ORIGINAL RESEARCH

PEER-REVIEWED

The MyHealthCheckup study: Training graduate students to implement cardiovascular risk screening programs in community pharmacies

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The MyHealthCheckup pharmacy initiative was based on the disease management services developed at the McGill Cardiovascular Health Improvement Program. We believe this pilot study demonstrates that community pharmacies are an ideal site for health promotion focusing on cardiovascular disease, diabetes and obesity.

L'initiative en pharmacie MonBilanSante s'inspire des services de gestion thérapeutique qui ont été mis en place dans le cadre du Programme d'amélioration de la santé cardiovasculaire de McGill. Nous croyons que ce projet pilote fait la preuve que les pharmacies communautaires sont un lieu idéal pour mener des programmes de promotion de la santé axés sur les maladies cardiovasculaires, le diabète et l'obésité.

ABSTRACT

Background: Hypertension is a major risk factor for cardiovascular morbidity and mortality. Despite this fact and the development of effective antihypertensive drug therapy, hypertension is often poorly controlled. Community pharmacies are an ideal site for the management of hypertension and other modifiable cardiovascular risk factors. The purpose of the current study was to develop and assess a pharmacy-based cardiovascular risk screening program implemented by graduate students.

Methods: Four graduate students trained as health coaches screened a convenience sample of adults who were interested in cardiovascular risk assessment in 21 Montreal area pharmacies. On the screening day, we assessed cardiovascular risk factors, including blood pressure, used the Cardiovascular Life Expectancy Model, which includes cardiovascular age, to inform patients of their personalized risk profile, delivered an individualized health coaching intervention and conducted a participant satisfaction survey. This was followed by an individualized health coaching intervention. The intervention program was implemented by trained graduate students and supported by pharmacists.

Results: Among the 238 patients who participated (57% female, mean age 60.6 years), 67% had a body mass index (BMI) greater than 25 kg/m^2, 52% had abdominal obesity, 58% reported insufficient physical activity and 14% were smokers. A total of 120 patients (51%) were taking antihypertensive medication, yet 63 (53%) had blood pressure readings above currently accepted targets. Higher BMI and physical inactivity were associated with increased rates of poorly controlled hypertension.

Conclusion: The screening program identified individuals with modifiable cardiovascular risk factors and poorly controlled hypertension. The intervention program was well received by participants and the majority provided contact information for future cardiovascular screening clinics. These findings support the feasibility of screening programs run by graduate students in the pharmacy setting. *Can Pharm J* 2012;145:268–275.

Introduction

Hypertension is a primary risk factor for the development of cardiovascular disease (CVD), yet it remains untreated or undertreated in many Canadians.[1,2] Recently, McAlister and colleagues reported that 20% of Canadians have hypertension and 35% of adults with hypertension fail to keep their blood pressure below recommended targets despite taking antihypertensive medication.[3,4] Awareness and management of hypertension in Canada has improved substantially over the past 20 years, including marked increases in

prescriptions for antihypertensive medications and increased education (i.e., Canadian Hypertension Education Program).[3] While health care professionals in Canada have made strides toward reducing the prevalence of hypertension, there is still room for improvement. Proper detection and management of hypertension and other cardiovascular risk factors have enormous potential to reduce the burden of CVD among Canadians.[2,5]

Hypertension contributes to more excess death than any other modifiable cardiovascular risk factor.[6] In addition to pharmacologic treatment, lifestyle behaviours, such as smoking cessation, weight loss and physical activity, have been associated with significant reductions in blood pressure in both men and women.[6,7] Despite the evidence linking healthy lifestyle behaviours with decreased hypertension and cardiovascular risk,[8] our health care system provides limited access to professionals who can support patients as they make lifestyle changes.[9] Even patients who have been diagnosed with hypertension and have been prescribed medication to control their blood pressure have limited access to resources to assist with cardiovascular risk reduction and lifestyle modification.

