reactions (ADRs) and drug–drug interactions (DDIs), both of which are strongly associated with polypharmacy.[3] Clinical pharmacologists, as specialists in general (internal) medicine, are able to set polypharmacy in the context of the patient's overall medical care. They also have first-hand experience of the non-pharmacological issues of multiple medicines, which include fragmented care and lack of ownership of medication lists.[4]

At University College London Hospital (UCLH), the clinical pharmacology and therapeutics (CPT) department runs an inpatient service providing non-organ-specific specialist care for patients with multimorbidity and, implicitly, polypharmacy. Clinical pharmacists are experts in medicines and provide invaluable information on their safe, appropriate and cost-effective use.

We have – in partnership with pharmacy colleagues – piloted an outpatient polypharmacy clinic, with the eventual hope of moving towards an integrated service.

Method

We established a working group to design the pilot service. We recruited a panel of specialist consultants to provide advice where required. This was both for safety and to minimise the risk of patients receiving conflicting advice at specialist clinics.

We conducted public and patient involvement (PPI) surveys to improve our understanding of the needs of patients with polypharmacy.

Diagnosis	Medication and dose	Relevant investigations	Adherence	Comments		
				Essential vs non-essential	Effectiveness of therapy	ADRs / cascade prescribing

Fig 1. Structured clinical pharmacology assessment tool.
ADR = adverse drug reaction.

The trust funded the development of the clinic, and the costs of each patient's post-admission clinic attendance were passed onto primary care. Calculations for costings analyses were made based on staffing costs per hour, using data from the Personal Social Services Research Unit (PSSRU).[5]

We adapted objectives from a core outcome set for trials aimed at improving polypharmacy to:

- identify and address the inappropriate use of medicines
- reduce harm through identification and management of ADRs
- analyse costings
- assess patient satisfaction.[6]

Patients discharged on 10 or more medicines were invited to attend clinic and provided with a patient information leaflet (supplementary material S1).

We developed a structured clinical pharmacology assessment tool (SCPAT; Fig 1) in collaboration with Prof Emma Baker and her colleagues at St George's Hospital, London, to assist in rationalising medications.

Medicines were labelled as 'essential' (where they served essential replacement functions, or where they were used to prevent rapid symptomatic decline) or 'non-essential'. Where medicines were categorised as 'non-essential', effectiveness of therapy was ascertained by questioning patients about symptoms or referring to relevant investigations.

We also developed a 36-item ADR checklist. First, we identified the 20 most commonly prescribed medicines using NHS Business Service Authority data, then checked the Summary of Product Characteristics (SmPC) for each.[7] We collated and ranked the associated ADRs by frequency. The checklist (Supplementary material S2) listed the 30 most prevalent ADRs, along with six others agreed by the working group to be relevant to our population.

Patients were invited to complete the checklist in clinic, with support where necessary, allowing us to construct a score for the 'ADR symptom burden'.

During the consultation, patients were invited to discuss their aims and priorities for healthcare and medicines. Open-ended questions were asked to get an idea of individuals' attitudes towards their health and medicines, for example 'How do you feel about taking tablets?' Later in the consultation, more specific questions were asked, for example 'what would you like your medicines to do you for you?' We used the discussion, along with information collected from the SCPAT and the ADR checklist, to inform decision making about continuing, dose-adjusting, class-switching or deprescribing individual drugs.

At 6-week follow-up, ADR symptom burden checklists were repeated and results were compared with the score pre-intervention.

Outcomes

Patient and public involvement

Responses to our PPI surveys highlighted the difficulties that patients experienced when they were being seen by several specialists; typical responses included *'My medications have been prescribed by five practitioners over 3 years … I would welcome a review of how they all interact'* and *'The problem is worst when one has several long-term conditions … No-one sees the whole picture'*.

Clinical outcomes

Twenty-four individuals were reviewed in the pilot service (Table 1). The total number of medicines prescribed to each patient was reduced by a median of 4 (interquartile range (IQR) 2–5).

Medicines unlikely to bring benefit

The most common reason for stopping a prescription was that there was no evidence to support the indication for which it had been used. For example, nicorandil had been prescribed to a patient with a normal myocardial perfusion scan, and omeprazole treatment continued for several years in an asymptomatic patient with no history of gastrointestinal bleed.

Medicines suspected to cause harm

We stopped a median of one medicine per patient due to suspected ADRs. Seven patients who required monitoring for adverse withdrawal effects or to check control of chronic disease following deprescribing were followed up. These seven patients completed the ADR checklist (supplementary material S2) before and after deprescribing (Table 2). The ADR burden fell from a median of 15 (IQR 14–17) to a median of 7 (IQR 4–11) at follow-up. As the

Table 1. Demographic and medicines data for 24 patients in pilot

Age, years, median (IQR)	82 (73–85)
Female, n (%)	10 (41.7)
Number of diagnoses, median (IQR)	9 (6–12)
Change in number of medicines prescribed, median (IQR)	4 (2–5)
Total number of drugs per patient, median (IQR)	Before: 12 (10.5–15.5) After: 10 (5.5–11)[a]

[a]$p \leq 0.05$ by Wilcoxon signed-rank test; IQR = interquartile range.

