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I got the idea to do this project while I was working on studies evaluating ways pharmacists can better assist in the management of patients with heart disease. It was my experience that patients knew very little about the risks of heart disease, but I wanted to find out for sure.

*L'idée de ce projet m'est venue pendant que je travaillais à des études visant à évaluer comment rehausser la participation des pharmaciens à la gestion des patients atteints de maladies cardiovasculaires. D'après mon expérience, les patients savaient très peu de choses sur les risques associés aux maladies coronariennes, mais je voulais m'en assurer.*

# An assessment of patient knowledge and awareness of issues surrounding cholesterol risk management

The large gaps in knowledge of risk factors in CVD represent an opportunity for pharmacists

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## Abstract

**Background:** A lack of patient understanding and awareness of issues surrounding cholesterol risk management may be one reason that a significant number of patients receiving cholesterol-lowering therapy do not achieve optimal cholesterol levels. This study was conducted to assess patients' knowledge and awareness of issues surrounding cholesterol risk management.

**Methods:** Community pharmacists within the Edmonton, Alberta, area were identified and asked to recruit patients within their practice who had been receiving cholesterol-lowering therapy for a minimum of six weeks. A 32-question telephone survey was developed and used as the instrument to assess patient knowledge and awareness. All surveys were conducted by the same individual, and data analysis was primarily descriptive.

**Results:** Seventeen community pharmacies recruited 136 potential subjects over an eight-

week period. Surveys were conducted with 105 (77%) of the eligible subjects. Of those surveyed, 37% identified elevated cholesterol as a risk factor for heart disease. While the majority of respondents felt it important to know their cholesterol targets (82%) and their specific levels (91%), only 23% and 29% of respondents indicated that they knew their high-density lipoprotein cholesterol and low-density lipoprotein cholesterol levels, respectively. Gaps in knowledge with respect to cholesterol-lowering therapy also existed.

**Conclusions:** The results of this survey indicate gaps in patient knowledge of various issues surrounding cholesterol risk management. Pharmacists are in an excellent position to provide better education to patients about cholesterol levels and cardiovascular disease risk management. Further research is required to determine whether improved patient knowledge leads to improved clinical outcomes.

**C**holesterol risk management is the process of screening and diagnosing dyslipidemia, initiating appropriate cholesterol-lowering therapy, and incorporating monitoring and follow-up to help ensure patients achieve their target cholesterol levels. Evidence suggests that cholesterol management is suboptimal, particularly in patients at greatest risk for cardiovascular events.<sup>1-3</sup> As cardiac risk level increases, the proportion of patients achieving target cholesterol levels decreases, such that approximately 37% of patients with a history of cardiovascular disease (CVD) do not achieve cholesterol targets established by national clinical guidelines.<sup>1-3</sup>

The actual reasons for the suboptimal management of dyslipidemia are poorly understood. A combination of physician, patient, and health care system factors likely contribute to poor achievement of cholesterol targets.<sup>4</sup> Patient-related factors may include medication intolerance or poor adherence.<sup>5,6</sup> Furthermore, a lack of patient understanding and awareness of issues surrounding cholesterol risk management may contribute to the low adherence rates and subsequent lack of achievement of optimal cholesterol levels.<sup>7</sup>

Few studies have directly assessed patient knowledge in this area; however, it has been shown that few patients even identify elevated cholesterol as a risk factor for heart disease.<sup>8-10</sup> This study was conducted to assess patients' knowledge and awareness of issues surrounding cholesterol risk management.

## Methods

### Design

This study was a cross-sectional telephone survey of ambulatory patients who received prescriptions from one of 17 participating community pharmacies within Edmonton, Alberta. Approval for the study was obtained from the Health Research Ethics Board of the University of Alberta.

### Patient selection

Subjects selected for the study were recruited through community pharmacies located within the Capital Health Authority region of Edmonton. Subjects were eligible for study inclusion if they were 18 years of age or older and were receiving a cholesterol-lowering medication for a minimum of six weeks prior to contact by the study investigator. Cholesterol-lowering medications were defined as any HMG-CoA reductase inhibitor (statin), fibric acid derivative (fibrate), bile acid sequestrant (resin), or niacin.

Subjects were excluded if they were unable to understand or speak English, had no telephone or fixed address, were residents of nursing homes,

## One-fifth of survey respondents could not name even one independent risk factor for heart disease

were not going to be in the geographic area for the duration of time between subject recruitment and survey administration, were already enrolled in a cholesterol study, were participating in a formal cardiac rehabilitation program, or did not consent to participate.

