

Implementation of Modified Cardiovascular Health Awareness Program for Canadian Adults on a Waiting List for a Family Physician

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Abstract

Introduction: The Cardiovascular Health Awareness Program (CHAP) was originally developed and evaluated as a community-based cardiovascular diseases (CVD) prevention program in communities where access to family physicians was not a significant issue. Many Canadians now face sub-optimal access to a regular source of primary care. Centralized waiting lists and prioritization based on urgency of medical need were created to address this problem. We aimed to assess the acceptability, CVD risk profile, and potential benefits of offering a modified version of CHAP to adults on the waiting list. **Methods:** The implementation was conducted in Laval (Canada) between March and June 2016, targeting individuals 40 years of age or older who were registered on the waiting list (GACO) and had a priority code of 3. Participants were invited through a personalized letter to attend sessions in community health centers. During the sessions, participants completed CVD risk profiles, risk of type 2 diabetes questionnaire (CANRISK); had their blood pressure, height and weight as well as waist circumference measured. They also received targeted healthy lifestyle and patient education materials and were referred to local programs including a medical follow-up, when required. **Results:** A total of 1976 invitation letters were sent resulting in 281 (14.2%) participants. The average age of attendees was 58.1 (SD=8.2) and a majority were female (58%, n=163). A third of participants (34.2%, n=96) had BP \geq 140/90 and 11.4% (n=32) were classified as having a very high risk for developing diabetes. Almost half (41.6%, n=117) of participants were referred either to health promotion programs offered by local health authorities, to family physicians (4.6%, n=13) or emergency departments (1.8%, n=5) for short-term medical assistance. **Conclusion:** Despite low participation rate, many adults on a waiting list had elevated risk for CVD and would greatly benefit from having a regular source of primary care.

Keywords

primary care, health promotion, access to care, community health, disease management, lifestyle change

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Background

Canada, as most other countries, does not fare well in preventing or delaying the onset of chronic diseases. This, despite the fact that a small set of well-established, modifiable lifestyle behaviors is responsible for most of the chronic conditions. The latest reports indicate that 85% of Canadians are not meeting the weekly physical activity recommendations; fruit and vegetable consumption is in decline; consumption of processed and fast foods as well as heavy alcohol consumption are on the rise; elevated rates of obesity and overweight remain virtually unchanged, putting

roughly 60% of men and 45% of women at an increased health risk as a result of excess weight.^{1,2}

The Cardiovascular Health Awareness Program (CHAP, www.CHAPprogram.ca) is a patient-centered,

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interdisciplinary, multi-pronged, community-led cardiovascular disease (CVD) prevention and management program targeting key modifiable risk factors and aimed at older Canadians.^{3,4} Essential components of CHAP are to increase cardiovascular risk awareness, connect with community programs and resources, create a feedback loop with primary care providers, and enable participants to acquire self-management skills. The program is explicitly based on the expanded Wagner's Chronic Care Model.⁵

During a CHAP session, blood pressure (BP) is measured using validated, automated devices and protocols based on Hypertension Canada recommendations⁶ and participants are assessed for cardiovascular/chronic disease risks (including diabetes) in familiar settings such as pharmacies, places of worship, social housing buildings, and other community spaces. Locally recruited and trained volunteers assist participants in measuring their blood pressure and in understanding their risk profiles. They also provide targeted healthy lifestyle and patient education materials, and offer advice about free or low-cost locally available resources and support programs. With the participants' permission, blood pressure readings and cardiovascular disease risk information are shared with participants' healthcare provider.

