Medication use and rural seniors

Who really knows what they are taking?

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ABSTRACT

OBJECTIVE To determine whether listings of current medications obtained from the office file of patients' attending physicians and the pharmacy record of patients' dispensing pharmacists corresponded to the actual use of medications in a group of non-institutionalized seniors residing in rural communities.

DESIGN In-home interviews followed by retrospective office chart and pharmacy database reviews.

SETTING Two rural communities in southern Alberta with populations of less than 7000 people.

PARTICIPANTS Twenty-five patients aged 75 years or older residing in the study communities, eight family physicians, and four dispensing pharmacies.

MAIN OUTCOME MEASURES Number of currently consumed prescription drugs, currently consumed over-the-counter (OTC) drugs, and stored or discontinued prescribed medications; knowledge of medications (prescribed, OTC, and stored) by family physicians and pharmacists; and number of prescribers or dispensing pharmacists.

RESULTS Patients took a mean of 5.6 prescribed medications, took a mean of 3.5 OTC medications, and had a mean of 2.0 stored or discontinued medications. Attending family physicians and primary dispensing pharmacists typically knew of only some of their patients' entire regimen of medications.

CONCLUSIONS Misinformation about medication consumption by seniors was common among health care providers. Undertaking routine medication reviews (with emphasis on OTC use), asking specific questions about actual consumption, encouraging use of one prescriber and one pharmacist, discouraging storage of discontinued medications, and reducing use of medication samples should be of benefit.

RÉSUMÉ

OBJECTIF Chez un groupe de personnes âgées vivant dans des communautés rurales et non placées en établissement, déterminer dans quelle mesure la médication véritablement consommée par le patient correspond à celle des listes figurant dans les dossiers des médecins traitants et des pharmaciens.

CONCEPTION Entrevues à domicile suivies d'une analyse rétrospective des dossiers des médecins traitants et des pharmaciens.

CONTEXTE Deux communautés rurales du sud de l'Alberta comptant moins de 7000 habitants.

PARTICIPANTS Vingt-cinq patients de plus de 75 ans vivant dans ces communautés, huit médecins de famille et quatre pharmacies.

PRINCIPALES MESURES DES RÉSULTATS Nombre de médicaments sur ordonnance et en vente libre actuellement consommés, liste des médicaments sur ordonnance cessés mais conservés à la maison, niveau de connaissance des médecins de famille et des pharmaciens concernant la médication (prescrite, en vente libre et conservée) et nombre de médecins qui ont rédigé les ordonnances et de pharmaciens qui les ont remplies.

RÉSULTATS En moyenne, les patients prenaient 5,6 médicaments sur ordonnance, 3,5 médicaments en vente libre et conservaient à la maison deux médicaments dont ils avaient cessé l'usage. Les médecins traitants et les pharmaciens avaient typiquement une connaissance partielle de la totalité des médicaments consommés par les patients.

CONCLUSIONS Les dispensateurs de soins de santé étaient souvent mal informés des médicaments consommés par les personnes âgées. Il serait avantageux de procéder systématiquement à une révision de la médication (en insistant sur les médicaments en vente libre), de poser des questions précises sur la consommation véritable, d'encourager le recours à un seul médecin traitant et à un seul pharmacien, de décourager la conservation des médicaments cessés et de réduire l'usage des échantillons de médicaments.

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Illness caused by medications could be the most significant preventable public health problem facing physicians.[1,2] Although the number of prescriptions for seniors increased fourfold between 1950 and 1976, no similar increase in physician visits occurred.[3]

This disparity suggests that the increase in consumption reflects an increasing reliance on medications to treat the health concerns of the elderly. Family physicians prescribe a medication in up to 86% of office encounters.[4] Research shows that seniors typically take 1.9 to 5.5 medications daily.[3-7]

Studies of actual medication consumption by seniors often use a home visit to identify which medications seniors have in their homes and are taking. Although pill counts are not an entirely accurate measure of medication use,[8] this technique is consistently used as the criterion standard because it is valid, reliable, noninvasive, quantifiable, and relatively inexpensive.

