Collaborative medication management services: improving patient care

Andrew L Gilbert, Elizabeth E Roughead, Justin Beilby, Kathy Mott and John D Barratt

ABSTRACT

Objective: To implement and evaluate a collaborative medication management service model.

Design: Participatory action research.

Setting and participants: The study was conducted from March 1999 to March 2000; 1000 patients, 63 pharmacists and 129 general practitioners from six Divisions of General Practice in South Australia participated.

Interventions: A collaborative service delivery model, involving a preliminary case conference, a home visit and a second case conference, was agreed through discussions with medical and pharmacy organisations and then implemented.

Outcome measures: Medication-related problems; actions recommended; actions implemented; and outcomes after actions taken.

Results: Overall, 2764 problems were identified. The most common medication-related problem (17.5% of all problems) was the need for additional tests. Thirty-seven per cent of problems related to medicine selection, 20% to patient knowledge, and 17% to the medication regimen. Of 2764 actions recommended to resolve medication-related problems, 42% were implemented. Of the 978 problems for which action was taken and follow-up data were available, 81% were reported to be "resolved", "well managed" or "improving".

Conclusion: This implementation model was successful in engaging GPs and pharmacists and in assisting in the resolution of medication-related problems.

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A SUBSTANTIAL NUMBER of people experience medication-related problems.[1,2] Australian studies[1,3] have shown that closer collaboration between general practitioners and pharmacists, together with better medication review by pharmacists,[2] can help to identify and resolve many of these problems.

In its 1999 Budget, the Federal Government allocated funding for the provision of Home Medication Reviews (HMRs). The Department of Health and Aged Care (now the Department of Health and Ageing) called for research proposals to establish a model for implementing these services.[4] Our project aimed to design and test a collaborative model for delivering and evaluating HMRs. We report the results of an implementation trial in which we set out to determine the requirements for and outcomes of an area-wide HMR service.

METHODS

Developing the service

We used a participatory action research design,[5] in which researchers worked with participants to design, implement and evaluate the service, allowing researchers and participants to solve problems that arose as the research progressed. The participatory action research process involved general practitioners, pharmacists and consumers in a series of workshops, focus groups and feedback sessions.

A call for expressions of interest in participating in the project was sent to all Divisions of General Practice in South Australia. Eight of the 15 Divisions responded and six participated (three rural and three urban Divisions). A Divisional Liaison Officer (DLO) was employed in each Division to facilitate the interaction between GPs and pharmacists and to assist in the local implementation of the HMR service.

A collaborative service delivery model (Box 1) was agreed on, and standard forms for documenting relevant patient information, reports and action plans were developed in consultation with participating GPs and pharmacists.

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Implementing the service

The study was carried out between March 1999 and March 2000.

