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The contribution of patient interviews to the identification of drug-related problems in home medication review

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SUMMARY

What is known and Objective: **To determine to what extent patient interviews contribute to the identification of drug-related problems (DRPs) in home medication reviews, in terms of number, type and clinical relevance.**
Methods: **We performed a cross-sectional study within the intervention arm of a randomized controlled trial. Patients were recruited from 10 Dutch community pharmacies. Patients were eligible if they were home-dwelling, aged 65 years and over and used five or more different drugs, including at least one cardiovascular or antidiabetic drug. The community pharmacist interviewed the patient at home about the medicines and identified potential DRPs in combination with medication and clinical records. This medication review was assessed and modified by an independent pharmacist reviewers' panel. Outcomes were the number and type of DRPs and recommendations and percentage of clinical relevant DRPs. Clinical relevance of DRPs was assessed by DRPs assigned a high priority, DRPs followed by recommendations for drug change and DRPs followed by *implemented* recommendations for drug change.**
Results: **A total of 1565 potential DRPs and recommendations (10 per patient).were identified for 155 patients (median age, 76 years; 54% women). Fifty-eight per cent of all recommendations involved a drug change; 27% of all DRPs were identified during patient interviews and 74% from medication and clinical records. Compared to DRPs identified from patient medication and clinical records, DRPs identified during patient interviews were more frequently assigned a high priority (OR = 1·8 [1·4–2·2]), were more frequently associated with recommendations for drug change (OR = 2·4 [1·9–3·1]) and were implemented recommendations for drug change (OR = 2·8 [2·1–3·7]).**
What is new and Conclusion: **This study shows that more than a quarter of all DRPs were identified during patient interviews. DRPs identified during patient interviews were more frequently assigned a higher clinical relevance.**

WHAT IS KNOWN AND OBJECTIVE

Studies have identified potential drug-related problems (DRPs) during different types of medication review.[1–8] Medication reviews can be solely based on patient medication and clinical records,[1,2] but can also be combined with patient interviews.[3–8] This more extensive review is known as a clinical medication review.[9]

Patient interviews have been performed in several settings such as hospitals,[3] pharmacies,[8] GPs' offices[4,7] or at the patient's home.[5,6] In Australia, a patient interview at home by an accredited pharmacist is the predominant method of clinical medication review.[5,10–12] In Europe, the patient is often invited to the community pharmacy for an interview, as with the Medicine Use Review (MUR) in England.[13] Different European studies in primary care included patient interviews at home,[6,14–16] but these were not always conducted by a clinically well-trained pharmacist and in close cooperation with a GP, like in Australia.[14–16]

Although DRPs identified during patient interviews have been shown to be clinically relevant, it is unclear to what extent additional DRPs are identified when complete clinical and medication records are available. Moreover, limited knowledge is available on the clinical relevance of DRPs identified through patient interviews compared to DRPs identified from clinical and medication records.[3]

This study examines the contribution of a patient interview to the identification of DRPs in home medication review with the availability of complete dispensing and clinical records. Moreover, we aimed to compare the clinical relevance of DRPs identified during patient interviews to DRPs identified by the combination of patient medication and clinical records.

METHODS

Study design

This was a cross-sectional study within the intervention arm of a randomized controlled trial (RCT) in a primary care setting. This RCT aimed to assess whether home medication reviews could reduce the number of DRPs and increase the proportion of patients with adequate control of blood pressure, cholesterol and HbA1C values. Patients were enrolled between February 2008 and August 2010.

Patients

Patients were recruited from 10 Dutch community pharmacies. Patients were eligible if they were home-dwelling, aged 65 years and over and used at least five oral prescription

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drugs, including at least one cardiovascular or one antidiabetic drug. Consenting patients were visited and interviewed face-to-face by a pharmacist at home. Patients were excluded if the majority of drugs were prescribed by specialists.

Formal ethical approval was obtained from the medical ethical review board of the Utrecht University Medical Centre. Patients gave written informed consent. To protect the patient's privacy, all medical data were anonymized by the community pharmacist using a randomly assigned unique number for each patient.