Research has shown that family physicians are often unaware of all the medications taken by their elderly patients.[5,7,9-11] Ignorance can lead to inappropriate therapies, which could cause harm. The risk of adverse drug reactions is four to seven times higher for the elderly than for other adults.[10] Reasons for this include excessive prescribing of drugs (polypharmacy) and inadequate supervision.[1] Another problem is that outdated prescribed medications are sometimes hoarded by the elderly, to be used if considered necessary in the future.[12]

Polypharmacy can lead to hospitalizations, medication errors, inappropriate prescribing, excessive drug costs, and even death.[12,13] Medications have been linked to declining self-care skills, falls, confusion, and depression.[12,14-16] Polypharmacy can lead to difficulties in interpreting laboratory results and thereby interfere with accurate diagnosis and treatment of illness.[17]

This study was undertaken to determine whether attending family physicians and primary dispensing pharmacists (as identified by patients) were truly aware of what their older patients were taking at home.

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METHODS AND DATA COLLECTION

This research project was reviewed and approved by the Ethics Committee of the University of Calgary. Eight family physicians practising in the study communities were asked to participate in the study, and all agreed. They in turn approached patients in their practices to participate in the study. As well, home care nurses working in the study communities approached potential participants whose family physicians had agreed to participate in the study. All four dispensing pharmacies in the communities agreed to participate in the study.

Twenty-five elderly patients were recruited, visited, and interviewed in their own homes. Recruitment started on May 1, 1994, and was completed by September 1, 1994. No record was kept of the total number of patients approached by the physicians and home care nurses. Two people who had originally agreed to participate did not, because of difficulty scheduling the home visit. There were no other withdrawals from the study.

Patient inclusion criteria were:

- 75 years of age or older as of January 1, 1994;
- living in a private dwelling (ie, not a patient in an active treatment hospital or a resident of a long-term care facility); and
- bearing personal responsibility for taking and monitoring medications (but could be assisted in this task by a spouse or other informal caregiver).

Patients were interviewed in their homes using a semistructured interview. They were asked about their current medication use including over-the-counter (OTC) drugs. During the visit we examined all medication containers, dosettes, and areas where medications were stored by patients. Patients were asked about the reasons for their medications, how they took them, allergies, side effects, other difficulties encountered, and subjective assessment of effectiveness. Discontinued prescribed medications kept by patients were also examined. For these stored medications, information was collected regarding the original reason for the medication, dosage, dispensing date, and reason for discontinuing the medication.

The criterion standard for medication use was the information obtained on the visit to the patient's home. Details (including drug names, strength, directions, date received, prescribing physician, and dispensing pharmacist) of all regularly consumed

drugs were listed. The findings of home visits were compared with the medication lists obtained from the physicians and pharmacists.

The attending family physician's and the primary dispensing pharmacist's awareness of the medications currently being used or stored by patients was assessed through reviews of patients' office charts and the computerized records at the pharmacy. If discrepancies existed between these records and the actual use of medication by patients, this information was shared with the family physician or the pharmacist who had the apparently incorrect information.

To detect potential drug interactions and other medication problems, a computerized drug-interaction database[18] and the professional judgment of one of the authors (D.H.) and a pharmacist were used. Lists of medications being consumed were examined to detect potential interactions, duplications, and misuse. Potential duplication was considered if two or more medications were being taken for the same indication. Misuse was considered if there were inappropriate dosages, duration of use, timing of consumption, instructions to the patient, or any other errors of prescribing or consumption that increased the risk to the patient or decreased the likelihood of drug efficacy. Misuse could arise from errors of prescribing or consumption.

Data were analyzed to provide descriptive statistics (eg, frequencies, mean values). Statistical significance (set at $P < 0.05$) of differences in proportions was explored by χ^2 analyses.

RESULTS

Of the patient sample, 20 were female and five were male. Subjects were an average age of 82.5 years (range 75 to 98 years). All could independently perform activities of daily living. Every subject was taking one or more drugs regularly (23 of 25 were taking one or more prescribed agents; 24 of 25 were taking an OTC preparation).