The CHAP model was refined through a series of studies that demonstrated its implementability, acceptability and ability to reduce participants' BP, encourage lifestyle changes and optimize drug regimens.⁷⁻¹¹ CHAP was rigorously evaluated using a community cluster randomized controlled trial involving 39 medium-sized communities (with populations of 10 000-60 000) in Ontario. Over 13 000 people aged over 65 years in the CHAP communities attended cardiovascular risk assessment and education sessions run by 600 volunteers in community-based pharmacies over a 10-week period. Adjusting for hospital admission rates in the year prior to the intervention, after 1 year, CHAP was associated with a 9% reduction in hospital admissions at the population level for stroke, acute myocardial infarction and congestive heart failure among residents aged ≥ 65 years ($P = .002$) relative to communities that did not implement CHAP.⁴ CHAP is the main evidence supporting more intense screening for hypertension, recommended by the Canadian Task Force on Preventive Health Care (CTFPHC)¹² and the U.S. Preventive Services Task Force (USPSTF).¹³ We estimate that over 100 000 CHAP assessments have been conducted since its inception.

CHAP was originally developed and evaluated as a community-based intervention held in local pharmacies and targeting older Canadians living in small to medium-sized communities in Ontario where access to a regular primary healthcare provider was not a significant issue.⁴ This meant that appropriate and timely follow-up was available to all attendees.

Currently, many Canadians, especially in Quebec, are either not affiliated with a regular source of primary care, or else face sub-optimal access to care. The latest statistics from Quebec indicate that one-third of residents in the Greater Montreal Area have no regular source of care and that this proportion is as high as 1 in 2 in some neighborhoods.¹⁴ In this context, it was inappropriate to offer population-based screening and CVD risk assessment sessions knowing that some participants with undiagnosed or poorly controlled conditions could not be provided with follow-up care.

Several Canadian provinces, including Quebec, have established centralized waiting lists to facilitate access to family physicians based on urgency of medical need and availability of primary care physicians.^{15,16} In 2008 the *Ministère de la Santé et des Services Sociaux* (Quebec ministry of health and social services), in collaboration with the Quebec Federation of General Practitioners, introduced the *Guichet d'accès pour la clientèle orpheline* (GACO), a province-wide service where citizens without a family physician could register to access a healthcare provider. The objective of this program was to centralize and prioritize demand as a way to help people find a family physician.¹⁷ In order to triage these requests according to urgency of care, individuals looking for a family physician are asked to complete a form that can be submitted online or returned by mail. Once the form has been submitted, a nurse contacts the person by phone and assesses the individual's health status based on a standardized questionnaire.¹⁶ Individuals are then assigned 1 of 5 priority codes. Priority 1 indicates need for immediate medical care (<30 days); priority 2 and 3 within 3 and 6 months, respectively. Patients classified as priority 4 do not require urgent care, and those with priority 5 are considered in good health, with no known health problems.¹⁸

In order to offer CHAP sessions to adults on a waiting list for a family physician in Laval, several modifications and changes were made to the original CHAP model. This included who was targeted, how they were invited, where the sessions were held, and what was done during and after the sessions. The invitations to participate were sent from the GACO office and not from family physicians and there were no media campaigns. After consultations with our partners, it was decided that the program will target individuals 40 years of age and older and that the CHAP sessions were to be held in community centers rather than pharmacies. Laval is predominately a French-speaking community, this meant that all our materials had to be translated into French. Because type 2 diabetes is a major target of prevention efforts in Laval, physical measures of height, weight, Body Mass Index (BMI, kg/m²), waist circumference and a questionnaire to assess the risk of developing type 2 diabetes were added. As the program was targeting individuals without a regular source of primary care, the assessment and referral protocols had to be adjusted accordingly.

It was felt that offering a modified CHAP to individuals on a waiting list might bring a number of benefits including: providing a more accurate and up-to-date evaluation of their priority status on the waiting list; learning about and accessing locally available programs and initiatives targeting lifestyle modification; and supporting self-management and healthy lifestyle.

The main objective of our project was to assess the acceptability, CVD profile and the potential benefit of offering a modified version of CHAP targeting adult patients on the GACO waiting list. The main indicators of acceptability were the participation rates and the risk profile of attendees. This included the prevalence of modifiable risk factors, the number of attendees with elevated BP who were either undiagnosed or treated and not controlled and the number of attendees with high risk for developing type 2 diabetes. The benefit was defined by the number of participants who were identified at risk for CVD or type 2 diabetes and referred to community programs and resources, family physicians or emergency departments.