Table 2. Adverse drug reaction symptom burden pre- and post-intervention

Patient	ADR burden (denominator: 36)		Delta change
	Pre-intervention	Post-intervention	
1	14	3	11
2	16	16	0
3	19	11	8
4	14	7	7
5	15	6	9
6	5	4	1
7	17	7	10
Median (IQR)	**15 (14–17)**	**7 (4–11)**	**8 (1–10)**

ADR = adverse drug reaction; IQR = interquartile range.

number of patients was small, we provide descriptive statistics but did not undertake formal statistical analysis.

The symptoms that appeared most amenable to improvement after deprescribing were postural hypotension, ankle swelling and nausea/vomiting (Table 3).

Cost analysis

Annual savings in discontinued medicines amounted to £4,957.44, based on NHS drug tariff costs.[8] In addition, warfarin was stopped in one patient, resulting in an annual saving of £126 on warfarin clinics.[9] The cost of staffing the clinic (including appointments that patients did not attend) was £2,592.60.

Patient satisfaction

Attendees were positive about the experience of undergoing a review of all their medicines in a dedicated setting. A post-clinic questionnaire asked the question 'Would you recommend that friends and family who are taking lots of medicines attend a similar type of appointment?' with all 24 patients responding 'Yes, definitely.'

Discussion

We describe what we believe to be the first multidisciplinary polypharmacy outpatient clinic in the UK. While patient numbers were small, the pilot service highlighted some important potential benefits of such an intervention. These include reduction in the prescription of medicines of unlikely benefit, identification and management of ADRs, cost savings and patient satisfaction.

We faced several challenges, starting with patient identification and recruitment. Patients were invited based on the number of medications they were taking. The number of prescribed medicines was taken to be an indirect measure of inappropriate polypharmacy, but this strategy may not have been sufficiently sensitive or specific. It is noted that the self-selecting nature of our patient cohort will have introduced some bias into our results. By definition, individuals responding to the invitation were likely to be those who were more engaged in health-related behaviours and more amenable to medicines optimisation.

An alternative approach could be to use electronic health records in primary and secondary care to identify individuals on multiple or high-risk medicines, perhaps by automated computer analysis. Services such as this may be of particular benefit to those experiencing social deprivation and health inequality, since these factors are associated with increased risk of multimorbidity and polypharmacy at a younger age.[10] Additional challenges would likely be encountered when engaging with this patient group, which could potentially limit the impacts but also reinforce the need for specialist services. Care home and palliative care registries would also be appropriate places to search for patients at risk of problematic polypharmacy.

Thorough and effective medicines reviews took a significant time. In the pilot clinic, both a clinical pharmacology registrar and a clinical pharmacist were present for the 60-minute appointment, costing £89.40 per hour in staffing. We have since developed an alternative clinic structure that would be more time- and cost-efficient (Table 4).

Inputting our pilot results into the SIMPATHY (Stimulating Innovation Management of Polypharmacy and Adherence in The Elderly) economic analysis tool estimates that carrying out two outpatient clinics per week could provide annual net cost savings of up to £155K.[12] These figures assume stopping three drugs per patient, and incorporate estimates of bed days saved by reductions in avoidable ADR-related admissions to hospital.[13]

Further efficiency savings could be made by developing this service into an integrated model with primary care involvement, incorporating virtual clinics and training and educational strategies.

Table 3. Symptoms that may be amenable to targeted deprescribing

Problem	Number of patients reporting problem pre-intervention (total n=7)	Number of patients reporting improvement in problem post-intervention
Postural hypotension, n (%)	5 (71)	4 (80)
Ankle swelling, n (%)	4 (57)	3 (75)
Nausea/vomiting, n (%)	3 (43)	3 (100)

Next steps

The key to reducing problematic polypharmacy on a national level is to improve knowledge of – and guidance for – rational therapeutics. Careful prescribing and monitoring of medicines should reduce the number of prescriptions for medicines with little or no benefit to an individual, or which cause harm out of proportion to the benefit they bring.

At a local level, our expectation is that our patients would benefit from a fully integrated service. This would harness the benefits of longitudinal and holistic care provided by GPs and GP pharmacists, along with specialist support from clinical pharmacologists and hospital pharmacists.

Local initiatives like this one, alongside system changes made on a national level, may go some way towards improving clinical outcomes for patients taking multiple medications.

Table 4. Proposed clinic staffing structure

Staff	Cost/min (£)[11]	Time (minutes)						Cost per review (£)
		Preparation	Time with patient			Post-clinic admin	Total	
		SCPAT	Medicines review	Side-effect screening	Discussion about issues, options and next steps	Letters, discussion with specialists		
Clinical pharmacist	0.77	15	15	20			50	38.5
CPT SpR	0.72				20	10	30	21.6
CPT consultant	1.8					5	5	9
Total								**69.1**

CPT = clinical pharmacology and therapeutics; SCPAT = structured clinical pharmacology assessment tool; SpR = specialist registrar.

Conclusion

Our pilot demonstrated the feasibility of establishing a specialist service in the secondary care or integrated care setting, dedicated to improving clinical outcomes for those experiencing problematic polypharmacy. ■

Supplementary material

Additional supplementary material may be found in the online version of this article at www.rcpjournals.org/fhj:

S1 – Patient information leaflet.

S2 – Adverse drug reaction checklist.

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