Accuracy of a Prescription Claims Database for Medication Reconciliation for Outpatients with Heart Failure

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ABSTRACT

Objective: To quantify agreement between the British Columbia prescription database (PharmaNet) and an interview-based assessment of current use of prescription medications.

Methods: Outpatients taking prescription medications for heart failure were identified through hospital clinic and community pharmacy records. Consenting patients brought their prescription medications to an interview during which the PharmaNet profile was reviewed and a consensus reached regarding current medication use.

Results: Discrepancies between the PharmaNet profile and the interview-based prescription medication history were identified for 138 (71.1%) of the 194 patients interviewed; these discrepancies represented a total of 353 (24.2%) of 1457 medications. The most common discrepancy involved medications that were listed in PharmaNet records but appeared inactive (overdue) according to refill records (205 medications for 81 patients). Eighty-five dosing discrepancies were identified, most frequently the result of adverse effects (11/85 or 13%) or ineffectiveness (10/85 or 12%). Diuretics were involved in discrepancies more frequently than other medication classes (77/353 or 21.8%), followed by ß-blockers (38/353 or 10.8%) and angiotensin-converting enzyme inhibitors (28/353 or 7.9%).

Conclusions: The majority of prescription medications taken by outpatients with heart failure appeared somewhere on the PharmaNet profile; however, without interviewing the patient, it was often difficult to determine which medications were still active or the dose that was currently being taken. PharmaNet profiles can be a valuable tool for determining an accurate prescription medication history if they are reviewed and clarified with patients during an interview.

Key words: medication reconciliation, prescription databases, heart failure

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RÉSUMÉ

Objectif : Évaluer quantitativement la concordance entre les données répertoriées dans la base de données sur les ordonnances de la Colombie-Britannique (PharmaNet) et l'utilisation réelle des médicaments d'ordonnance selon une évaluation faite à partir d'entretiens avec les patients.

Méthodes : Des patients externes prenant des médicaments d'ordonnance pour l'insuffisance cardiaque ont été sélectionnés à partir des dossiers de cliniques externes et de pharmacies communautaires. Les patients consentants ont apporté leurs médicaments d'ordonnance dans le cadre d'un entretien au cours duquel les profils de PharmaNet ont été examinés, et un consensus a été dégagé concernant l'utilisation actuelle des médicaments.

Résultats : Des différences entre le profil PharmaNet et l'historique des médicaments d'ordonnance issu de l'entretien ont été relevées chez 138 (71,1 %) des 194 patients interrogés; ces différences touchaient un total de 353 (24,2 %) des 1457 médicaments prescrits. La différence la plus fréquente avait trait à des médicaments qui apparaissaient dans PharmaNet, mais qui portaient le statut inactif (ordonnance à renouveler) d'après l'enregistrement des renouvellements d'ordonnance (205 médicaments chez 81 patients). On a noté 85 différences au chapitre de la posologie, la plupart du temps attribuables à des effets indésirables (11/85 ou 13 %) ou à l'inefficacité (10/85 ou 12 %). Les différences étaient attribuables plus fréquemment aux diurétiques qu'aux autres médicaments (77/353 ou 21,8 %), suivis des â-bloquants (38/353 ou 10,8 %) et des inhibiteurs de l'enzyme de conversion de l'angiotensine (28/353 ou 7,9 %).

Conclusions : La majorité des médicaments d'ordonnance pris par les patients externes souffrant d'insuffisance cardiaque apparaissaient dans le profil PharmaNet; toutefois, il était difficile, sans parler au patient, de déterminer quels médicaments ils prenaient toujours ou quelle était la dose réellement prise. Les profils PharmaNet peuvent être un outil précieux pour déterminer un historique de médicaments d'ordonnance précis, s'ils sont examinés et clarifiés dans le cadre d'un entretien avec les patients.