### Subject recruitment

To identify community pharmacists, a list of pharmacies located within Edmonton was obtained from the Alberta College of Pharmacists. Community pharmacists were contacted in person by the study investigators to determine interest in participating in the study. Efforts were made to ensure that the recruited pharmacists represented a geographic sample of pharmacies (i.e., pharmacies located in the west, east, north, and south of the city). Community pharmacists who agreed to participate were responsible for identifying eligible subjects for the study.

At the time of initial contact, each pharmacist was provided with an explanation of the purpose of the study, the inclusion and exclusion criteria, and the main outcomes that were to be evaluated. The pharmacists who agreed to participate were provided with a computer-generated list of subjects who attended their pharmacies and who met the inclusion criteria for the study.

Pharmacists were asked to contact every third subject (in person or by telephone) on their list and, with the use of a pre-formatted dialogue, to explain the study and obtain verbal consent to participate in the telephone survey. The pharmacists documented the following for all those who consented to participate: the subject's name, address, and telephone number; the best time of day to contact the subject; the name, dose, and dosing regimen of cholesterol-lowering medications; and, if possible, the duration of therapy.

### Key points

- Patient knowledge of the effect of cholesterol levels on cardiovascular risk management is highly variable.
- Patients may not know their target and specific individual cholesterol levels or the intended duration of their dyslipidemia therapy.
- More research is needed to help us identify the characteristics in patients and interventions that may improve adherence to lipid-lowering therapy.

## 20% of respondents said that their health care provider did not explain why they were prescribed a cholesterol-lowering drug

### Survey content

A seven-page, 32-question survey was developed as the instrument to assess subject knowledge. Searches of the medical literature using MEDLINE and EMBASE databases were conducted in order to retrieve any previously published surveys appropriate to our needs. Select questions were adapted

from two surveys (one published<sup>11</sup> and one unpublished) and were compiled with new questions created by the investigators.

The survey was sent for review to content experts in the fields of cardiovascular risk reduction and survey writing. These individuals included two physicians, a clinical research nurse working at a risk reduction clinic, three clinical pharmacists, and a postdoctoral research fellow with extensive experience in survey writing. The survey was reviewed a final

time and was validated for content, clarity, and readability. A final draft was administered to three individuals who were representative of the population to be surveyed in order to identify and rework any awkward, ambiguous, or confusing questions. Revisions were made, and the survey was retested with the same individuals for final content validation.

The content of the survey pertained to knowledge and awareness of risk factors for heart disease. Subjects were asked, in an open-ended fashion, to identify as many risk factors for heart disease as they could. The survey addressed the subjects' knowledge of the role of cholesterol in heart disease, the different lipoproteins, and the cholesterol-lowering medication they were currently taking. It also assessed subjects' awareness of their own cholesterol levels. Most responses were formatted in a yes/no or true/false fashion.

### Survey conduct

All surveys were conducted by telephone by the same individual (LG). Each contact was conducted in exactly the same manner using a pre-formatted dialogue that included identification of the study investigator, verification of the subject's identity, a brief reminder of how and why the subject was being contacted, the name of the pharmacist who asked the subject to participate, and the objective and length of the survey. Individuals were informed that they could refrain from answering any question that they did not wish to answer and that survey answers would be kept strictly confidential.

### Data analysis

The primary objective of the survey was to determine subjects' knowledge and awareness of issues surrounding cholesterol risk management. A secondary objective was to determine whether knowledge and awareness of these issues differed among individuals with varying levels of cardiac risk. Subjects were classified as very high, high, moderate, or low risk, based on the definitions established by the Canadian guidelines for cholesterol management (Table 1).<sup>12</sup>

The sample size was estimated using the EPI Info computer program (version 2000, Centers for Disease Control, World Health Organization) for population surveys. It was determined that a sample size of 123 subjects was required to provide a frequency of 25% ± 5%, at a confidence level of 80%. This was based on the following: an estimate that 3.9 million Canadians take cholesterol-lowering medications, an estimate that 25% of subjects are aware of cholesterol as a risk for heart disease,

### Points clés

- Les connaissances des patients sur le lien entre les taux de cholestérol et les risques de maladies cardiovasculaires varient énormément.
- Certains patients ne connaissent pas leurs taux exacts de cholestérol, leurs taux cibles ou encore la durée prévue de leur traitement hypolipidémiant.
- Des travaux de recherche plus poussés sont nécessaires pour déterminer les caractéristiques des patients et les interventions capables d'assurer une meilleure acceptation des traitements hypolipidémians.