Methods

Recruitment and setting

The implementation of the modified CHAP was conducted in Laval (population 420 000), Quebec's third largest city between March and June 2016.¹⁹ The target population consisted of persons 40 years of age or older, registered on the Laval waiting list (GACO) and attributed a priority code 3. This is because the prevalence of CVD and type 2 diabetes increases with age and CANRISK is recommended, as a screening tool, for individuals >40 years of age and older. Furthermore, we hypothesized that individuals with a priority code 3 would be the most appropriate target for a volunteer run CVD assessment program and most likely to benefit from it either via adoption or maintenance of health lifestyles of reclassification of their priority code.

There were a total of 20 418 individuals in Laval had a priority code assigned and were on the waiting list for a family physician. Of this group, 6310 had a priority code 3 and 1976 were 40 years of age or older and were therefore eligible to participate in the study. All these individuals were mailed a personalized letter signed by the manager of the Laval GACO inviting them to attend 1 or more CHAP sessions held in 1 of 4 community health centers (*CLSC: Centre local de services communautaires*). Invitation letters were sent over several weeks using a staggered approach. Potential participants were then invited to attend CHAP sessions based on proximity of their home address to 1 of 4 community health centers.

The invitation letter indicated that participation in the program was voluntary and would not guarantee or accelerate assignment to a family physician. Before sending the

invitations, the research team, at the invitation of the Laval regional department of general practice director, met with representatives of Laval family medicine groups (GMF) to explain the program, to discuss the FP referral protocol, and to ensure that participants identified with very high blood pressure or irregular heart rate readings would be provided timely follow-up by community family physicians. CHAP-GACO was seen as a novel way to reach persons on the waiting list and FP agreed to evaluate persons referred to them by the program, providing the essential feedback loop with a primary care provider ensuring their safety. Participants were free to choose their preferred location and time: morning, afternoon, and evening sessions were offered. Participants were also offered parking reimbursement, when applicable.

Intervention protocol

The sessions were facilitated by volunteers recruited in partnership with local volunteer organizations (*Centre d'action bénévole Laval and Moisson Laval*). Volunteers were trained by the CHAP team using a standardized 1-day training workshop. While the volunteers were not required to have any medical background, almost half were retired nurses. CHAP 3-h sessions were supervised by a nurse who insured the CHAP protocol was followed. This included selection of the proper size and placement of a BP cuff, following guidelines for BP, weight, height and waist circumference measurements, and respecting participants' privacy and confidentiality of the collected data. A CHAP nurse was also available onsite to answer participants' and volunteers' questions. Finally, participants who were identified as high-risk were re-assessed by a CHAP nurse using a standardized protocol. If the systolic pressure during the first session was between 160 and 180 mm Hg, the nurse was asked to complete an assessment form and invite the participant for a second session. This was done to address a potential white coat response by some of the participants (see Supplemental Appendix 1).

During the sessions, participants completed CVD risk profiles including diabetes risk assessment (CANRISK).^{20,21} This included measurement of blood pressure in both arms (3 consecutive readings at 1-min intervals without any antecedent rest period) using a validated (Microlife WatchBP™) automated device with an atrial fibrillation (AF) detection algorithm. All participants had their height, weight as well as waist circumference measured. Participants also received targeted healthy lifestyle and patient education materials and were informed about and linked to supportive, local, free or low-cost resources and programs (eg, walking clubs, smoking cessation programs). The health advice and referrals were based on modifiable risk factors identified as part of the CHAP assessment and the interest expressed by the participants to address them. This included referrals to

Table 1. Self-Reported Demographic and Lifestyle Risk Factors (n = 281*).