Mots clés : bilan comparatif des médicaments, bases de données sur les médicaments d'ordonnance, insuffisance cardiaque

INTRODUCTION

Attention to patient safety in the hospital setting is increasing, largely because of the efforts of the US Institute for Healthcare Improvement's 100,000 Lives campaign[1] and the Safer Healthcare Now! initiative[2] in Canada. Both of these programs include medication reconciliation as a priority topic, and many hospitals across North America have launched projects aimed at improving this process to meet accreditation standards. Medication reconciliation, defined as "a formal process of obtaining a complete and accurate list of each patient's current home medications",[1] is now a requirement of the Canadian Council of Health Services Accreditation and a safety goal of the US Joint Commission (formerly the Joint Commission on Accreditation of Healthcare Organizations).[3] However, in a recent Canadian study conducted in the emergency department of a large teaching hospital, medication reconciliation revealed a high rate of prescribing errors on admission, with serious health implications.[4] The authors suggested that hospital access to prescription dispensation data from community pharmacies could help improve the accuracy of medication reconciliation.

PharmaNet is a provincial computer database that records medication information for all prescription transactions processed by British Columbia community pharmacies, regardless of patient age, payment method, or insurance coverage.[5] It has been a legal requirement in British Columbia since 1995 that all prescriptions dispensed by community pharmacies be entered into the PharmaNet database for immediate adjudication of claims by the Ministry of Health. PharmaNet remains the most comprehensive prescription database in Canada, and it is used extensively in medication-related research and provincial drug policy decision-making.[6-11]

In 1999, access to PharmaNet was implemented in British Columbia hospitals for use by licensed pharmacists, and more recently for use by emergency physicians. Patient-specific PharmaNet profiles are reviewed to assist in obtaining medication histories and to identify drug-related problems related to medications taken before admission. However, patient interviews often reveal that patients have changed their medication regimens since the most recent refill of their prescriptions. As part of the Safer Healthcare Now! initiative, there has recently been a wide-scale systematic assessment of the medication reconciliation processes used in British Columbia hospitals. From these audits, it has become clear that printed PharmaNet profiles are often used in place of formal medication history interviews, despite the potential limitations of these profiles. Given that no published information on the accuracy of PharmaNet data is available and given that use of PharmaNet data for medication history information could lead to prescribing errors, we undertook a study to assess agreement between the prescription medication history obtained from PharmaNet and that obtained during a thorough patient interview. We hypothesized that the types and doses of prescription medications listed in PharmaNet would often be different from those actually being consumed by patients. It is anticipated that the information from this study will help those using PharmaNet for medication reconciliation as well those using PharmaNet data for research and policy decisions. It may also be useful for those accessing similar databases as they are implemented across Canada over the next few years.[12]

METHODS

This cross-sectional cohort study evaluated agreement between medication lists obtained from a structured patient interview and from the PharmaNet profile available to British Columbia hospital pharmacists. This profile includes, in one comprehensive list, all active and inactive prescription medications filled at British Columbia community pharmacies during the previous 14 months, excluding drugs used to treat HIV (for historical reasons related to confidentiality). A cohort of patients with heart failure was selected as the study sample because these patients typically have a large number of similar prescription medications, and these complicated drug regimens often prompt hospital pharmacists to review PharmaNet for medication history information. All patients with current contact information who had an appointment at the St Paul's Hospital Heart Function Clinic or the Pre Heart Transplant Clinic between January and August 2003 were contacted by regular mail with an invitation to participate. Patients with active prescriptions for furosemide and an angiotensin-converting enzyme (ACE) inhibitor or an angiotensin receptor blocker were also recruited from 3 local community pharmacies. A consent form describing the study methods was reviewed with all patients who expressed an interest in participating. Consenting patients were asked to go to St Paul's Hospital for a 30- to 60-min interview and to bring with them all medications that they were currently consuming. The interviews were carried out by a pharmacy resident (L Jang) or an undergraduate pharmacy student trained by the principal investigator (S Salansky) and were based on a structured survey instrument developed for this study. The survey was pretested with clinic patients and was revised according to feedback to ensure that the wording of each question

was clear. During the interview, responses to survey questions, medication labels, printed PharmaNet profiles, and clinic records (for clinic patients only) were reviewed with the goal of obtaining an accurate list of currently consumed, regularly administered prescription medications, including doses and dosing frequencies. Although information on use of nonprescription and alternative medicines was collected, these medications were not included in the medication lists used for analysis of agreement, because PharmaNet records only medications issued by prescription. Discrepancies between the medication lists obtained from the patient and from PharmaNet were queried, and a consensus regarding current medication consumption was reached between the interviewer and patient. When provided by the patient, reasons for discrepancies between the consensus list and the PharmaNet profile were recorded. In addition to use of a checklist, patients were encouraged to provide additional comments, which were categorized during the data analysis.