Seven of the subjects lived in a community of approximately 1600 people in which 8% of the population was older than 75. This community was served by two family physicians, one pharmacy, and the local health unit. The closest hospital was approximately 25 km away. The other 18 subjects lived in (or close to) a larger community of approximately 6900. Nine percent of this community was aged 75 years or older. It was served by 12 family physicians and several visiting specialists. There was a hospital in the larger community as well as three pharmacies and the local health unit.

Table 1. Mean number of medications used by study subjects

MEDICATION TYPE	MEAN NUMBER
Prescription	5.6
Over-the-counter	3.5
Stored or discontinued	2.0
Total medications in the home	11.1

Table 2. Most common medications

TYPE OF DRUG	N
PRESCRIPTION CLASS	
Cardiovascular	30
Antihypertensives	17
Nonsteroidal anti-inflammatory drugs	14
Anxiolytics and sedatives	13
OVER-THE-COUNTER	
Vitamins and minerals	30
Analgesics	19
Laxatives	12
Herbal preparations	10

The mean number of medications per subject is shown in **Table 1**. The range for prescribed drugs was 0 to 14 and for OTC medications was 0 to 9. The range for stored, discontinued medications was 0 to 8. The total number of medications per subject ranged from 5 to 24 (**Table 2**).

Knowledge by the attending family physician and the primary dispensing pharmacist of medication use is summarized in **Table 3**. While physicians and pharmacists were often able to identify by name the prescribed medications being taken by their clients, they rarely had accurate knowledge of how these prescribed medications were being consumed (**Table 3**). Neither family physicians nor pharmacists were able to consistently identify even by name the OTC or stored drugs.

Nineteen study participants had stored medications in their homes. All participants were asked what they would do with prescribed medications not currently being taken or that had been discontinued before the prescription was finished (**Table 4**).

Table 3. Physician and pharmacist knowledge of medication use

	KNOWLEDGE OF NAME OF MEDICATIONS FOR ENTIRE STUDY POPULATION		KNOWLEDGE OF NAME, DOSE, AND FREQUENCY OF ALL MEDICATIONS USED BY EACH PATIENT	
MEDICATION TYPE	PHYSICIAN	PHARMACIST	PHYSICIAN	PHARMACIST*
Prescription	89.4% (126/141)	80.9% (114/141)	5/23	5/23
Over-the-counter	14.9% (13/87)	6.9% (6/87)	1/24	0/24
Stored or discontinued	18.0% (9/50)	6.0% (3/50)	2/19†	0/19†
Total in home	53.2% (148/278)	44.2% (123/278)	1/25	0/25

**Primary dispensing pharmacist.*
†Knew name of medication.

Data were analyzed to determine whether the number of prescribers or dispensing pharmacists was related to either the number of medications or health care professionals' knowledge of medications used by patients. On average, patients had 2.1 (range 1 to 6) prescribers and 1.3 (range 1 to 2) dispensing pharmacists (**Table 5**). No statistically significant differences were found.

Table 4. Stated action to be taken with stored or discontinued medications in the home

STATED ACTION	FREQUENCY (N = 25)
Would keep medication in home	8
Would return medication to a pharmacist	5
Would discard medication	12

Eleven patients had duplication of medications, 18 of 25 had potential drug interactions, and 13 of 25 were misusing medications. Twenty-two subjects had at least one of these concerns with their medications. None of the patients had a clinically evident severe drug interaction.

DISCUSSION

The limited sample size from one rural area makes it inappropriate to generalize the results of this study to all rural communities in Canada. Individuals participating in the study (ie, patients and physicians) were volunteers and could differ from the general population of seniors and providers in important ways. For example, volunteer patients could have been motivated to obtain a second opinion because of concerns about their medications. This concern might have led to examining a group taking more medications on average than typical seniors in these communities. Alternatively, physicians could have approached their "best" patients, those they thought they knew the best. Such a selection bias could lead to underestimating the true extent of misinformation about drugs.