Intervention

For all patients, complete patient medication records from the community pharmacy including drug dispensing records, information on comorbidity, drug intolerances and other relevant patient notes were available. Because the majority of patients in the Netherlands are registered at only one community pharmacy, independently of prescriber, patient medication records are virtually complete with regard to prescription drugs.[17] The community pharmacists collected data from the clinical records of the patient with the help from the GP practice, including medical history and laboratory data. As part of the study protocol, patients were offered additional laboratory measurements of HbA1C, cholesterol, sodium, potassium and creatinine and blood pressure measurement. The patient's community pharmacist interviewed the patient at home aiming to identify possible DRPs.

During the home visit, the community pharmacist evaluated all medications that patients kept at home, including discontinued prescription drugs, over-the-counter drugs and complementary and alternative medicines (patients indicated whether each medication was currently taken). Community pharmacists had limited experience with medication review. Therefore, they received a 2-day training course in medication review as a part of this study. Within this course, pharmacists were taught how to perform a structured medication review and how to communicate with patients about adherence and understanding of the drug therapy regimen and about patient's experiences and concerns regarding drug therapy (in particular, possible adverse effects). GPs did not receive additional training in medication review.

A pharmaceutical care plan was proposed by the community pharmacist using both the patient medication and clinical records (including additional laboratory data and blood pressure collected as part of the study protocol) and the data from the patient interview. These pharmaceutical care plans were evaluated, if necessary adjusted, and completed by two independent pharmacists from a pool of three pharmacist reviewers (A.F; J.K.D; and H.K.). Pharmacist reviewers had several years of experience with medication review, as well as in-depth knowledge of national clinical guidelines.

Reviewers used both implicit and explicit criteria to identify potential DRPs. Explicit criteria consisted of a list of clinical rules based on Dutch treatment and prescription guidelines. Examples of clinical rules were 'Lack of appropriate treatment for secondary prevention for CHD (antiplatelet, lipid-lowering, β-blocker, ACE-inhibitor)', 'Lack of appropriate treatment for patients with diabetes and LDL >2·5 mmol (lipid lowering)' or 'No available monitoring data for blood pressure, lipids, glucose, BMI or data >1 year old in patients for whom these measurements are indicated in treatment guidelines'.[18]

Implicit criteria for identifying DRPs were based on a structural assessment as proposed by Cipolle *et al.* in the rational order of indication, effectiveness, safety and compliance.[19,20] The two reviewers reached consensus in a case conference. If no consensus was met, the third reviewer was consulted until consensus was reached. For example, when the two reviewers could not agree (e.g. on the necessity of gastric protection with a proton pump inhibitor in a geriatric patient using aspirin or on the need to change the dosing time for simvastatin from the afternoon to the evening).

Drug-related problems were prioritized by the pharmacist reviewers as high, medium or low from the patient's perspective, with the highest priority on those that cause the most concern[20] and need action. For example, high priority was assigned to recommendations that could directly relief patient complaints or to recommendations following on measurement of a deviating laboratory value or blood pressure.

The pharmaceutical care plans were sent to the community pharmacist to be discussed in a case conference with the patient's GP within 4 weeks. DRPs with high priority were to be discussed first with the GP, followed by DRPs with medium priority, whereas DRPs with low priority were considerations with low urgency.

Data classification

Drugs were classified using the Anatomical Therapeutic Chemical (ATC) classification. Potential DRPs were classified using the D.O.C.U.M.E.N.T. classification system[1,21,22] using the recently updated version.[23,24]

All coding and classification were independently undertaken by one investigator (H.K.) and a student investigator (Y.A.). When there were differences in coding, the investigators reached consensus in a case conference with a third investigator (either A.F. or M.B.).

Outcome measures

After 12 months (t = 12), medication records were collected to analyse the drug changes. The outcomes could only be assessed for patients with complete medication records available for at least 6 months. The total number of DRPs and recommendations were assessed by the main investigator (H.K.). Clinical relevance was assessed by the percentage of DRPs assigned a high priority, the percentage of recommendations for drug change and the percentage of implemented recommendations for drug change.