Community pharmacies are an ideal site to assist in the management of cardiovascular risk factors, since many individuals already being treated for hypertension or CVD regularly refill prescriptions in these pharmacies.[2,10,11] Pharmacists are a knowledgeable and often underutilized source of health information.[12] Community pharmacists have also identified themselves as being interested in playing a more active role in health promotion and disease prevention.[12,13] Pharmacies are easily accessible to all individuals and while many patients have difficulties accessing primary care physicians, there is no wait-list associated with scheduling an appointment to consult with a pharmacist.[14] Recent changes in provincial legislation have broadened the role and scope of pharmacists beyond dispensing medications, in order to promote the effective and efficient delivery of health care services across the country.[15] For example, in Quebec, pharmacists may render their opinion on the quality of pharmacotherapy of a patient through a process called "pharmaceutical opinion."[16] To promote medication adherence and understanding in Ontario, patients taking more than 3 medications (prescription or nonprescription) are eligible for an annual 30-minute consultation with a pharmacist under the provincially funded MedsCheck program.[15]

A recent meta-analysis of randomized controlled trials confirmed the utility of pharmacy-based intervention programs for the management of cardiovascular risk factors.[14] Pharmacy-based interventions resulted in improved control of blood pressure and cholesterol levels (total cholesterol and LDL cholesterol). This systematic review confirms the role community pharmacies can play in the management of CVD.[14] However, the review did not conclude whether interventions led by pharmacists alone or implemented in collaboration with health care professionals were associated with better outcomes.[14] As such, the objectives of the current study were to train graduate students to implement hypertension screening programs in community pharmacies and to assess the suitability of community pharmacies as sites for health coaching to promote lifestyle modification to improve CVD risk factors. The goal of the screening program was to identify modifiable cardiovascular risk factors among patients with or without a previous diagnosis of hypertension.

KNOWLEDGE INTO PRACTICE

- Detection and management of hypertension and other cardiovascular risk factors will reduce the prevalence of cardiovascular disease in Canada.
- Community pharmacies are an easily accessible site for cardiovascular risk screening and pharmacists are interested in playing an increased role in health promotion.
- Individuals at risk for cardiovascular disease are willing to participate in pharmacy-based cardiovascular risk screening programs.
- Training graduate students as health coaches is an effective tool for increasing awareness of cardiovascular risk factors in community pharmacies.

Methods

The study was conducted between July 2009 and April 2010 in community pharmacies located in Montreal, Quebec. Consent was obtained from the McGill University Research Ethics Board. The study protocol underwent peer review and was supported by the MITACS Accelerate program. Twenty-five pharmacies were selected for participation and 21 consented to participate. Given the descriptive nature of the study and the specific focus on feasibility, no sample size calculation was conducted. The pharmacies selected for participation were located in downtown Montreal and easily accessible by the public.

The senior pharmacist in each pharmacy was approached by a health coach and invited to have their pharmacy participate in the study. Pharmacists who consented to participate were asked to

MISE EN PRATIQUE DES CONNAISSANCES

- Le dépistage et la prise en charge de l'hypertension et d'autres facteurs de risque cardiovasculaire réduiront la prévalence des maladies cardiovasculaires au Canada.
- Les pharmacies communautaires sont des lieux facilement accessibles pour mener des programmes de dépistage du risque cardiovasculaire, et les pharmaciens souhaitent jouer un plus grand rôle dans la promotion de la santé.
- Les personnes qui présentent un risque de maladie cardiovasculaire sont disposées à participer à des programmes de dépistage offerts en pharmacie.
- La formation des étudiants diplômés à titre de conseillers en santé est un moyen efficace d'instaurer, dans les pharmacies communautaires, des programmes de sensibilisation aux facteurs de risque cardiovasculaire.

recruit a convenience sample of 15 to 20 clients for participation in a cardiovascular risk screening day. Consenting pharmacists were given bilingual posters and flyers to distribute to their clientele. The posters instructed interested clients to approach the pharmacy counter to schedule an appointment for the screening day. Additionally, pharmacists and pharmacy assistants invited clients filling prescriptions for any medications, either related to CVD or otherwise, to sign up for an appointment. Through the use of posters as well as pharmacist-initiated recruitment, we endeavored to avoid self-selection or volunteer bias. Both men and women were eligible to participate as long as they were over the age of 18 years and able to communicate in either English or French. The primary role of the pharmacist was to assist with recruitment, arrange material support for the screening day (i.e., private consultation room) and answer medication-related questions arising during the screening appointment.