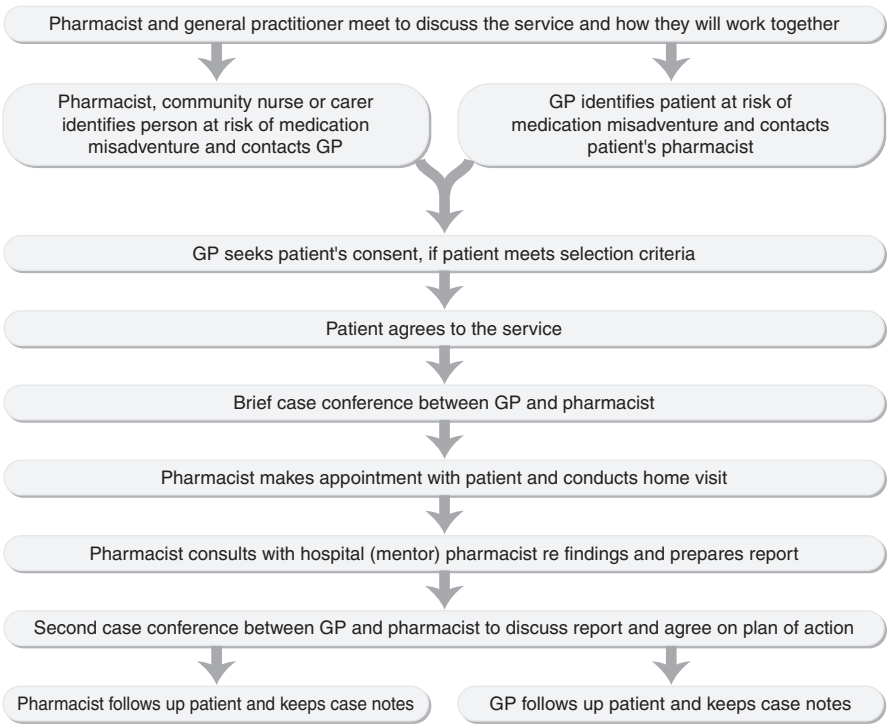
GP and pharmacist recruitment

DLOs used divisional newsletters and meetings with GPs to encourage participation. Pharmacists were invited to participate through a mailout. The DLO visited interested GPs and community pharmacists to discuss the proposed service, and provided support to GPs and pharmacists throughout the project. Local reference groups were established to help resolve issues that arose during implementation.

Patient selection and recruitment

Each GP or pharmacist identified 5–10 eligible patients from their practices, based on patient selection criteria that had been previously used to identify patients at risk of having medication-related problems (Box 2). GPs were eligible for RACGP clinical audit points if 10 of their patients participated in the study.

1: Collaborative medication management model used in our study



For any patient identified by a community pharmacist, the pharmacist consulted the patient's GP to ensure the patient met eligibility criteria. Verbal consent for participation in the study was sought from each patient and recorded by the GP in the patient's case notes.

The medication management service

Once patients had agreed to participate, a brief case conference was held between the patient's GP and the community pharmacist. Relevant information was shared regarding the reason for referral, current medical conditions, prescribed medications and relevant laboratory results.

Pharmacists visited each patient in the home to discuss medication-related issues raised by the patient or the patient's GP. The pharmacist recorded information about all medications (prescription and non-prescription) the patient was taking, how they were being taken, and how well the patient understood the medications and their effect. Administration devices were inspected and the patient was asked to demonstrate their use. Pharmacists clarified dosing instructions, provided patient education and assisted with dose administration where required. Pharmacists prepared a written report of the home visit on a standard form.

The patient's usual community pharmacist conducted most home visits. As many of the pharmacists had not previously undertaken this style of practice, a hospital-based clinical pharmacist reviewed the community pharmacists' analyses and provided clinical advice where necessary.

The GP and pharmacist met again to discuss the reports and agree on a plan of action to resolve outstanding medication-related problems within an appropriate time frame. Patients were followed up, usually within three months. The GP and pharmacist kept case notes.

Evaluating the service

Two researchers coded the medical conditions, medications taken and medication-related problems from patient case notes. Medical conditions were categorised according to the *International classification of diseases* (ICD-9-CM),[6] medications according to the *Anatomical and therapeutic classification*[7] and medication-related problems according to previously employed criteria (Box 3).[1,3,8] From patient case notes, the researchers noted actions taken to address the problems (Box 4) and outcomes of those actions (Box 5). For some patients, the GP and pharmacist identified more than one problem.

Ethics approval

The study was approved by the Human Research Ethics Committee of the University of South Australia and the Research Ethics Committee of the University of Adelaide.

RESULTS

Participants

A total of 129 GPs and 63 pharmacists (representing 17% of GPs and 30% of pharmacists in the six Divisions of General Practice) participated in the trial. The target of 1000 patients was achieved.

The median age of patients was 72 years for men (range, 1–100 years) and 74 years for women (range, 8–100 years). Fifty-three percent of the patients lived in urban areas. The average number of medications being taken was nine per patient (range, 2–25), and the average number of medical conditions per patient was 6 (range, 1–15).