Statistical analysis

All data were analysed using databases (Microsoft Access 2007; Microsoft Corporation, Redmond, WA, USA) and statistical software (SPSS version 17.0; SPSS Inc., Chicago, IL, USA). Descriptive statistics were used for basic characteristics. Pearson chi-square tests were used for each categorical variable. An independent t-test was used for comparison of the mean number of DRPs per patient. A P-value <0·05 was considered statistically significant. Differences between the percentages of clinical relevant DRPs and recommendations identified during patient interviews and those identified by medication and clini-

cal records were assessed by odds ratios (OR) and corresponding 95% confidence intervals.

RESULTS AND DISCUSSION

Patient flow

Patients were recruited for the intervention group in 10 community pharmacies. A total of 481 patients were eligible for participation in the intervention group of the study (Fig. 1). Of 396 patients were sent an invitation to participate. Of patients invited to participate, 188 patients (47%) gave informed consent; 33 patients gave informed consent, but did not actually participate in the study. The reasons for not participating were loss of interest (n = 22), patient died (n = 4), health deterioration (n = 4) and hospital admission (n = 3). Finally, 155 patients were included in this analysis (response 39%).

Patient characteristics

The median age of the patients was 76 years and 54% was women (Table 1). A mean of 4·2 diagnoses was registered per patient. The most common registered diagnoses were hypertension (52%), diabetes mellitus (37%) and hyperlipidaemia (23%). The mean number of prescribed drugs per patient was 9·0 [range, 5–33]. The most commonly prescribed drug groups were agents acting on the renin-angiotensin system (ACE-inhibitors and AII antagonists) (72%), antithrombotic agents (70%) and lipid modifying agents (68%).

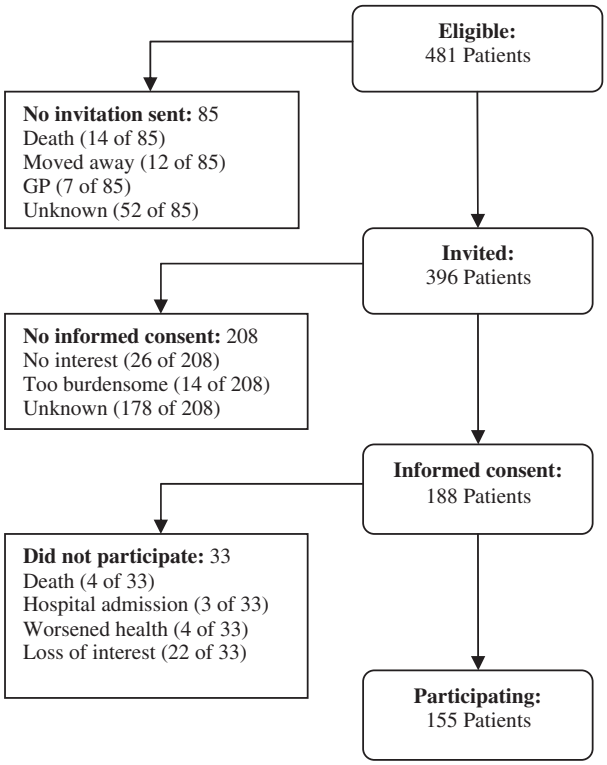

Fig. 1. Patient flow chart.

DRPs and recommendations in general

For 155 patients, a total of 1565 potential DRPs were identified, a mean of 10 DRPs per patient [range, 4–21] (Table 2). The most frequently observed types of DRPs were 'Drug Selection' (28%), 'Undertreated '(26%) and 'Monitoring required' (23%). DRP *sub*-types were most often classified as 'No indication apparent' (21%), 'Condition undertreated' (18%) and 'Laboratory monitoring' (17%).