On the screening day, participants presented to the pharmacy's consultation room at the prearranged screening time and were instructed to read and sign an informed consent and complete a health history questionnaire. The health history questionnaire collected basic demographic information (e.g., age, sex, ethnicity), CVD status, family history of CVD, diabetes status and family history of diabetes, use of medications, smoking status and 7-day physical activity recall. Screening appointments were run by one of the 4 trained graduate students and were 30 minutes in length. Screening appointments consisted of 3 components: 1) anthropometric measurements, 2) cardiovascular risk assessment and 3) health coaching. Anthropometric measurements included weight, height, waist circumference and blood pressure. Excess body weight was defined as a body mass index (BMI) greater than 25 kg/m^2. Abdominal obesity was defined as a waist circumference greater than 88 cm for women or 102 cm for men. Blood pressure was measured twice using an appropriately sized arm cuff, with a wait of approximately 10 minutes between readings. The lower of the 2 measurements was used. Measurements were taken in a quiet room with the participant seated and his or her arm supported by an armrest. Standardized measurement protocols and an automatic oscillometric device (Life-Source UA 767 Plus machine; A&D Engineering Inc., San Jose, CA, USA) clinically validated by the Association for Advancement of Medical Instrumentation were used.[17,18] The Life-Source UA 767 machine has been used to measure blood pressure in previous research studies and is endorsed by Hypertension Canada.[2,18] In 2006, the Life-Source UA 767 was recommended by the Canadian Hypertension Education Program as a validated monitor for pharmacists to use to assess blood pressure.[18]

Using the information from the health history questionnaire and the measurements collected by the health coach, a personalized cardiovascular risk profile was created for the participant based on the Cardiovascular Life Expectancy Model.[2,19] Patients with missing cholesterol values were assigned imputed age- and sex-specific Canadian average cholesterol values.[19] The 1-page risk profile contained the individual's 10-year risk of developing CVD, their "cardiovascular age" and the potential benefits of lowering modifiable risk factors to recommended target values.[19] The patients received a copy of the risk profile to take home and discuss with their physician at their discretion. The individual's cardiovascular age was calculated as their age minus the difference between their estimated remaining life expectancy (adjusted for their coronary and stroke risk) and the average remaining life expectancy of Canadians of the same age and sex. For instance, a 50-year-old with a life expectancy of 25 more years (vs 30 years for the average Canadian) would be assigned a cardiovascular age of 55.[19] After discussing the CVD risk profile, the health coach then discussed strategies for smoking cessation, increasing physical activity levels or weight reduction, depending on the needs and interests of the individual. Following the screening appointment, the cardiovascular risk profile and healthy lifestyle information were made freely available to the participants on the bilingual MyHealthCheckup website (www.myhealthcheckup.com or www.monbilansante.com). All data were entered into a secure computer data-

base at the time of the screening and participant information was saved on a password-protected computer.

At the end of the health coaching session, participants were asked to anonymously complete a 3-item questionnaire assessing the intervention program (e.g., "How helpful was the information provided in the health coaching session?"), along with an open-ended question asking for additional comments. Participants rated the intervention on a 5-point Likert-like scale ranging from "very helpful" to "not helpful at all." To minimize the influence of social desirability bias, health coaches left the screening room while this questionnaire was being completed.

Preliminary data analyses were conducted to assess the accuracy of data entry and the assumptions of multivariate analyses. Descriptive statistics, including means, medians, standard deviations, skewness and kurtosis, were calculated for all variables. Multivariate logistic regression was used to test the main study objectives. The study data were analyzed using STATA 11.0 (STATA Corporation, College Station, TX, USA).