TABLE 1 Cardiovascular risk classification<sup>12</sup>

Risk category	Risk factors
Very high risk	≥ 4 cardiac risk factors,* CVD, PVD, stroke, transient ischemic attack, and/or history of diabetes in subjects > 30 years of age
High risk	≤ 3 cardiac risk factors
Moderate risk	≤ 2 cardiac risk factors
Low risk	≤ 1 cardiac risk factor

\*Cardiac risk factors include age (males aged 45 years or older; females aged 55 years or older), a family history of premature CVD in a first-degree relative (males 55 years of age or less; females 65 years of age or less), smoking one or more cigarettes per day, and the presence of high blood pressure or receiving a medication to treat high blood pressure.

CVD = cardiovascular disease defined as a history of myocardial infarction, unstable angina, stable angina, coronary artery bypass graft surgery, and/or percutaneous coronary intervention with or without stent placement; PVD = peripheral vascular disease.

and an assumption of random sampling of subjects from the population. Analysis of results was primarily descriptive.

## Results

Seventeen pharmacies agreed to participate. Ten (59%) of the pharmacies were pharmacy chains, five (29%) were independently owned, and two (12%) were within grocery stores. In total, 136 subjects were identified by the pharmacists and consented to participate. However, since four subjects (3%) later refused to participate and 27 (20%) could not be contacted, a total of 105 surveys were completed.

Subject demographics are presented in Table 2. The average age of respondents was 65 ± 11.3 years, 44% were male, and over 50% had more than a high school education. A history of CVD was present in 42% of the respondents. Hypertension was the most prevalent cardiovascular risk factor in the population surveyed. Overall, the majority of respondents were classified as either very high risk (42%) or high risk (29%) for CVD. Statins had been prescribed to 92% of respondents. As well, 61% of respondents had taken cholesterol-lowering therapy for a minimum of two years.

Figure 1 displays respondents' awareness of risk factors for heart disease. The majority (59%) of respondents identified a high-fat diet as a risk factor for CVD. The major independent and modifiable cardiovascular risk factors (smoking, hypertension, and dyslipidemia) were identified by 56%, 26%, and 37% of the respondents, respectively. Specifically, among respondents who had a documented history of CVD, the proportion who identified those same risk factors was slightly higher: smoking, hypertension, and dyslipidemia were identified by 62%, 31%, and 54% of subjects with CVD, respectively. However, 20% of respondents were unable to name even one independent risk factor for heart disease.

Of the 105 subjects surveyed, 73% believed that heart disease could be prevented. To examine respondents' knowledge of the association of cholesterol with heart disease, the survey included six true/false statements. While the majority of respondents answered most of the individual statements correctly, 68.6% answered all six statements correctly.

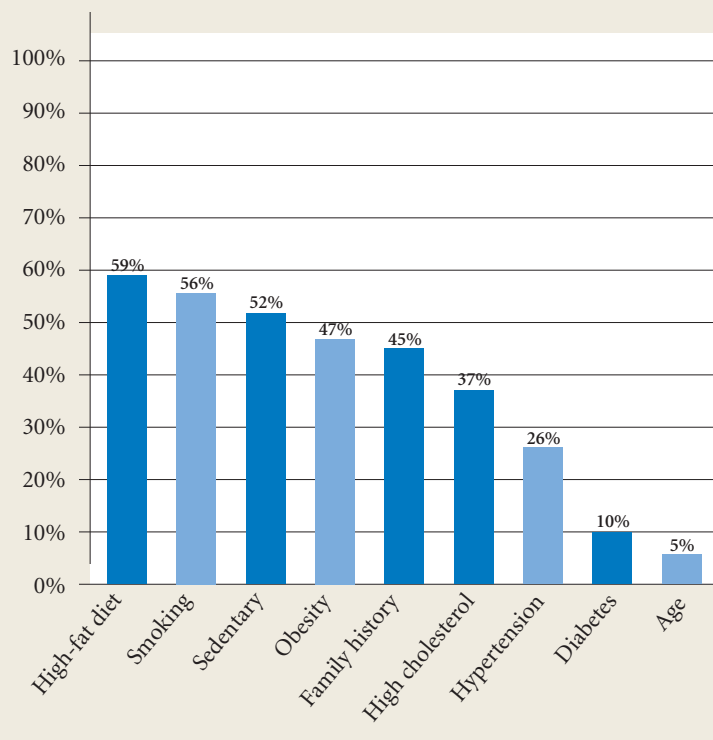
Respondents were asked if they had heard of low-density lipoprotein cholesterol (LDL-C) and high-density lipoprotein cholesterol (HDL-C) and to explain what they were and the importance of each. While 97% and 92% had heard of LDL-C and HDL-C, respectively, 20% and 58% of respondents could not explain the reason why LDL-C was

**TABLE 2**  
Respondent demographics

Male	44%
Female	56%
Average age (yr ± SD)	65 ± 11.3
<b>Cardiac risk factor history*</b>	<b>%</b>
Cardiovascular disease	42
Diabetes mellitus	11
Hypertension	50
Current smoker	16
Family history of heart disease	32
<b>Cardiac risk level</b>	
Very high	42
High	29
Moderate	9
Low	20
<b>Highest level of education</b>	
Grades 1 to 9	8
High school	40
Technical	5
College/university	37
Postgraduate	9

\*Data are not mutually exclusive.