Of 1565 recommendations, 905 (58%) comprised a recommendation for drug change (mean, 5·8 per patient) (Table 3). The most common recommendations for drug change were 'Addition of a drug' (18%) and 'Cessation of a drug' (13%). Frequently recorded recommendations not involving a drug change were Laboratory Monitoring (19%) and 'Adjustment of patient records' (13%).

Of 905 recommendations for a drug change, 264 (29%) recommendations were implemented as a drug change (Table 4). The most implemented drug changes were 'Cessation of a drug' (58, 23%) and 'Addition of a drug' (53, 21%).

DRPs and recommendations in patient interviews

More than a quarter of DRPs and following recommendations (415; 27%) were identified during patient interviews (Tables 2 and 3).

The DRP types 'Compliance' (19% vs. 1·6%, $P < 0·01$), 'Toxicity' (16% vs. 2·5%, $P < 0·01$), 'Over or underdose' (14% vs. 9·7%, $P = 0·02$) and 'Education' (1·7% vs. 0·2%, $P < 0·01$)

Table 1. Baseline sociodemographic, medical and drug-related characteristics of 155 patients

Female (n, %)	84	54%
Age, year (median, interquartile range]	76	72–81
Number of prescription drugs (mean per patient ±SD)	9·0	3·6
Medical history, No. (%)		
Hypertension	75	52%
Diabetes mellitus	53	37%
Hyperlipidaemia	33	23%
Coronary artery disease	27	19%
Pulmonary disease	23	16%
Arrhythmia	24	17%
Cerebral vascular lesion, past or TIA	25	17%
Cataract	20	14%
Osteoporosis	16	11%
Artrosis	16	11%
Heart failure	12	8%
Most prescribed drug groups (ATC), No. (%)		
Agents acting on the renin-angiotensin system (C09)	112	72%
Antithrombotic agents (B01A)	109	70%
Lipid-modifying agents (C10A)	106	68%
Beta blocking agents (C07A)	80	52%
Drugs for peptic ulcer and GORD (A02B)	68	44%
Calcium channel blockers (C08C)	50	32%
Drugs for obstructive airway diseases (R03)	51	33%
Drugs used in diabetes (A10)	48	31%
Benzodiazepine derivatives (N05BA, N05CD)	35	23%
High-ceiling diuretics (C03C)	33	21%
Low-ceiling diuretics (C03A, C03B, C03E)	31	20%

Table 2. Comparison of number and type of DRPs identified from medication and clinical records compared to patient interviews for 155 patients

DRP type and subtype	Medication and clinical records (*N* = 1150 DRPs)		Patient interviews (*N* = 415 DRPs)		*P*-value
	N	%	*N*	%	
D(rug selection)	317	28	118	28	0·74
Duplication	9	0·8	3	0·7	0·91
Drug interaction	9	0·8	6	1·5	0·23
Contra-indications apparent	67	5·8	7	1·7	<0·01
No indication apparent	221	19	102	24	0·02
Other drug selection problem	11	1·0	0	0·0	0·05
O(ver or underdose)	111	10	58	14	0·02
Prescribed dosage too high	24	2·1	9	2·2	0·92
Prescribed dosage too low	60	5·2	12	2·9	0·05
Incorrect or unclear dosing instructions	27	2·3	37	8·9	<0·01
C(ompliance)	18	1·6	78	19	<0·01
Taking too little	4	0·3	39	9·4	<0·01
Taking too much	2	0·2	6	1·4	0·02
Difficulty using dosage form	12	1·0	33	8·0	<0·01
U(ndertreated)	324	28	78	19	<0·01
Condition undertreated	223	20	56	14	0·04
Condition untreated	57	5·0	20	4·8	0·94
Preventive therapy required	34	3·0	2	0·5	<0·01
M(onitoring)	350	30	9	2·2	<0·01
Laboratory monitoring	260	23	1	0·2	<0·01
Non-laboratory monitoring	90	7·8	8	1·9	<0·01
E(ducation) or information	2	0·2	7	1·7	<0·01
Disease management or advice	2	0·2	7	1·7	<0·01
T(oxicity)	29	2·5	66	16	<0·01
Toxicity, allergic reaction or adverse effect present	29	2·5	66	16	<0·01
Mean per patient, SD	7·4 ± 3·0		2·7 ± 2·0		<0·01