Health coach training

Four bilingual graduate students from Canadian universities were recruited to be trained as health coaches for this project. The graduate students came from a range of health-related backgrounds: pharmacology, nutrition, kinesiology and public health. The health coach training program consisted of 7 modules: 1) Principles of Health Coaching, 2) Cardiovascular Disease, 3) Diabetes, 4) Physical Activity, 5) Nutrition, 6) Weight Loss and 7) Smoking Cessation. A description of each of the training modules is provided in Table 1. Trainees were required to learn the content of all 7 modules and complete a face-to-face evaluation to successfully complete the health coach training. The evaluation was completed by a team of health care professionals consisting of a physician, exercise physiologist and nurse.

The health coaches were trained to use motivational interviewing to promote health behaviour change.[20,21] Motivational interviewing is defined as a "directive, client-centered counseling style for eliciting behaviour change by helping clients to explore and resolve ambivalence" (p. 325).[20] As described in the Transtheoretical Model, behaviour change is a process that progresses through 5 stages: pre-contemplation, contemplation, preparation, action and maintenance.[21] The coaches used motivational interviewing to identify participants' readiness to change their diet, physical activity level or smoking habits and to provide them with stage-appropriate information on how to make a change. Participants interested in making a behaviour change were provided with relevant resources, such as Canada's Food Guide, Canada's Physical Activity Guide to Healthy Living or the Canadian Cancer Society's book *One Step At a Time: For Smokers Who Want to Quit*.

Results

The participants found that the health coaching intervention provided by the graduate student health coaches was informative and provided useful cardiovascular risk information. The health coaches successfully implemented the screening program in 21 community pharmacies, demonstrating the suitability of community pharmacies as sites for health coaching interventions. The intervention and information provided was rated as "very helpful" by 79% of participants and 20% rated the intervention as "helpful." Comments provided by participants were overwhelmingly positive. When asked if they were interested in providing their contact information for future pharmacy health coaching sessions, 85% voluntarily provided their telephone number and/or e-mail address. The high proportion of participants who rated the intervention as at least "helpful" (99% of participants) and voluntarily provided their contact information is an indication that the interven-

TABLE 1 Description of the health coaching modules and key learning objectives

Module	Key learning objectives
Module 1 Principles of Health Coaching	• Stages of Change Model • Motivational interviewing • Conducting a health coaching session
Module 2 Cardiovascular Disease	• Risk factors for cardiovascular disease • Cardiovascular risk assessment
Module 3 Diabetes	• Risk factors for diabetes • Diabetes risk assessment
Module 4a Physical Activity Theory	• Benefits of physical activity • Risks of inactivity • Physical activity and chronic health conditions
Module 4b Physical Activity Practical Advice	• Canada's Physical Activity Guide to Healthy Living • Exercise recommendations for special populations • Barriers to physical activity
Module 5 Nutrition	• Canada's Food Guide for Healthy Eating • Obesity and nutrition • Sodium consumption
Module 6 Weight Loss	• Physiology of weight loss • Tools to support weight loss
Module 7 Smoking Cessation	• Benefits of quitting smoking • Strategies for quitting • Anticipating challenges

tion was positively received by participants.

Included in the present analyses are 238 individuals between 20 and 89 years of age (mean age 60.6 ± 14.3 years). The mean systolic blood pressure was 133 mm Hg (SD 19.9, range 87 to 199 mm Hg) and mean diastolic blood pressure was 76.05 mm Hg (SD 10.5, range 51 to 109 mm Hg). Among the participants, 51% reported taking antihypertensive medication and 36% reported taking medication for hyperlipidemia. Unhealthy lifestyles were common among the participants, including excess body weight (67%), insufficient regular physical activity (0–720 METs [metabolic equivalent of task] per week; 58%) and abdominal obesity (52%). Smoking was reported by 14% of participants. Age, diabetes, CVD, BMI, abdominal obesity and taking medication for hyperlipidemia all showed a statistically significant relationship with taking antihypertensive medication (Table 2; $p < 0.05$).