2: Selection criteria for patient participants[1]

Patients included those who were

- taking multiple medications;
- taking 12 or more doses of medication a day;
- taking high doses of medication;
- on complicated medication regimens;
- taking medications requiring regular monitoring;
- having difficulty with compliance;
- showing signs of potential drug-induced problems or interactions;
- not showing the expected response to their medication;
- living alone and having a history of cognitive impairment or difficulty with vision or hearing;
- recently hospitalised;
- considered by a general practitioner or other medical professional as likely to benefit from the service.

Medication-related problems

Pharmacists identified 2764 medication-related problems, the most common (17.5%) being the need for additional tests (Box 3). On average, 2.5 problems were identified per person.

Thirty-seven per cent of all problems related to medicine selection, 20% to patient knowledge and skills, and 17% to the medication regimen. Only 1% of problems related to drug–drug interactions, 2% to contraindicated therapy, 2% to the use of medicine without indication, and 1% to duplication of therapy.

In response to the identified problems, pharmacists recommended 2764 actions to GPs, of which 1163 (42%) were documented in patient case notes as having been implemented. No information was available on implementation of the remaining actions. This may mean that no action was taken, that the action was rejected by the GP, that follow-up had not occurred at the time of the study's completion, or that the action had been previously trialled, was still under consideration or was implemented but poorly documented. The types of actions most commonly implemented included changes to medicine selection; changes to the dose, frequency or duration of therapy; and patient education (Box 4).

Follow-up data, as recorded in the patient's case notes, were available for 978 (84%) of the problems for which an action was documented as having been implemented. Problems were documented as being "resolved" or "well managed" in 61% of these cases, and "improving" in a further 20% (Box 5). Outcome data were available for 85 of the problems for which no actions were implemented. In 61 of these cases the problem was unresolved or worse at follow-up, with only 13 of the problems resolved or well managed at follow-up.

The model required GPs and pharmacists to negotiate actions based on the pharmacist's report. In 23 instances the GP refused to implement the action(s); in 31 instances, although the GP and pharmacist agreed on the action, the patient refused.

3: Frequency of medication-related problems identified from patient case notes

Problem category	Occurrence
Management issues	
Need for an additional test (eg, serum creatinine and electrolytes)	483 (17.5%)
Need for additional therapy (eg, physiotherapy, podiatry)	142 (5.1%)
Problems related to medicine selection	
Need for additional medicine (eg, influenza vaccine, analgesics)	321 (11.6%)
Wrong or inappropriate medicine (eg, NSAIDs where history indicates allergic reaction or contraindication)	319 (11.5%)
Adverse drug reactions, including drug–drug interactions and allergies (eg, NSAIDs with ACE inhibitors)	236 (8.5%)
Unnecessary medicine (eg, quinine taken long-term for nocturnal leg cramps)	153 (5.5%)
Problems related to medication regimen	
Dose too low (eg, analgesics)	223 (8.1%)
Dose too high (eg, psycholeptics)	137 (5.0%)
Rationalisation of drug therapy (eg, changing dose administration time of diuretic to better fit person's lifestyle)	97 (3.5%)
Problems related to patient knowledge and skills	
Poor understanding of disease and/or treatment	197 (7.1%)
Compliance problems	138 (5.0%)
Inappropriate technique (eg, using asthma inhalers)	99 (3.6%)
Lifestyle issues	75 (2.7%)
Anxiety about treatment	43 (1.6%)
Other	
Medicines out-of-date	101 (3.7%)
Total	*2764 (100.0%)*

NSAID = non-steroidal anti-inflammatory drug. ACE = angiotensin-converting enzyme.

4: Actions recommended and implemented to resolve medication-related problems

Action	Number of actions recommended	Number of actions documented as implemented
Change medication selection because inappropriate/wrong drug being taken	640 (23.2%)	289 (24.9%)
Consider other management options	536 (19.4%)	161 (13.8%)
Adjust dosage regimen	532 (19.2%)	233 (20.0%)
Change medication based on result of a recommended test/examination	495 (17.9%)	110 (9.5%)
Provide patient education and training	309 (11.2%)	212 (18.2%)
Assist with equipment/administration aids	171 (6.2%)	80 (6.9%)
Collect/arrange disposal of medication	81 (2.9%)	78 (6.7%)
Total	*2764 (100.0%)*	*1163 (100.0%)*

DISCUSSION

Our study showed that a collaborative medication management service could be successfully implemented through Divisions of General Practice and was acceptable to all participants. The process employed enabled GPs and pharmacists to identify people at risk of medication misadventure and to resolve many of their medication-related problems.