Characteristic	Mean (SD) or n (%)
Age: (Years)	58 (8.2)
Sex: (Female)	163 (58%)
Living alone: (Yes)	61 (21.7%)
Health status: (Fair/Poor)	56 (19.9%)
Smoking status	
Current (Yes)	24 (8.5%)
Former (Yes)	125 (44.5%)
Eat at least 5 portions of fruits and vegetables each day: (NO)	153 (54.4%)
In a typical week, how many times do you eat high fat foods or fast food? (>3 times)	30 (10.7%)
Drink 2 or more alcoholic beverages per day (woman) or 3 or more (man): (Yes)	34 (12.1%)
Physical activity for at least 30 min each day: (No)	161 (57.3%)
In a typical week, how frequently do you feel overwhelmed or stressed?: (Often)	64 (22.8%)

*Not all questions answered by all respondents.

Cible Santé and *Saines Habitudes de Vie*, 2 lifestyle modification programs offered by the local health authority (*CISSS Laval*) that would normally require a referral from a health professional. Finally, based on a *a priori* developed protocol, several family physicians in Laval agreed to provide a timely follow-up to participants who were identified as requiring urgent care at the CHAP sessions.

Consent and Confidentiality

The study protocol was approved by the scientific and research ethics committee of the regional health authority. Participants and volunteers provided written consent to participate.

Statistical Analysis

Data were analyzed with SPSS, version 24.0 for Macintosh. Univariate descriptive statistics and frequency distributions were used to describe the data.

Results

Of the 1976 invitation letters mailed, 281 (14.2%) adults attended at least 1 CHAP session and 14 of those attended a second session. A total of 33 volunteers were recruited and trained to assist participants, with an average of 5 volunteers per session. A total of 26 CHAP sessions were held in the 4 community health centers.

The average age of attendees was 58.1 (standard deviation (SD)=8.2) and 58% (n=163) were female. Almost 1 in 5 participants rated their general health as fair or poor (19.9%, n=56) and a similar proportion was living alone (21.7%, n=61). A more detailed participant profile in terms of demographic characteristics and self-reported lifestyle risk factors is shown in Table 1.

Participants were asked whether they have ever been diagnosed by a physician with type 2 diabetes (1.1%, n=3), high blood sugar level (6.8%, n=19), high blood pressure (37.0%, n=104), heart disease (4.3%, n=12), or dyslipidemia (9.6%, n=27). The vast majority of participants who were previously diagnosed with hypertension indicated that their BP was controlled with medication (87.5%, 91/104) or with lifestyle changes (12.5%, 13/104).

Participants were asked to indicate which health related topics they would like to receive more information about. The most popular topics, in decreasing order of frequency, were *Healthy eating/healthy weight* (58.4%, n=164); *Physical activity/exercise programs* (47.3%, n=133); *Support programs to modify lifestyle habits* (34.5%, n=97); *Stress management* (33.5%, n=94), and *Living with pain and/or chronic health condition(s)* (32.0%, n=90).

Automated BP measurements were obtained using the Microlife WatchBP™ monitor with simultaneous atrial fibrillation (AF) detection. The trained volunteers ensured that appropriate cuff size was used and that the Hypertension Canada guidelines for BP measurement were followed.⁶ The mean readings from the arm with higher readings were subsequently used.

Volunteers assisted the participants with weight (digital scale), height and waist circumference measurements, as well as filling of the CANRISK questionnaire.

The mean (SD) systolic and diastolic BP was 131.9 (17.3) mm Hg and 77.9 (9.8) mm Hg, respectively. More than a third of participants (34.2%, n=96) had BP \geq 140/90, including 1.8% (n=5) whose BP \geq 180/110 mm Hg. Over 43% (n=45) of participants who reported that their hypertension was controlled with medications or lifestyle had a BP reading \geq 140/90 mm Hg. There was 1 participant with possible AF based on the WatchBP™ detection algorithm. Over 80% of participants had a BMI, which would fall in the overweight (38.8%, n=109) or obese (41.7%, n=117)

Table 2. Physical Measures and CANRISK Scores (n=281*).