Among individuals taking antihypertensive medication ($n = 120$), 53% were still above the target blood pressure for treated patients defined by the Canadian Hypertension Education Program. Target blood pressure in treated patients is defined as 140/90 mm Hg and among people with diabetes, as 130/80 mm Hg. The mean blood pressure among individuals on antihypertensive medication was 139/77 mm Hg, while the mean blood pressure among those not taking medication for hypertension was 126/74 mm Hg. The participants taking antihypertensives were, on average, 10 years older than those not taking medication (65 years vs 55 years, respectively). Antihypertensive medication was particularly common among participants who were insufficiently active (62.5%), those with abdominal obesity (62.5%) and those with a BMI greater than 30 kg/m^2 (47%). Approximately twice as many participants on antihypertensive medication had a BMI greater than 30 kg/m^2 compared to those not on antihypertensives.

A high proportion of participants in the present study had one or more modifiable risk factors for the development of CVD (Figure 1). Risk factors included excess weight, waist circumference greater than 102 cm for men or 88 cm for women, cigarette smoking and physical inactivity (< 720 METs/week). Among the study participants, 87% had one or more modifiable risk factors (23% had 1 risk factor, 28% had 2 risk factors and 35% had 3 or

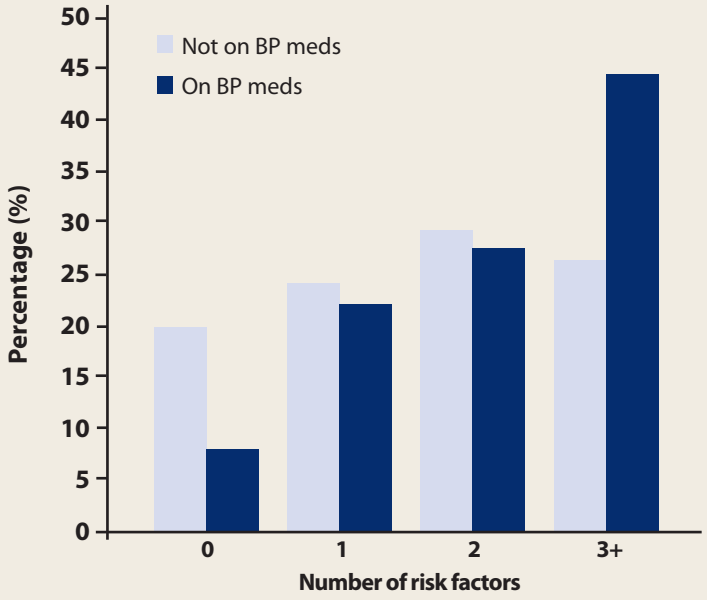
TABLE 2 Clinical characteristics of participants stratified by medication usage for hypertension

Characteristic*	Total sample ($n = 238$) No. (%)	Not on antihypertensive medication ($n = 115$) No. (%)	On antihypertensive medication ($n = 120$) No. (%)	*p*-value
Age (years)				< 0.001
<50	60 (25.2)	45 (39.1)	14 (11.7)	
50–59	46 (19.3)	26 (22.6)	20 (16.7)	
60–70	59 (24.8)	19 (16.5)	39 (32.5)	
>70	73 (30.7)	25 (21.7)	47 (39.2)	
Female	135 (56.7)	70 (60.9)	64 (53.3)	0.24
Has diabetes	48 (20.2)	14 (12.2)	33 (27.5)	0.003
Has CVD	28 (11.7)	6 (5.2)	21 (17.5)	0.003
Taking drugs for hyperlipidemia (%)	85 (35.7)	22 (19.1)	63 (52.5)	< 0.001
Above target blood pressure	95 (39.9)	31 (26.9)	63 (52.5)	< 0.001
BMI (kg/m^2)				<0.001
18–24.9	78 (33.1)	49 (42.6)	28 (23.7)	
25–29.9	78 (33.1)	42 (36.5)	35 (29.7)	
>30	80 (33.9)	24 (20.9)	55 (46.6)	
Abdominal obesity	124 (52.1)	47 (40.9)	75 (62.5)	0.001
Exercises less than 720 METs/week	137 (57.6)	60 (52.2)	75 (62.5)	0.11
Currently smokes	34 (14.3)	20 (17.4)	14 (11.7)	0.21

