Cardiovascular risk factor modification among high-risk patients: Do pharmacists play a role?

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Introduction

Cardiovascular (CV) disease accounts for 30% of all deaths in Canada, and the number of deaths is expected to rise as our population ages.¹⁻³ There is irrefutable evidence demonstrating that controlling modifiable risk factors effectively reduces the risk of CV events and mortality.⁴⁻⁷ Among patients at high risk for CV events, studies in different settings have consistently shown that achievement of evidence-based treatment targets is less than ideal.⁸⁻¹² Recent Canadian data, however, remain sparse on the topic.¹³⁻¹⁶

The reason for the gap between research evidence and clinical practice is likely multifactorial. One factor may be that traditionally, only physicians had the privilege to prescribe medications. Pharmacists in Alberta have been able to prescribe since 2007. To our knowledge, however, there is no published information identifying if pharmacists are proactively managing the therapy of Albertans. Given this, the purpose of this pilot study was to assess both the management of modifiable risk factors among patients known to be high risk for CV events and the role of pharmacists in this process of care.

Methods

This pilot study was a retrospective chart review with a cross-sectional patient postal survey. Patients were eligible for inclusion if they had a most responsible discharge diagnosis (i.e., primary reason for hospital stay) of ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI)

or other acute coronary syndrome. All eligible patients at the University of Alberta Hospital admitted between October 1, 2009, and March 31, 2010, were identified using the *International Statistical Classification of Diseases and Related Health Problems, Tenth Revision, Canada (ICD-10-CA)* codes. Patients were excluded if they had a terminal illness (e.g., metastatic cancer, life expectancy <6 months, palliative care) precluding aggressive risk factor management, were transferred to a long-term care facility or other hospital or resided outside of Alberta. Data were collected from the hospital chart (sex, date of birth, admission and discharge date, most responsible diagnosis, specialization of the attending physician, comorbidities, tobacco use, last blood pressure prior to discharge, discharge medications) to determine eligibility. All eligible patients were mailed the study information sheet, a written consent form and a brief survey along with a prepaid postage return envelope between 11 and 17 months after discharge. Up to 3 attempts were made to contact patients by phone within 7 to 14 days of the mailing to ensure that it was received and to answer questions about the study. All patients who subsequently provided written consent were included in the study. The study was approved by the Health Research Ethics Board at the University of Alberta.

For those providing consent, data were gathered through electronic databases such as Netcare, a provincial laboratory database used to retrieve low-density lipoprotein, apolipoprotein B and hemoglobin A1C levels, and the Pharmaceutical Information Network (PIN), for prescription history and prescriber

TABLE 1 Cardiovascular risk factor target achievement rates at 1 year

Risk factor*	Target goals	n (%) at target at 12 months
Dyslipidemia (n = 31)	LDL <2.0 mmol/L or ≥50% LDL decrease from baseline	22 (71)
Tobacco use (n = 9)	Complete cessation from cessation date to the end of the follow-up duration	7 (78)
Hypertension (n = 3)	<140/90 mmHg <130/80 mmHg (with diabetes or chronic kidney disease)	1 (33)
Diabetes (n = 2)	Hemoglobin A1C of ≤7%	1 (50)
All risk factors (≥2 risk factor) (n = 35)	As above	3 (9)

LDL, low-density lipoprotein.

*Reflects those who did not have the risk factor at target at baseline.

names. Prescription history and prescriber names were also accessed from pharmacies to address potentially missing data in PIN, and patient surveys gave the most recent blood pressure, frequency of blood pressure assessment by a health care professional, current tobacco status, date of last tobacco use, smoking cessation products and frequency of tobacco use assessment by a health care professional.

To assess successful risk factor modification, we included the proportion of patients with an acute coronary syndrome who had uncontrolled hypertension, dyslipidemia or diabetes or who were smokers during their index hospitalization, who subsequently achieved any of the Canadian guideline targets for these risk factors 1 year after discharge (refer to Table 1 for targets). To assess the role of pharmacists in this process of care, we examined the frequency of risk factor assessment by a health care provider, alterations to relevant medications to facilitate achievement of targets (defined as initiation of new medications, any increase in the daily dose in milligrams and medication switches to an increased bioequivalent dose within the same or different therapeutic class) and identified the discipline or specialization of the health care provider altering the medications. These analyses were performed only when >10% of the study population had the risk factor, to increase the chance of obtaining meaningful conclusions (excluding analysis of both diabetes and hypertension). All analyses of the data were descriptive, using proportions and

means where appropriate, using Microsoft Excel 2010 (Microsoft, Redmond, WA).

Results

A total of 180 patients were initially screened, 136 patients were eligible and 44 (32%) responded (Figure 1). Mean age was 64.3 years, 36 (82%) were male, 15 (34%) had a discharge diagnosis of unstable angina (UA) or NSTEMI and the remaining 29 (66%) had an STEMI.