The small size of the study makes it likely that type II errors occurred in some of our analyses. Notwithstanding the deficiencies we found in the knowledge of what patients were actually taking, we did not uncover any clear evidence of harm to the patients arising from these deficiencies. The study was not designed to uncover the consequences of this lack of knowledge but was descriptive and exploratory.

The method was appropriate for data collection and did not require more resources than had been anticipated. The time required for home visits is perhaps impractical for routine clinical use. The results of this study demonstrate that information about medication use obtained on a home visit is significantly different from information found by reviewing records of involved health professionals.

We found that patients took an average of 5.6 prescribed and 3.5 OTC medications. These numbers are higher than in other studies.[4,6,7,9] Of particular note was the use of OTC medications. Family physicians and pharmacists were nearly uniformly unaware of these preparations.

Neither physicians nor pharmacists were aware of the total medication regimen for most of their patients. While knowledge of OTC preparations might be an unrealistic expectation for pharmacists, limiting the analysis to prescribed medications still revealed deficiencies in knowledge. Pharmacists were unlikely to be aware of medica-

Table 5. Knowledge of prescribed medications

	TOTAL PRESCRIBED MEDICATIONS CONSUMED	MEAN PRESCRIBED MEDICATIONS CONSUMED	MEDICATIONS KNOWN BY PHYSICIANS		MEDICATIONS KNOWN BY PHARMACISTS*	
			NAME, DOSE, FREQUENCY	NAME ONLY	NAME, DOSE, FREQUENCY	NAME ONLY
PRESCRIBING PHYSICIANS						
1	26	3.2	80.8% (n = 21)	88.5% (n = 23)	80.8% (n = 21)	88.5% (n = 23)
2	68	9.7	64.7% (n = 44)	94.1% (n = 63)	64.7% (n = 44)	83.8% (n = 57)
3 or more	47	4.7	76.6% (n = 36)	85.1% (n = 40)	63.8% (n = 30)	72.3% (n = 34)
DISPENSING PHARMACIES						
1	109	6.0	66.1% (n = 72)	89.0% (n = 97)	68.8% (n = 75)	84.4% (n = 92)
2 or more	32	4.6	90.6% (n = 29)	90.6% (n = 29)	65.6% (n = 21)	68.8% (n = 22)

**Primary dispensing pharmacist.*
†Pharmacy identified as patient's primary pharmacy.

tions filled at other pharmacies or of drug samples given to patients. Prescriptions not known by attending physicians were typically those written by former physicians or specialists. It must be recognized that patients are the final arbiters of medication use. They manage medication in response to a variety of factors in addition to physicians' or pharmacists' suggestions, often according to their symptoms.

Without exception, patients stated that it was important for their physicians and pharmacists to be aware of their medications. There was no difficulty obtaining patient consent to review with the physicians and pharmacists the information obtained. All professionals participating in the study (physicians and pharmacists) were enthusiastic about the study and interested in the findings from the home visit. Therefore, lack of interest does not explain the discrepancies found in information about the medication use of patients.

CONCLUSION AND RECOMMENDATIONS

A number of conclusions and recommendations appear supportable by the results of our study and review of the literature.

- Attending family physicians and dispensing pharmacists are often unaware of OTC preparations and how elderly clients are actually consuming prescribed medications.
- Medication reviews should be done periodically. Clients should be asked to bring in *all* their current medications. These reviews should be done proactively with probing questions.
- The practice of storing discontinued prescriptions should be strongly discouraged, with opportunities provided for patients to bring old medications into their physicians' offices or their pharmacy for disposal. While only a few of our subjects stated they would store discontinued prescribed medications, most did.
- Patients should inform their physicians and pharmacists of any changes they make in how they are taking their medications (especially prescribed medications).
- Patients should be encouraged to use one prescriber and one pharmacist. A recent publication suggests that the risk to patients increases with the number of prescribing physicians.[19]
- Use of medication samples should be reconsidered, and a means of informing the dispensing pharmacist should be developed.
- Physicians and pharmacists should be aware that a substantial proportion of medications consumed by the elderly are not prescribed and might not be considered medications by their patients.

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