To evaluate agreement between the medication lists obtained from PharmaNet and the patient interview, a consistent definition of "active" (i.e., currently consumed) medications was used for all medication lists obtained. Medications were deemed active according to the PharmaNet profile if the most recently dispensed supply provided a sufficient quantity to last at least until the date of the interview if taken according to the prescription directions. Accordingly, medications were excluded from the agreement analysis if it was not possible to determine, from refill data listed in PharmaNet, whether they were currently active. For example, liquids and creams were excluded, as were medications for which PharmaNet directions indicated that the drug was to be taken "as needed" or "as directed". Warfarin was also excluded from the analysis, because doses of this drug commonly fluctuate between refills. Medications mentioned during the interview were considered active if the patient indicated that he or she was using them regularly up to and including the day of the interview. Medications excluded from the PharmaNet list were also excluded from the interview list. However, if a medication was to be used "as needed" (prn) according to the PharmaNet profile but the patient claimed to be using it on a regular schedule, the medication was included on the interview list for the purpose of agreement analysis.

Data Analysis

All data were entered into the database of a statistical software program (SPSS version 12.0, SPSS Inc, Chicago, Illinois) for analysis. Concordance between the PharmaNet and interview lists was calculated according to the method described by Yao and others.[13] The proportion of medications from the interview list that appeared in PharmaNet was also recorded. For example, if the interview list consisted of medications a, b ,c, d, and e, and the PharmaNet list consisted of medications a, b, c, f, and g, the concordance was 0.43 (3 common medications out of a total of 7 medications in the 2 lists) and the proportion from the interview that were listed in PharmaNet was 0.60 (3 of 5 medication from the interview list). Logistic regression modelling was used to identify patient characteristics associated with the presence of one or more discrepancies.

Agreement between PharmaNet and the interview regarding the number of medications currently consumed was also calculated, using the method of Bland and others,[14] since many clinical pharmacy programs and medication studies use number of medications as a screening criterion. This approach calculates bias by estimating the mean difference between 2 measurement methods (in this case the PharmaNet and interview medication lists) across the study sample (d) and calculating the standard deviation of these differences (s). The "limits of agreement" were expressed as the mean of the differences between the lists ± 1.96 standard deviations of the differences ($d \pm 2s$). The difference between the number of medications in the 2 medication lists (y axis) and the mean of the 2 measurements (x axis) was plotted for each patient.[14]

Sample Size Justification

Bland[15] suggested that a reasonable sample size for studies assessing agreement between 2 clinical measurements would be at least 100 subjects, each of whom has 1 set of the 2 measurements (see explanation below), but recommended that 200 subjects be recruited if possible. A sample size (n) of 200 provides a standard error of the agreement that is 0.24 times the standard deviation of the differences (s) between the 2 measurements, based on the formula $\sqrt{3s^2/n}$.[15] On the basis of this recommendation, patients were invited to participate until at least 100 and up to 200 patients were recruited over the 8-month data collection period. The duration of the data collection period was determined by the appointment schedule of the clinics, an expected recruitment rate of 30% to 50%, and the funds available for this project.

RESULTS

Of the 367 patients to whom letters were mailed inviting participation in the study, full medication history

interviews were completed for 194 patients (52.9%) who had active PharmaNet profiles. The demographic characteristics of the study subjects are presented in Table 1. One hundred and thirty of the patients interviewed (67.0%) brought all of their prescription medications to the interview. On the basis of PharmaNet records and the patient interview, there was at least one difference in the list of medications currently consumed for 138 patients (71.1%; Table 2). Concordance between PharmaNet and the interview was 0.81 (95% confidence interval [CI] 0.77 to 0.84), and the proportion of medications from the interview that were active according to PharmaNet was 0.83 (95% CI 0.80 to 0.86). One hundred patients (51.5%) claimed to be taking at least one medication that was not listed in PharmaNet or was inactive according to the PharmaNet profile; 31 patients (16.0%) indicated that they were not taking at least one medication that appeared active on the PharmaNet profile. A higher number of currently consumed, regularly administered prescription medications identified during the patient interview was associated with a higher risk of discrepancies (odds ratio 1.31 per medication on the list, 95% CI 1.13 to 1.53; $p < 0.001$). The use of memory aids (pill boxes) was associated with fewer discrepancies (odds ratio 0.40, 95% CI 0.16 to 1.00; $p = 0.05$).