DRP, drug-related problem.

were relatively more identified during patient interviews, whereas 'Monitoring' (30·4% vs. 2·2%, $P < 0·01$) and 'Undertreated' (28% vs. 19%, $P < 0·01$) were more frequently identified from medication and clinical records (Table 2). 'Toxicity, allergic reaction or adverse effect present' (16% vs. 3%, $P < 0·01$), 'Taking too little' (9% vs. 0·3%, $P < 0·01$) and 'Incorrect or unclear dosing instructions' (9% vs. 2%, $P < 0·01$) were the main DRP *sub*types that were more frequently identified during patient interviews (Table 2). Examples of specific DRP *sub*types in patient interviews are shown in Box 1.

Table 3. Comparisons of number and type of recommendations identified from medication and clinical records compared to patient interviews for 155 patients

Type of recommendation	Medication and clinical records (*N* = 1150 recommendations)		Patient interviews (*N* = 415 recommendations)		*P*-value
	N	%	*N*	%	
Recommendations for drug change	603	52	302	73	<0·01
Cessation of drug	135	12	70	17	0·01
Dose increase	75	6·5	23	5·5	0·48
Dose decrease	38	3·3	25	6·0	0·02
Addition of drug	219	19	56	14	0·01
Replacement of drug	103	9·0	61	15	<0·01
Dose frequency/ schedule change	28	2·4	46	11	<0·01
Drug formulation change	5	0·4	19	4·6	<0·01
Recommend dose administration aid	0	0·0	3	0·7	<0·01
Mean per patient, SD	3·9 ± 1·9		1·9 ± 1·6		<0·01
Other recommendations	547	48	113	27	<0·01
Education/ counselling session	16	1·4	33	8·0	<0·01
Monitoring: Non-laboratory	86	7·5	13	3·1	<0·01
Monitoring: Laboratory	280	24	11	2·7	<0·01
Adjustment of patient records	156	14	40	9·6	0·04
Other	9	0·8	14	3·4	<0·01
Mean per patient, SD	3·5 ± 1·9		0·7 ± 0·9		<0·01

Table 4. Comparison of the clinical relevance of drug-related problems identified from medication and clinical records and during patient interviews

Clinical relevance of DRPs	Medication and clinical records		Patient interviews		OR [CI 95%]	*P*-value
	N	%	*N*	%		
Overall (reference)	1150		415		ref	
With high priority	445	39	219	53	1·8 [1·4–2·2]	<0·01
With recommendations for drug change	603	52	302	73	2·4 [1·9–3·1]	<0·01
With *implemented* recommendations for drug change	145	13	120	29	2·8 [2·1–3·7]	<0·01

DRP, drug-related problem.