Problems relating to medication use were common. Importantly, outcome data reveal that the service resulted in 81% of problems being resolved, well

5: Outcomes after taking action to resolve medication-related problems

Outcome	Frequency of outcome
Problem resolved (clear statement given in case notes, or self-evident that problem no longer exists [eg, vaccination given])	548 (56.0%)
Problem well managed (clear statement in case notes that processes have been established to enable patient to manage an identified problem)	48 (4.9%)
Problem improving (case notes indicate some steps have been taken to resolve identified problem, but further steps are required to achieve optimal management)	200 (20.4%)
Problem unchanged (case notes indicate no change in identified problem)	144 (14.7%)
Problem worse (case notes indicate deterioration in patient's health)	17 (1.7%)
Resolution has created new problem (case notes indicate that resolution of one problem directly leads to another [eg, allergic reaction to recommended medication])	7 (0.7%)
Problem being monitored (case notes indicate general practitioner is aware of problem and has agreed, as part of the plan, to monitor patient)	14 (1.4%)
Total	*978 (100.0%)*

managed or improving at follow-up. Although the study was restricted to South Australia, the inclusion of both rural and urban Divisions improves the generalisability of the findings.

The nature and extent of medication-related problems, particularly in older at-risk people, has been well described.[1,3,8] The establishment of professional relationships between GPs and pharmacists, achieved through the participatory action research approach in our study, was an important element in the success of the project.

Importantly, our model is compatible with the Enhanced Primary Care package,[9] which includes case conferencing as a rebatable item.

There are many opportunities for collaboration between GPs and pharmacists to improve health outcomes for consumers. People at high risk of medication misadventure include those living in residential aged-care facilities, those with chronic illnesses (eg, mental health problems, asthma, diabetes, cardiovascular disease), and those returning home after a stay in hospital.

Based on the evidence presented in this project, the HMR service, which is currently being implemented nationally,[4] has the potential to improve the overall management of medicines in the community and significantly improve health outcomes for consumers in Australia.

COMPETING INTERESTS

None identified.

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REFERENCES

1. March G, Gilbert A, Roughead E, Quintrell N. Developing and evaluating a model for pharmaceutical care in Australian community pharmacies. *Int J Pharm Pract* 1999; 7: 220-229.
2. Roberts M, Stokes J, King M, et al. Outcomes of a randomised controlled trial of a clinical pharmacy intervention in 52 nursing homes. *Br J Clin Pharmacol* 2001; 51: 257-265.
3. Krass I, Smith C. Impact of medication regimen reviews performed by community pharmacists for ambulatory patients through liaison with general medical practitioners. *Int J Pharm Pract* 2000; 8: 111-120.
4. Framework document for domiciliary medication management reviews. Medication Management Implementation Steering Group, February 2001. Available at: <http://www.aacp.com.au/dmmr/frame.pdf>. Accessed 26 September 2001.
5. Colquhoun D, Kelleher A. Health research in practice: political, ethical and methodological issues. London: Chapman and Hall, 1993.
6. International classification of diseases. 9th revision. Clinical modification. (ICD-9-CM). 3rd ed. Bethesda, Md: US Department of Health and Human Services, 1989.
7. Commonwealth Department of Health and Aged Care. Australian statistics on medicines 1998. Canberra: AusInfo, 1999.
8. Cipolle RJ, Strand LM, Morley PC. Pharmaceutical care practice. New York: McGraw-Hill, 1998.
9. Primary care initiatives: enhanced primary care package. Canberra: Commonwealth Department of Health and Aged Care, 1999.

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