Of the 1457 medications reviewed from these lists, 353 (24.2%) were involved in a discrepancy. Most commonly (205 medications for 81 patients), these discrepancies involved medications that were listed somewhere on the 14-month PharmaNet profile and were currently being consumed by the patient, but appeared inactive (i.e., overdue for a refill) based on the number of days supplied at the most recent refill. Of these 205 medications, 72 (35.1%) were overdue by 1 week or less, 69 (33.7%) by 8 to 30 days, and 64 (31.2%) by more than 30 days. Patients' reasons for being late in

Table 1. Characteristics of 194 Patients Interviewed about Prescription Drug Use

Characteristic	No. (%) of Patients*
Median age, years (range)	65 (27–94)
Recruitment site	
Heart Function Clinic	162 (83.5)
Pre Heart Transplant Clinic	19 (9.8)
Community pharmacy	13 (6.7)
New York Heart Association heart failure class†	
Class I	41 (21.1)
Class II	66 (34.0)
Class III	19 (9.8)
Class IV	1 (0.5)
Unknown	67 (34.5)
No. of prescription medications (mean ± SD)‡	7.0 ± 2.8
No. using herbal products§	29 (14.9)
No. using vitamins or supplements§	130 (67.0)
No. using other nonprescription products§	113 (58.2)

SD = standard deviation.
*Unless indicated otherwise.
†Most current from clinic medical record.
‡According to list obtained from patient interview.
§Nonprescription products used at least once per week

Table 2. Discrepancies between Medication Lists Obtained from PharmaNet and Information from Patient Interviews*

Discrepancy	No. (%) of Patients (*n* = 194)	No. (%) of Medications (*n* = 1457)
Any discrepancy	138 (71.1)	353 (24.2)
Different medications listed†	115 (59.3)	268 (18.4)
Patient taking medication overdue for refill (according to PharmaNet)	81 (41.8)	205 (14.1)
≤ 7 days overdue	37 (19.1)	72 (4.9)
8–30 days overdue	34 (17.5)	69 (4.7)
> 30 days overdue	42 (21.6)	64 (4.4)
Patient taking medication not recorded in PharmaNet	19 (9.8)	23 (1.6)
Patient not taking medication recorded as active in PharmaNet	15 (7.7)	31 (2.1)
Medication used "as needed" despite regular schedule of use recorded in PharmaNet	9 (4.6)	9 (0.6)
Different doses listed‡	64 (33.0)	85 (5.8)

*Individual patients might have more than one discrepancy.
†Discrepancies in generic name; excludes discrepancies of dose or brand name.
‡Dosing discrepancies involving medications that were active according to both sources.

Table 3. Reasons Provided by Patients for Discrepancies between Medication Lists Obtained from PharmaNet and Patient Interviews (*n* = 268 Medications with Discrepancies)*

Reason	No. (%) of Discrepancies (*n* = 268)	
Overdue for refill (according to PharmaNet)	205	(76.5)
Patient "hadn't got around to" refilling prescription	40	(14.9)
Dose or frequency changed recently	38	(14.2)
Doses left from previous refill	30	(11.2)
Supply provided in hospital	20	(7.5)
Recently restarted a previous supply	18	(6.7)
Self-reported noncompliance	14	(5.2)
Borrowed from another person	5	(1.9)
Other reason	4	(1.5)
Unknown	36	(13.4)
Medication used "as needed" despite regular schedule of use recorded in PharmaNet	9	(3.4)
Medication appears active in PharmaNet but not being taken by patient	31	(11.6)
Adverse effects	7	(2.6)
Changed by physician before patient finished current supply	4	(1.5)
Symptoms resolved	2	(0.7)
Not working	1	(0.4)
Wrong medication supplied	1	(0.4)
Unknown	16	(5.6)
Patient taking medication not recorded in PharmaNet	23	(8.6)
Using sample medication	16	(5.9)
Filled outside British Columbia	3	(1.1)
Using spouse's supply	1	(0.4)
Not filled in > 14 months	1	(0.4)
Using supply from hospital	1	(0.4)
Unknown	1	(0.4)

*Discrepancies in generic name; excludes dose discrepancies.