BOX 1. EXAMPLES OF DRPS IDENTIFIED DURING PATIENT INTERVIEWS

Gender, age (years)	Example of DRP	DRP subtype	Assigned priority
♂, 75	Despite use of two antihypertensives (nifedipine 30 mg retard once daily, candesartan 16 mg once daily), measurement at home shows a very high systolic blood pressure of 198 mmHg	Condition undertreated	High
♀, 79	Uses nitroglycerine almost daily at 5 PM because of dyspnoe. She experiences flushes. Also, uses isosorbide mononitrate 60 mg once daily and diltiazem 60 mg three times a day. Next to cardiovascular medication uses a combined budesonide and salmeterol inhaler two times a day	Condition undertreated	High
♂, 83	Uses betamethason ointment every day without using an emollient. Complains about delayed healing of wounds	Condition undertreated	High
♀, 78	Has restarted alendronic acid without consulting physician. Thought this was a preventive measure during use of iron tablets. Stopped taking prednisolone a half year before the interview and does not suffer from osteoporosis according to the clinical data	No indication apparent	High
♀, 70	Takes levothyroxin at 9 AM Did not know that this has to be taken half an hour before breakfast	Incorrect or unclear dosing instructions	High
♀, 65	Intermittently uses furosemide 60 mg for facial oedema	No indication apparent	Medium
♀, 75	Uses a coumarin and experiences severe bleeding during blood sampling. Suffers from itching in the evening, especially when the heater goes on and suspects this is an adverse effect	Toxicity, allergic reaction or adverse effect present	Medium
♂, 76	Experiences hoarseness during use of beclomethason 100 μg three doses at once after breakfast	Toxicity, allergic reaction or adverse effect present	Medium
♂, 73	Uses metformine 850 mg once daily instead of the prescribed 3 times a day because of gastrointestinal problems. Is of the opinion that he gets prescribed too many medicines. Except metformin uses a long-acting insulin before the night and a short acting insulin before meals	Taking too little	Medium
♂, 76	Uses six different medicines (fosinopril pantoprazol, metoprolol, acetylsalicylic acid, atorvastatin and alfuzosin) at different dosing moments, whereas these could be taken at the same time	Incorrect or unclear dosing instructions	Low
♀, 75	Uses half a tablet of 80 mg sotalol twice daily, whereas 40 mg tablets are available and would be more convenient	Incorrect or unclear dosing instructions	Low
♀, 79	Experiences coughing by captopril. However, this is not disturbing	Toxicity, allergic reaction or adverse effect present	Low

DRP, drug-related problem.

'Dose frequency/schedule change' (11% vs. 2·4%, $P < 0·01$) and 'Drug formulation change' (5% vs. 0·4%, $P < 0·01$) were more often recommended based on patient interviews (Table 3). Both recommendations were also more often implemented: 'Dose frequency/schedule change' (7·4% vs. 1·5%, $P < 0·01$) and 'Drug formulation change' (1·4% vs. 0·1%, $P = 0·03$).

Clinical relevance of DRPs

Drug-related problems assigned a high priority were more likely to be identified during patient interviews than from medication and clinical records (OR = 1·8 [1·4–2·2]; $P < 0·01$) (Table 4). Examples of DRP *sub*types identified during patient interviews with high, medium and low priority are shown in Box 1.

Furthermore, DRPs followed by recommendations for a drug change were more likely to be identified during patient interviews (OR = 2·4 [1·9–3·1], $P < 0·01$) (Table 3 and 4).

Finally, DRPs followed by *implemented* recommendations for drug change were more likely to be identified during patient interviews (28% vs. 12%; OR = 2·8 [2·1–3·7]; $P < 0·01$) (Table 4).

This study shows that patient interviews at home contribute significantly to the identification of clinical relevant DRPs. Not only were more than a quarter of all DRPs identified during patient interviews, the DRPs identified during patient interviews were also assigned higher priorities and more frequently led to recommendations involving a drug change and were more enacted compared to DRPs identified from clinical and medication records.

The relative contribution of patient interviews to identification of all DRPs in our study was comparable to findings of Krska (29%) in primary care.[6] Studies with patient interviews in other settings reported higher percentages (GP's office 73%, hospital 40%), but the intervention and population in these studies were also quite different.[3,7] In addition, in our study, 53% of the DRPs in patient interviews were assigned a high priority, and 73% were followed by a recommendation involving a drug change. The only study that previously looked into the clinical relevance of DRPs identified by patient interviews was performed in hospitalized patients and assessed that 65% of these DRPs were of high relevance.[3]

'Toxicity, allergic reaction or adverse effect present' was the most frequent DRP subtype that was identified in patient interviews. This was also the most common pharmaceutical care issue in the study of Krska.[6] This finding gives support to the assumption that the concerns of the patient were sufficiently addressed by the community pharmacists in the home visits. This is not always obvious, because analysis of taped consultations from the HOMER study suggested that pharmacist reviewers were primarily concerned with compliance and knowledge of drugs.[16,25]