*Medication information was missing for 3 participants and BMI information was missing for 2 participants; METs: metabolic equivalent of task.

more). There was a significant difference between the number of risk factors present for those taking antihypertensive medication compared with those not taking medication ($p = 0.007$). Figure 1 presents the number of risk factors among participants by medication status. Among individuals on antihypertensive medication, a small percentage of participants (6%) had no cardiovascular risk factors, compared to 20% of participants not on antihypertensives. The greatest discrepancy between the medication groups occurred with the highest risk factor level. A high proportion of participants taking medication had 3 or more risk factors (43%), while 27% of those not taking medication had a similar number of risk factors.

FIGURE 1 Number of cardiovascular risk factors in participants currently taking antihypertensive medication versus participants not on medication



Discussion

Control of hypertension and the management of cardiovascular risk factors are important to reduce the incidence of CVD in Canada. The results demonstrated that cardiovascular risk assessment, including hypertension screening, was feasible and well received by participants. The intervention was rated very highly by the majority of participants. Moreover, the present results are promising in that they demonstrate that individuals with hypertension, or those at high risk for developing hypertension, will make appointments for and return to the pharmacy to attend pharmacy-based intervention programs for CVD risk reduction. The high proportion of participants in the study with one or more cardiovascular risk factors underscores the fact that it is not just the "worried well" who are willing to attend a pharmacy-based cardiovascular risk screening program.

Despite not being a random sample of pharmacy clientele, the participants' risk factor statistics were consistent with Canadian national estimates. The Canadian Community Health Survey estimated that 91% of Canadian adults have one or more cardiovascular risk factors; 22% have 1 risk factor, 29% have 2 risk factors and 40% have 3 or more risk factors.[22] Of the 238 people screened in this study, 86% had 1 or more cardiovascular risk factors: 23% had 1 risk factor, 28% had 2 risk factors and 35% had 3 or more. The proportion of people with blood pressure above target values in the sample (40%) was twice the national estimate (20%). This is not surprising, as patients with hypertension or related medical conditions are more likely to visit the pharmacy than patients without hypertension or comorbidities.[3] Using community pharmacies as a site to increase awareness of cardiovascular risk factors and provide easy access to support for health behaviour change has been shown to be effective in this study, as well as elsewhere in the scientific literature.[23] These findings highlight a gap in the care of a particular high-risk group: individuals with diagnosed hypertension who are taking blood pressure medication. A significant proportion of participants on blood pressure medication were still hypertensive and had room for improvement with respect to their cardiovascular risk factors. Individuals taking antihypertensive medication must return to the pharmacy on a regular basis to refill their prescriptions, which presents a perfect opportunity for ongoing monitoring and lifestyle coaching. Our results provide further support for the position that pharmacy clientele are interested in pharmacy-based health promotion programs for hypertension management.[14]

A recent systematic review revealed that the majority of published, pharmacy-based intervention research has focused on the pharmacist or other health care professionals as the primary interventionist.[14] However, pharmacists have identified time constraints as the primary reason why they fail to integrate health promotion and CVD prevention programs into their daily pharmacy practice.[12] The results of this study highlight the potential for the creation and ongoing implementation of screening programs supervised and supported by pharmacists, but implemented by graduate students in the community. Although we did not formally assess pharmacist satisfaction with the program, pharmacists felt that the pro-