Table 4. Reasons Provided by Patients for Dosing Discrepancies between Medication Lists Obtained from PharmaNet and Patient Interviews (*n* = 85 Medications with Discrepancies)

Reason	No. (%) of Cases (*n* = 85)	
Adverse effects	11	(13)
Lack of efficacy	10	(12)
Previous regimen too complicated	7	(8)
Condition improved	7	(8)
Dose varies with weight or renal function	6	(7)
Verbal instructions differ from prescription	6	(7)
To adjust for changes in other medications	2	(2)
Condition worsened	1	(1)
Mistake entering dose in PharmaNet	1	(1)
Cost	1	(1)
Unknown	33	(39)

Table 5. Medication Classes Involved in Discrepancies (*n* = 353 Medications with Discrepancies)

Drug Class	No. (%) of Discrepancies (*n* = 353)	
ß-Blockers	38	(10.8)
Furosemide	38	(10.8)
Spironolactone	29	(8.2)
ACE inhibitors	28	(7.9)
Vitamins and supplements	24	(6.8)
Oral hypoglycemics	22	(6.2)
Lipid-lowering agents	20	(5.7)
Digoxin	17	(4.8)
Angiotensin receptor blockers	16	(4.5)
Antiarrhythmics	10	(2.8)
Other diuretics	10	(2.8)
Nitrates	9	(2.5)
Antiplatelet agents and anticoagulants	9	(2.5)
Calcium-channel blockers	6	(1.7)
Other	77	(21.8)

ACE = angiotensin-converting enzyme.

obtaining refills are listed in Table 3. While many patients simply "hadn't got to it yet" or had doses remaining from a previous early refill, many patients described dosing changes relayed verbally by physicians that were not reflected in the PharmaNet profile. A total of 31 medications had been discontinued by patients, most commonly because of adverse effects and often (16/31 or 52%) on the advice of the physician. Twenty-three medications that did not appear anywhere on the PharmaNet profiles were being used by the patients interviewed. These were typically samples issued by physicians.

There were 85 discrepancies in the doses of drugs that were listed on both PharmaNet and the interview list. According to the patients involved, the change in dose was most commonly the result of adverse effects or lack of efficacy, or to simplify the drug regimen (Table 4). Adrenergic ß-receptor blocking agents (ß-blockers) and furosemide were the medications most commonly involved in identified discrepancies (Table 5).

The total number of regularly administered prescription medications differed between the medication lists obtained from patients and those listed in PharmaNet for 109 (56.2%) of the patients. On average, PharmaNet listed one fewer medication than the list obtained during the interview (Figure 1). For 6 patients, an equal number of medications were listed on PharmaNet and by the patient, but the medications on the lists differed to some degree.

