



# the **Translator**

Canadian Pharmacy ► Research ► Health Policy ► Practice ► Better Health

## Pharmacists help improve hypertension management

This issue of *the Translator* highlights research demonstrating how pharmacists can help manage patients' high blood pressure.

- Systematic review and meta-analysis concludes that pharmacists' interventions significantly reduce systolic blood pressure
- Pharmacist and nurse teams improve blood pressure control among patients with diabetes
- Interventions at community pharmacies lower systolic blood pressure among high income earners
- Cost-benefit analysis reveals value for pharmacist-led hypertension programme

### Systematic review and meta-analysis concludes that pharmacists' interventions significantly reduce systolic blood pressure

Machado M, Bajcar J, Guzzo GC, Einarson TR. Sensitivity of patient outcomes to pharmacist interventions. Part II: systematic review and meta-analysis in hypertension management. *The Annals of Pharmacotherapy*. 2007; 41: 1770-1781.

**Issue:** High blood pressure (BP) is a health condition that affects a significant proportion of the population and accounts for 5.8% of total deaths worldwide.<sup>1</sup> Although pharmacists are the most accessible health care professionals, few studies have quantitatively examined pharmacists' interventions in the control and prevention of high BP.

**A solution:** A systematic review and meta-analysis was conducted to identify and evaluate pharmacists' interventions in the management of patients with high BP. Studies included in the systematic review were primarily conducted in medical clinics and community pharmacies. The

**77% of studies evaluating patients' systolic blood pressure were sensitive to pharmacists' interventions.**

most common interventions (82%) were medication management (e.g. drug dosage adjustments), and education about high blood pressure (68%). This included verbal information about the disease and the role of medications, diet and exercise to help improve patients' health.

Outcomes that were further evaluated using meta-analysis included systolic and diastolic BP reductions, adherence to

treatment, patients' medication/disease knowledge, and quality of life.

Pharmacist-sensitive outcomes were defined by the authors as outcome indicators that focus on how patients, and their conditions, are affected by their interaction with a pharmacist. The outcomes that were able to be evaluated were categorized into 4 sensitivity categories: definitely sensitive, possibly sensitive, possibly not sensitive, and definitely not sensitive to pharmacist interventions. An outcome was categorized as definitely sensitive only if meta-analysis found that a clinically important and statistically significant difference. Similarly, definitely not sensitive outcomes had to be derived from

<sup>1</sup>World Health Organization. Cardiovascular diseases. [www.who.int/cardiovascular\\_diseases/en](http://www.who.int/cardiovascular_diseases/en). Last accessed October 28, 2009.

<sup>2</sup>Please see Table 1 in original article for further description.

## Systematic review and meta-analysis concludes that pharmacists' interventions significantly reduce systolic blood pressure

meta-analytic results; however, they were so designated only if results that were neither clinically nor statistically significant were determined. Outcomes were labeled possibly sensitive or possibly not sensitive if results were positive or negative, respectively, based on descriptive information but no clinical or statistical conclusions could be drawn.<sup>3</sup>

Of these outcomes, systolic BP was determined to be 'definitely-sensitive' to pharmacists' interventions (both clinically and statistically significant), as it was

reduced  $6.9 \pm 12.0$  mm Hg more than the standard care group ( $p = 0.047$ ). Patient knowledge of medications or disease was suggested to be 'possibly sensitive,' while diastolic BP, adherence and quality of life were determined to be 'possibly not sensitive,' as pharmacists' interventions did not have a significant influence.

**Implications:** Systolic BP is generally less controlled than diastolic BP<sup>3</sup> and can be significantly influenced by pharmacists' interventions. Other outcomes may also

be sensitive to interventions; however, further research is required to support this claim. Future studies should also examine the clinical impact of pharmacists' interventions in the management of BP for high-risk/complex patients where interventions may be more significant. Limitations to the study include the potential for publication bias, the evaluation of some outcomes found in only a small number of studies, and the inability to assess the quality of the interventions performed in the studies.

<sup>3</sup>Izzo JL Jr, Levy D, Black HR. Importance of systolic blood pressure in older Americans. *Hypertension* 2000; 35: 1021-4.

### Background or research methods:

*International Pharmaceutical Abstracts*, MEDLINE, EMBASE, the Cochrane Central Register of Controlled Trials and 3rd Quarter secondary databases were searched from the start of the study to the end of December 2006. Search terms included hypertension, pharmaceutical services or pharmaceutical care

and patient outcomes. Two independent reviewers identified 28 articles that met the inclusion criteria. Outcomes were categorized based on qualitative and quantitative assessment of the study results to determine the 'sensitivity' to pharmacists' interventions. Data were also extracted from controlled clinical trials and combined in a meta-analysis

to evaluate reductions in systolic and diastolic BP from pharmacists' interventions compared to standard care. □

**Financial Support:** Funding for this research was provided by the Ontario Ministry of Health and Long Term Care – Health Care Outcomes.