**FIGURE 1** Respondents' identification of cardiovascular risk factors\*



\*Data are not mutually exclusive.

## While 82% and 91% of respondents said that knowing their target and actual cholesterol levels was important, only 23% and 29% actually did keep track of their HDL-C and LDL-C levels, respectively

known as the “bad” cholesterol and HDL-C, the “good” cholesterol. Furthermore, despite the fact that 82% and 91% of respondents felt it important to know their target and actual cholesterol levels, only 23% and 29% indicated that they knew their levels, respectively.

Most (60%) respondents indicated that their family physician or pharmacist was their main source of information about the purpose of taking cholesterol-lowering medication. Twenty percent of respondents indicated that their health care provider did not explain their cholesterol-lowering medication with regards to the reason for taking medication, how long it had to be taken, and its potential side effects. With respect to respondents’ knowledge of their specific cholesterol-lowering medications, most of those surveyed (81%) could correctly name the cholesterol-lowering medication they were taking, and 36% could also correctly identify the dose of the medication. Severe muscle aches and effects on the liver were cited by 12.5% and 9.6%, respectively, as potential side effects; however, 50% of respondents could not name any side effects to be aware of with their medication. Although 64% felt that they would need to continue taking their cholesterol-lowering medication if and when their cholesterol levels returned to normal, 36% were unsure of the duration of therapy or believed they could discontinue the therapy.

### Discussion

Numerous studies have been conducted that have focused on interventions to close the treatment gap in managing dyslipidemias. They have focused primarily on physician and health care system factors.<sup>13-17</sup>

Although patient-related factors are also an important area of research, they have not been as extensively evaluated except in the area of cholesterol-lowering medication adherence.<sup>5,6</sup> The National Cholesterol Education Program clinical practice guidelines (NCEP ATP III) suggest that one way to improve adherence to these guidelines is to focus on the patients by involving them in their own care.<sup>4</sup> We conducted this survey to determine respondents’ knowledge of a variety of issues surrounding cholesterol risk management. The data collected from this survey could be useful in determining whether or not there is a need to bet-

ter educate patients on cholesterol risk and, if so, it could offer guidance in the design of patient-specific interventions to improve knowledge.

We found that only approximately one-third of respondents identified high cholesterol as a risk factor for heart disease, despite the fact that all respondents had been taking cholesterol-lowering medication at least six weeks prior to the survey. Furthermore, except for smoking, less than half of respondents were able to identify major CVD risk factors, such as hypertension or diabetes. (Our results are similar to others. The Canadian Heart Health Survey interviewed over 20,000 people across Canada and found that 27% spontaneously identified high cholesterol, 52% identified smoking, and 22% identified hypertension as cardiac risk factors.<sup>8</sup>) Although not mentioning a particular risk factor does not necessarily translate to not knowing it, these results would still suggest that better educational efforts in CVD risk factor identification may be necessary.

Most respondents felt that it was important to know their target and actual cholesterol levels, yet most (77% and 71%, respectively) did not know either of these levels. A survey of adults over 40 years of age found that 51% of respondents did not know their total cholesterol levels.<sup>9</sup> If patients feel this knowledge is important, then it is possible that simple education on target and individual cholesterol levels may provide incentive for patients to remain on therapy and/or seek medical treatment from physicians. Indeed, research from other areas suggests that educating patients to take control of their own health improves outcomes.<sup>18-21</sup>

### Limitations

Our study had a number of limitations:

- The survey was not validated for construct; however, content and face validity were assessed.
- There may have been selection bias in the population surveyed, so the responses may not be generalizable. We attempted to randomly select pharmacies from different geographic areas of Edmonton; however, it is possible that the pharmacists who agreed to participate may have been providing a higher-than-average level of patient care.
- The subjects who agreed to participate may have been more knowledgeable of the issues surround-

ing cholesterol risk management than the general population.

• We did not attempt to correlate level of knowledge with clinical outcomes, such as cholesterol levels.

## Conclusion

Our results indicate that there are gaps in patient knowledge of various issues surrounding cholesterol risk management, particularly in identifying

high cholesterol as a cardiac risk factor, knowing target and specific individual cholesterol levels, and understanding the duration of therapy. Health care professionals and pharmacists, in particular, are in an excellent position to provide better education to patients about cholesterol risk and management. Further research is required to determine whether improved patient knowledge leads to improved clinical outcomes. ■

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