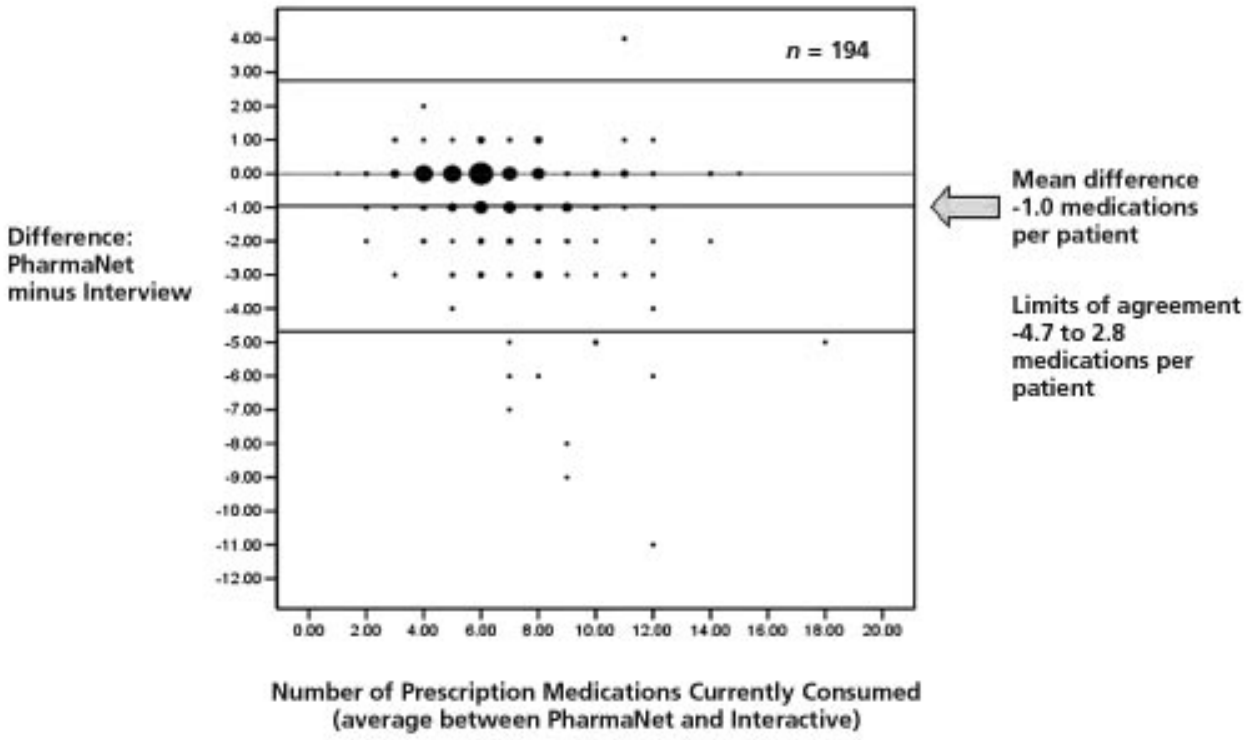

Figure1. Bland–Altman agreement plot of the number of prescription medications currently consumed, assessed by examination of PharmaNet data and a patient interview. The size of each circle is proportional to the number of data points, and the line at 0.00 represents no difference.

DISCUSSION

More than 70% of the PharmaNet profiles reviewed for this study contained some inaccurate or misleading information about prescription medications currently consumed by the patients interviewed. These results suggest that sole reliance on PharmaNet profiles for medication histories could result in a high incidence of prescribing errors. Conversely, since it was relatively uncommon for a patient to be taking a medication that did not appear anywhere on the 14-month profile, PharmaNet provides an excellent starting point for medication reconciliation.

A recent review evaluating research on medication history-taking concluded that 60% to 67% of medication histories obtained during the hospital admission process contained at least one error, and that 11% to 59% of these errors were clinically important.[3] The authors of the study suggested that prescription databases could be used to improve the accuracy of medication information obtained during the hospital admission process, and they specifically mentioned PharmaNet as an example of such a system.[4] Not surprisingly, the cumulative evidence suggests that reviewing with patients information from a prescription database (e.g., PharmaNet) provides more accurate medication history than using either an interview or PharmaNet profiles alone. What may be surprising to some clinicians is the degree of inaccuracy of the information in PharmaNet. These results are particularly pertinent given that anecdotal reports of the medication reconciliation processes carried out in Canadian hospitals (from those participating in the Safer Healthcare Now! initiative) have revealed that sole use of PharmaNet profiles for prescription medication information is common. Even when a medication history is conducted, clinicians often streamline the process by accepting the PharmaNet profile as the list of current prescription medications and focusing only on nonprescription products during the patient interview.

These results indicate that asking specific questions while reviewing PharmaNet data with patients is a relatively efficient approach for compiling an accurate medication history. The majority of discrepancies identified in the current study were the result of overdue refill dates, so these inconsistencies should be clarified with patients, regardless of how long overdue the prescription appears. Although the names of most active

medications were usually listed somewhere on PharmaNet, at least some doses were inaccurate for approximately one-third of patients; thus, doses should be queried routinely. Furthermore, specific drug classes should be targeted, since patients more commonly deviated from the original prescription directions for medications with rapid effects on symptoms (e.g., diuretics) and those with a high incidence of adverse effects (e.g., ß-blockers). Patients should also be asked whether they have been given drug samples at the physician's office, since this was the most common explanation for use of medications not listed in PharmaNet. Where reasons for discrepancies were reported, adverse effects were most often implicated; therefore, patients reporting adverse effects during the interview should be questioned further to determine whether the adverse effects have resulted in deviations from prescribed instructions. Use of memory aids was associated with a lower rate of discrepancies, probably through facilitation of adherence to prescribed dosing instructions.[16] During the medication interview, patients should be asked about the use of memory aids and should be encouraged to use such aids.