## Pharmacist and nurse teams improve blood pressure control among patients with diabetes

McLean DL, McAlister FA, Johnson JA, King KM, Makowsky MJ, Jones CA, Tsuyuki RT. A randomized trial of the effect of community pharmacist and nurse care on improving blood pressure management in patients with diabetes mellitus. *Arch Intern Med.* 2008; 168(21): 2355-2361.

**Issue:** The risk of early heart disease is significantly increased in patients with both diabetes and high blood pressure (BP),<sup>4</sup> yet more than 88% of patients with diabetes and high BP are still not reaching the optimal level of <130/80 mm Hg.<sup>5</sup>

**A solution:** The Study of Cardiovascular Risk Intervention by Pharmacists – Hypertension (SCRIP-HTN) sought to determine the efficacy of multidisciplinary interventions by pharmacists and nurses on BP control in patients with diabetes. The pharmacist-nurse teams collaborated with patients and their family physicians to improve BP control. Community pharmacist-nurse teams educated patients in the intervention group about diet and exercise as strategies to reduce



Targeted intervention in hypertensive patients with diabetes may improve cardiovascular outcomes.

BP, motivated patients to take control of their BP and shared patients' BP readings and guideline recommendations with the patients' family physicians.

**Implications:** After six months, systolic blood pressure (SBP) was reduced by 5.6 mm Hg more among those who received the intervention. The subgroup of patients with the poorest BP control at baseline (SBP greater than 160 mm Hg), benefited the most from the intervention with a 24.1 mm Hg greater reduction compared to those who received usual care.

This study suggests that community pharmacist-nurse teams effectively collaborate with patients and physicians to improve BP management in patients with poor BP control. The implementation of this type of service requires means for reimbursing pharmacists and nurses for providing this service.

<sup>4</sup>Sowers JR, Epstein M, Frohlich ED. Diabetes, hypertension and cardiovascular disease: an update. *Hypertension.* 2001; 37: 1053-1059.

<sup>5</sup>Hypertension 2008. Public Recommendations. <http://hypertension.ca/bpc/wp-content/uploads/2008/02/2008publicrecommendations.pdf>. Last accessed Nov. 6, 2009.

**Background or research methods:** This multi-centre, randomized controlled trial, was conducted in 14 community pharmacies in Edmonton, Alberta. It was established to determine the difference in SBP among patients receiving enhanced care compared to usual care between baseline and 24 weeks. Adult patients with type 1 or type 2 diabetes and BP >130/80 mm Hg were identified

on two screening visits two weeks apart. Patients were randomized to receive the intervention or usual care from the pharmacist-nurse teams. Patients receiving the intervention were seen every six weeks, while those in the usual care group received a telephone follow up at 12 weeks and a final in-person visit at 24 weeks. All procedures were taken from the Canadian Hypertension Education

Program guidelines. □

**Financial Support:** SCRIP-HTN is supported by grants from the Canadian Diabetes Association, Heart and Stroke Foundation of Canada, Canadian Council of Cardiovascular Nurses, Alberta Heritage Foundation for Medical Research and Merck Frosst Canada Ltd. ManthaMed provided BpTru devices.

# Interventions at community pharmacies lower systolic blood pressure among high income earners

Chabot I, Moisan J, Grégoire JP, Milot A. Pharmacist intervention program for control of hypertension. *The Annals of Pharmacotherapy*. 2003; 37: 1186-1193

**Issue:** Although high blood pressure (BP) is common in North America, only 16% of Canadians have adequate control of this condition.<sup>6</sup> Previous studies have reported significant increases in pharmacists' workload to help improve patients' BP control. For this study, BP control (systolic/diastolic) was defined for patients less than 60 years as <140/90 mmHg, and for patients greater than 60 years as <160/90 mmHg.<sup>7,8</sup>

**A solution:** A computer-based pharmacist intervention program that could be easily integrated into an average pharmacy workday was piloted in community pharmacies to examine its impact on patients' BP levels and BP control.

Family income was found to inter-

act significantly with the intervention; therefore participants were stratified by income level to further measure program effects. For example, although the lower income group was found to have more BP measurements during the study, the mean number of pharmacist interventions per patient was higher among the high-income earners.

Pharmacists' interventions focused on improving BP control proved to be beneficial for systolic blood pressure (SBP) in the high-income group, ( $-7.8 \pm 2.9$  mm Hg compared to control  $+0.5 \pm 2$  mm Hg;  $p=0.01$ ). No significant impact on diastolic blood pressure (DBP) was observed. By the end of the study, a greater percentage of high-income patients receiving the pharmacist intervention (69%) had con-

trolled BP readings compared to those receiving usual care (42%).

**Implications:** This study demonstrated that a pharmacist intervention program may be useful in improving health outcomes. However, future studies should consider the impact of socioeconomic status on the effect of pharmacist interventions. Barriers to successful interventions in low-income populations must be identified to devise health promotion programs suitable for all family income levels. The study was not randomized, and baseline characteristics between the control and intervention groups were different, which are significant limitations to the study.