Of the 31 patients with uncontrolled dyslipidemia at baseline, 22 (71%) subsequently met the Canadian guideline targets (Table 1). Three of the 9 patients not at target demonstrated improvement in their lipid panel, 4 had no improvement and 2 did not have a lipid panel drawn. Seven (78%) of the 9 patients reporting tobacco use were no longer smoking, and 1 of the 2 patients with uncontrolled diabetes achieved target. The remaining patient showed an improvement in the hemoglobin A1C. One of the 3 patients with uncontrolled hypertension achieved target, and the remaining 2 patients did not report blood pressure. Of the 35 patients with 2 or more uncontrolled risk factors, 3 (9%) were able to meet all the Canadian guideline targets for their risk factors (Table 1).

To assess the role of pharmacists in the process of care for risk factor modification, each risk factor was evaluated separately. Seventeen patients (77%) who achieved dyslipidemia targets did so on their discharge regimen, and the remaining 5 patients had 1 change. Those

FIGURE 1 Patient flow and eligibility

NSTEMI, non-ST-elevation myocardial infarction; STEMI, ST-elevation myocardial infarction

who did not achieve target either remained on their discharge regimen (5 patients, 55%), had a dose increase ($n = 1$) or switch to a more potent antidiyslipidemic ($n = 1$) or had their statin discontinued ($n = 2$). All medication alterations were done by cardiologists, family physicians or internists with no available documentation of pharmacist involvement.

Patients who stopped tobacco use were primarily on nicotine replacement products or quit without using a smoking cessation product. Of the patients continuing to smoke, 1 did not initiate a smoking cessation product and the other discontinued varenicline. Patients who stopped smoking using smoking cessation products tapered their regimen without aid from any health care professional.

Discussion

The proportion of patients not at target at hospital discharge who achieved CV risk factor targets 1 year after their acute coronary

syndrome was as follows: 71% for dyslipidemia, 33% for hypertension, 50% for diabetes and 78% for tobacco discontinuation. Only 9% achieved target for all modifiable risk factors. Our results found no evidence of pharmacist involvement in this process of care.

Overall, our study has shown rates of CV risk factor control falling within those reported in the Canadian literature, which range from 20% to 42% for hypertension and 17% to 84% for dyslipidemia.¹³⁻¹⁶ A novel investigation was our examination of the involvement of pharmacists in assessing CV risk factors and modifying medications to help achieve guideline targets. Our results highlight a critical role being fulfilled by the hospital team (not in the community setting), given that those achieving targets for dyslipidemia tended to do so on their discharge medication regimen and those not achieving targets had lipid panels ordered yet tended to continue on their discharge antidiyslipidemics.

Although there are nonphysician prescribers in Alberta, such as pharmacists and nurse practitioners, all medication alterations in our study were attributed to physicians. Our inability to capture nonphysician prescribers could have been for several reasons—first, they may simply not have participated in the care of this particular small pool of patients. After all, prescribing privileges for pharmacists were fairly new to Alberta at the time of this study, having been implemented in late 2007.¹⁷ Practice change takes time, and this may be reflective of a delay in implementation. Second, pharmacists may participate in patient care through multidisciplinary teams, and their interventions may be implemented through prescriptions written by a physician. Consequently, the method of collecting prescriber data for nonphysician sources must be refined to enable capture of accurate information. Moreover, the order entry system at the level of dispensing allows for a generic prescriber identification number that may be selected if an individual prescriber's identification number is not known or readily available, making it more problematic to discern the discipline of the prescriber.

This pilot study was limited by its small sample size and retrospective nature, allowing for only descriptive conclusions. Only one-third of the eligible patients were enrolled in the study, falling within the expected response rate for consent and survey by mail.¹⁸ A proportion of the patients not enrolled may be less well managed, due to

self-selection bias. Lifestyle contributions were not tracked and blood pressure measurements, tobacco use and smoking cessation product use gathered on the patient survey were highly dependent on the accuracy of patient recall over a 1-year period. Improvements in study design include increasing the number of hospital sites polled and increasing the time period eligible for data collection. Finding accurate sources of information not dependent on consent would help to capture data from nonresponders, and a prospective study would enable this. Consistent timing and accurate reporting of objective data such as blood pressure would improve data completeness, and prospectively involving health care professionals participating in prescribing decisions might lead to better reporting of nonphysician prescribing.

These preliminary data demonstrate that CV risk factor management of our enrolled population is similar to other reports in the literature. A gap in care continues to exist, and our pilot data suggest a greater role for health care providers in the community. Nonphysician providers are receiving authorization to initiate and alter medication therapy. Unfortunately, our data did not indicate any role played by pharmacists in the management of a patient's chronic diseases. Further research is necessary to confirm our results in an adequate sample size and to ensure adequate capture of the role of allied health care professionals in CV risk factor management. ■

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