Several previous studies have evaluated agreement between prescription records and interview-based medication history. However, those studies involved databases that were not centralized between pharmacies and were not available for general clinical applications beyond the individual pharmacy where the data were stored. In addition, dosing discrepancies were not reported, nor were reasons for discrepancies evaluated, in any of the studies reviewed. Sjahid and others[17] evaluated the accuracy of information obtained from 1682 patients over 55 years of age in a Dutch population-based study database. These investigators found 80.4% concordance with interview-based medication history lists. Lau and others[18] reported that 70% of medications present in a home inventory of 115 elderly patients were "active" according to pharmacy records and 96% were listed somewhere on the pharmacy record; however concordance was not calculated. In a study of antihypertensive drugs, there was full agreement between pharmacy records and a patient questionnaire for 321 (86%) of 372 patients interviewed.[19] However, the definition of agreement included instances in which specific antihypertensive drugs were listed neither by the patient nor in the pharmacy records; this category applied for most patients with "full agreement" (207/321 or 64%). More recently, Kaboli and others[20] interviewed 493 patients receiving primary care through US Veterans Affairs and found complete agreement between the computerized medication profile and a medication interview list for only 5.3% of patients. Finally, Caskie and Willis[21] evaluated agreement between an interview-based medication list and pharmacy records for 294 patients participating in a clinical trial evaluating cognitive triaging in elderly people who did not have dementia. Agreement was 49% to 81% depending on the drug class, but this was examined simply at the level of drug class, without taking into account the specific medications consumed. Notably, in all of these studies, including the present investigation, the computerized record under-reported the number of prescription medications used.

This study had several limitations. The medication history information used for assessment of accuracy of the PharmaNet profile relied largely on patient responses to a survey that has not been validated scientifically. In particular, medications not filled at a British Columbia community pharmacy (e.g., drug samples provided by physicians) and not presented or mentioned at the interview could not be identified. On the other hand, focusing on medications used up to and including the day of the interview minimized recall bias. Furthermore, the use of multiple sources of medication history information (e.g., patient, spouse, PharmaNet profiles, vial labels, chart records) limited the possibility of patients overlooking medications that they were currently using. Medications were excluded from the analysis if it was not possible to determine whether they were currently active based on refill data (e.g., creams, liquids, and medication taken "as directed"). It is possible that additional discrepancies would have been identified if these medications had been evaluated. The accuracy of pharmacists' transcription of prescription information into the PharmaNet database was not assessed; however, previous research evaluating other Canadian prescription claims databases indicates that this process is reliable.[22,23] Previous research involving this clinic cohort has revealed a high rate of medication adherence,[6,7] which might have influenced agreement between the 2 sources of medication history information. The attempt to recruit nonclinic patients through local community pharmacies, so that a wider range of adherence patterns would be represented in the study, was only marginally successful. Neither outcomes nor the potential for adverse consequences were assessed, which rendered it difficult to interpret the clinical relevance of the discrepancies identified. Lastly, this study evaluated a single prescription database for a specific cohort of patients. These results may not be applicable to other databases, where prescription information is entered under different circumstances, or to patients treated for different disease states in different settings.

CONCLUSIONS

Most PharmaNet profiles reviewed for this cohort of patients with heart failure contained some inaccurate or misleading information, thus revealing PharmaNet's shortcomings as a principal source of information about patients' prescription medication history in this setting. However, these results also suggest that PharmaNet can be an invaluable tool for improving the accuracy of information obtained during a medication history interview. Streamlining the thorough interview process employed in this study by briefly reviewing the PharmaNet profile with the patient, asking about overdue refills and side effects, and querying the use of samples and nonprescription medications appears to be an effective approach for medication reconciliation in this population.

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