<sup>6</sup>Joffres MR, Ghadirian P, Fodor JG, Petrasovits A, Chockalingam A, Hamet P. Awareness, treatment, and control of hypertension in Canada. *Am J Hypertens*. 1997 Oct;10(10 Pt 1):1097-102.

<sup>7</sup>Reeves RA, Fodor JG, Gryfe CI, Patterson C, Spence JD. Report of the Canadian Hypertension Society Consensus Conference: 4 Hypertension in the elderly. *CMAJ*. 1993; 149: 815-20.

<sup>8</sup>Canadian Hypertension Education Program. <http://hypertension.ca/chep/recommendations/diagnosis-assessment/follow-up-criteria-for-diagnosis-recommendations>. Last accessed 26 October, 2009.

**Background or research methods:** In 1998, nine community pharmacies in Quebec City were selected to participate in this nine-month study. Four pharmacies implemented the pharmacist intervention program, while the other five operated as the usual care/control. Of the 100 patients who completed the study, 41 were exposed to the intervention and 59 received usual care. At the

intervention pharmacies, the pharmacists used a computer-based intervention program aiming at improving BP control through an increase in treatment adherence and an optimization of treatment. The impact of the intervention program was determined by BP measurements taken by blinded researchers during six scheduled home visits, three at baseline and three following the intervention.

Adherence was determined from prescription refill records and self-reported adherence. □

**Financial Support:** Funding was provided by the Fonds de la recherche en santé du Québec and the Fonds d'enseignement et de la recherche de la Faculté de Pharmacie de l'Université Laval.

CPhA staff select articles to be included in each issue of the *Translator* without influence from Pfizer Canada or other sponsors. Dr. Chabot was a PhD candidate when this study was conducted. Dr. Chabot has been working at Pfizer Canada since 2005.



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May 15-18, 2010	Annual National Conference in Calgary, AB

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# Cost-benefit analysis reveals value for pharmacist-led hypertension programme

Côté I, Grégoire JP, Moisan J, Chabot I, Lacroix G. A pharmacy-based health promotion programme in hypertension – cost-benefit analysis. *Pharmacoeconomics*. 2003; 21(6): 415-428.

**Issue:** Pharmacists are ideally positioned to help patients improve adherence to and manage adverse events of their medications. The costs and benefits of pharmacists' interventions to improve health outcomes for patients with hypertension, however, are unclear.

**A solution:** In 1998, a pharmacy-based health promotion programme was designed to improve blood pressure (BP) control through pharmacist-led activities. This study examines the costs and benefits of this program. Direct costs, including the costs of medications, physician visits, hospitalizations and patients' travel; indirect costs, such as pharmacists' time invested in delivering the programme, and time invested by patients and their caregivers; and fixed costs for the required software were considered. Benefits of the programme were measured by cost savings to the health care system including treatment costs and small fixed costs. For this study 41 patients were exposed to the intervention and 59 were exposed to usual care.



**Implications:** On average the cost per patient of the intervention was \$30.68 CDN, while the benefits were calculated at \$295.46 CDN. The pharmacist-led programme was found to be cost effective for several reasons. First, the most frequent intervention provided by pharmacists was BP readings which were provided at

**The intervention programme benefits outweigh the costs by a ratio of almost 10 to 1.**

significantly lower cost than other possible interventions (e.g physician visits). Second, per capita programme fixed costs were low because of the high number of patients with hypertension. Finally, during the intervention period there were only  $10 \pm 2.6$  visits to the pharmacy by the intervention group. As a result, few interventions were recorded, therefore minimizing the costs of pharmacists' time.

Other considerations include the potential variability in cost savings in other provinces as the levels of hypertension in the patient population will affect the measure of per capita fixed expenses, and that the costs for one-hour training sessions at each pharmacy site were not included. It should also be noted that after the intervention, study participants were asked if they would be willing to pay for the programme; only two of the 41 patients indicated that they would. This study supports further research to examine the long term impact of this pharmacy-based programme on a larger study population.<sup>9</sup>

<sup>9</sup>Summary of the efficacy of this intervention is published in another research article and summarized in this issue of the Translator: Chabot I, Moisan J, Grégoire JP, Milot A. Pharmacist intervention program for control of hypertension. *The Annals of Pharmacotherapy*. 2003; 37: 1186-1193.

**Background or research methods:** Nine pharmacies in the Quebec City area participated in this nine-month study. Four pharmacies implemented the pharmacy-based health promotion programme, while the other five provided usual care. Of the 100 patients who completed the study, 41 were exposed to the intervention and 59 were not. The intervention

consisted of the pharmacist measuring and recording patient's BP at each prescription refill and an assessment of patient adherence to medications. An in-home questionnaire, administered before and after the intervention, was used to obtain patients' individual characteristics and their willingness to pay for the programme. □

**Financial Support:** Funding for this study was provided by the Fonds de la recherche en santé du Québec and the Fonds d'enseignement et de la recherche de la Faculté de Pharmacie de l'Université Laval in Quebec.

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## the Translator

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