'Taking too little' was the second DRP subtype that was significantly more identified during patient interviews. Compliance issues are mentioned as DRPs in many studies with patient interviews.[6,26,27] Sturgess showed that clinical medication review including patient interviews even improved compliance measured by self-reporting and refill rate.[27] Repeated domiciliary visits after initial medication review may also enhance compliance as was measured by pill counts.[28] Their explanation was that compliance issues might be discussed easier in a patient's home than in a busy community pharmacy.[26]

'Incorrect or unclear dosing instructions' was the third DRP subtype that was identified significantly more in patient interviews. The corresponding recommendation 'Dose frequency/schedule change' was often implemented. For many patients, minor changes in their dose schedule can diminish the frequency of dosing. As shown in an example in Box 1, some patients are taking medication throughout the whole day, whereas these could be taken at the same time. In an earlier domiciliary interviewing study, half of the patients judged that medication management was a major daily preoccupation, and spouses were often required to assist.[28]

It could be questioned whether patient interviews at home reveal additional or other type of DRPs than patient interviews in a consulting area in the community pharmacy or GP practice; however, this was not the aim of this study. On the one hand, patient interviews at home may elicit more and other DRPs, because patients might feel more comfortable at home and therefore are more likely to share their experiences and concerns about their medicines. This is illustrated by the finding that compliance issues and adverse effects were frequently identified by patient interviews in our study and Krska's study.[6] Furthermore, all medicines were available at home, whereas patients invited to the pharmacy or GP practice might forget to bring part of their medicines, especially those that are used intermittently.[8] Finally, certain medication-risk factors, for example, lack of medication administration routine, multiple storage locations, hoarding and medication storage conditions seem only to be identified by home visits.[26,28–30] On the other hand, costs of home visits are also higher. Future studies should focus on cost effectiveness of patient interviews at home compared to interviews conducted at a GP practice or pharmacy.

This study had several strengths. Firstly, the intervention in our study comprised a clinical medication review meaning that all data were available to conduct a medication review. Next to the availability of all clinical records of the patients, additional laboratory values and blood pressure values were obtained as part of the RCT. Despite the availability of all these data, more than a quarter of all DRPs were identified from patient interviews. Secondly, a very detailed and accurate description of DRPs was possible, because all pharmaceutical care plans and reports of patient interviews were electronically sent by the community pharmacists to the pharmacist reviewers. This made it also possible to distinguish very clearly between DRPs identified from medication and clinical records and from patient interviews without any overlapping. Thirdly, DRPs were assigned a priority by the pharmacist reviewers' panel, and this could be seen as an indicator of clinical relevance. Fourthly, patient interviews were conducted by community pharmacists. More than half of the DRPs identified from these patient interviews had a high priority. In an earlier study, in which patient interviews were conducted by pharmacy or practice assistants, only a quarter of identified DRPs had potential clinical relevance.[31] Finally, the use of experienced pharmacist reviewers probably led to more complete and standardized pharmaceutical care plans.

There are some limitations associated with this study. Firstly, a considerable part of the invited patients (53%) did not give informed consent. However, our target group is an older population who have a considerable disease burden. In particular, the extra laboratory monitoring that was part of the study was not appreciated by many potential participants. Secondly, community pharmacists had a short course (2-days) in medication review and had limited experience in conducting medication reviews. Finally, each initial pharmaceutical care plan by a community pharmacist was adjusted and completed by well-trained pharmacist reviewers who had no relationship with patients. Although standardization is a strength of the study, it may limit generalizability to daily clinical practice where pharmacists might identify less DRPs, but have a relationship with patients. Future research should further elaborate on the role of both the community pharmacists and the pharmacist reviewers regarding the identification of DRPs.

WHAT IS NEW AND CONCLUSION

Patient interviews by community pharmacists have a major contribution in the identification of DRPs. This implies that, in general, medication review without a patient interview may lead to fewer clinical relevant recommendations.

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CONFLICT OF INTEREST

All authors declare that they have no conflict of interests that are directly relevant to the content of this study.

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