gram was feasible and were willing to participate. Interventions that train graduate students appear both cost-effective and sustainable. Many graduate students seek to augment their academic training by gaining hands-on experience working in health care settings. Future intervention programs could explore using pharmacists' knowledge and expertise by involving them in the training of graduate student health coaches. Considering that graduate students successfully implemented the health coaching intervention in the present study, future research could explore the possibility of using pharmacy assistants to deliver health promotion interventions. Such a strategy would allow for programs to be offered at the pharmacy level without adding to the workload of pharmacists. Alternatively, pharmacy assistants could be trained to complete more pharmacy-related tasks to enable pharmacists to participate in health promotion interventions. Pharmacists have also identified a lack of trained personnel as another important barrier to integrating health promotion into pharmacy practice.[12] The graduate student health coaches were trained with low-cost, computer-based modules that could easily be adapted as a tool to train pharmacy staff.

Limitations

As with any research study, this study had limitations that warrant mention. Despite the positive feedback for the intervention program from most of the participants, 15% of participants did not want to be contacted for further intervention programs. This could be due to the inclusion of all pharmacy clientele into the study sample, including patients who may have been reassured about their low cardiovascular risk during the health coaching session and therefore felt no need for further intervention, as well as high-risk patients who might already be followed closely by their family physician, and who also did not feel the need for continued pharmacy-level intervention. It would be interesting for future pharmacy-based intervention programs to collaborate with local physicians to increase the clinical impact of the screening program. Moreover, to further understand the needs of the 85% of patients who did wish to be contacted further, it would be helpful to study how many currently track their own blood pressure at home and how many are followed up regularly by their family doctor for blood pressure control.

Additionally, although standardized measurement protocols were followed for the measurement of blood pressure, typically 2 blood pressure measurements greater than 140/90 mm Hg on 2 separate clinic appointments are required for the diagnosis of hypertension. For the present study, 2 blood pressure readings were taken consecutively on the same day and the lower of the measurements was used. The Canadian Hypertension Education Program guidelines require 3 measurements, discarding the first and taking the average of the latter 2 readings. As such, it is possible that there was some misclassification of hypertension status in the study results. It is possible that single-day blood pressure measurements may not truly reflect long-term blood pressure control among those on antihypertensive medication. Although the pharmacy-based blood pressure measurements presented in this study do have some limitations, we hypothesize that there could be possible advantages, such as potential decreases in white coat hypertension associated with blood pressure measurement in a clinical setting.

Another potential limitation is that the participants in the study volunteered to participate, which may limit the generalizability of the findings. However, one could argue that this truly reflects how screening programs would occur in pharmacies in a real-world setting. Blackburn and colleagues have argued that pharmacy intervention research is frequently too focused on research design and protocol rather than real-world applicability.[24] Due to the cross-sectional study design, we were not able to assess whether the program successfully promoted long-term health behaviour change. It is very likely that sustained health behaviour change requires more than 1 appointment with a health coach. It is important to interpret the present results in light of this fact. Due to the limited resources and small team of graduate students working on the project, there was only 1 clinic day per pharmacy site, with the exception of 1 pharmacy that hosted 2 clinics. While this study demonstrates that the program is feasible and pharmacy clientele are interested in participating, future research is required to assess the influence of pharmacy interventions on health behaviour over time. Future intervention programs should focus on offering the screening program repeatedly (i.e., once a month or twice a year) at different times (i.e., daytime, evenings, weekends) in the same pharmacy to maximize program accessibility and patient retention. It may be increasingly difficult to recruit patients for a long-term pharmacy-based intervention, thus studies should pay particular attention to fostering program adherence and include targeted strategies for maintaining behaviour change.

Conclusion

There have been a number of studies demonstrating the benefits of using community pharmacies for health promotion programs; however, widespread implementation has not yet occurred.[10,24] The present study demonstrates the feasibility of an inexpensive pharmacy-based intervention program implemented by graduate students. Future research is required to assess the long-term benefits and cost-effectiveness of the proposed program. The positive results of the present study open the door for future longitudinal pharmacy-based intervention programs to provide long-term cardiovascular risk management and health behaviour change. ■

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