Characteristic	Mean (SD) or n (%)
Systolic BP: (mean)	131.9 (17.3)
<120	56 (19.9%)
120-139	139 (49.5%)
140-179	81 (28.8%)
>180	5 (1.8%)
Diastolic BP: (mean)	77.9 (9.8)
<80	164 (58.4%)
80-89	80 (28.5%)
90-119	37 (13.2%)
>120	—
BP \geq 140-179/90-109	91 (32.4%)
BP \geq 180/110	5 (1.8%)
Heart rate (mean)	73.3 (13.0)
Body mass index (mean)	29.8 (5.8)
Normal weight (18.5-24.9)	54 (19.3%)
Overweight (25.0-29.9)	109 (38.9%)
Obese (30.0-39.9)	104 (37.1%)
Morbidly obese (>40)	13 (4.6%)
Waist circumference	
Males:	
\geq 102 cm (40 inches)	94 (80.3%)
Females	
\geq 88 cm (35 inches)	135 (82.8%)
CANRISK score	
Low (<21)	37 (13.2%)
Moderate (21-32)	115 (40.9%)
High (33-42)	97 (34.5%)
Very high (43-87)	32 (11.4%)

*Not all questions answered by all respondents.

categories. Almost half of participants had high (34.5%, n=97) or very high risk (11.4%, n=32) of developing type 2 diabetes based on their CANRISK scores. Table 2 provides more detailed summary of the physical measures.

After completing the CVD risk profile questionnaire and undergoing physical measures, participant results were reviewed by one of the trained volunteers. At-risk participants were either referred to one of the lifestyle modification programs offered by the local health authority or to a CHAP nurse for on-site re-assessment: almost a third (28.8%, n=81) of attendees were referred to *Cible-Santé* and 12.8% (n=36) to *Saines habitudes de vie* and approximately 1 in 10 participants (11.7%, n=33) were re-assessed by a CHAP nurse based on the predetermined protocol. The main reason for nurse re-assessments was elevated systolic BP (\geq 160 mm Hg). The re-assessment included re-measurement of BP as well as a detailed medical history including previous diagnosis of hypertension, type 2 diabetes, atrial fibrillation, current medications, important changes in health status, and adherence to medication. Following re-assessment by a nurse, 15 (5.3%) participants were asked to

return for another CHAP session held on a different day, 5 (1.8%) were referred to the local emergency department, and 13 (4.6%) were referred to one of the family physicians that agreed to provide timely follow-up for participants identified as requiring urgent care at the CHAP sessions.

Discussion

A modified version of CHAP targeting adult patients on the waiting list for a family physician in Laval, Canada, was successfully implemented. We were able to recruit and train 33 volunteers, sent out 1976 invitations and held 26 CHAP sessions attended by 281 participants. The implementation of CHAP required the collaboration of and support from a number of organizations and groups including the Laval regional health authority, the Laval regional direction of general practice, local volunteer organizations, waiting list managers, community health (CLSC) centers, and local family physicians and the emergency room department.

While the overall attendance rate at CHAP sessions was modest, this is not unexpected given participation rates in health promotion activities are often quite low.²² The invitation letter was from the GACO manager and not from someone that potential participants would have known or trusted. Further, it should be noted that the invitation letter clearly stated that participation in the program would not secure or accelerate assignment to a family physician. This was a younger group of participants, probably actively employed, thus making participation more challenging, even though a few evening sessions were held. The low participation suggests that the program attracted disproportionately individuals who were most motivated and who felt that a CVD assessment would be of benefit to them. If this was in fact the case, the prevalence of CVD risk factors and undiagnosed or uncontrolled hypertension or type 2 diabetes might be lower in individuals with a priority code 3 who elected not to participate in the program.

The prevalence of modifiable risk factors based on both self-reports and physical measures was high and, for many risk factors, significantly exceeded reported rates for similar age groups in the Quebec general population. For example, the proportion of attendees classified as obese was more than twice the proportion for Quebecers in the same age group.²³ Perhaps not surprisingly, close to half of the participants had a high or very high CANRISK score putting them at significant 10-year risk of developing type 2 diabetes. Similarly, CHAP attendees rated their own health as significantly poorer than the general population.²³ The prevalence of high blood pressure that was either undiagnosed, untreated or uncontrolled was quite high. This despite the fact that many attendees reported that their hypertension was treated with medication and/or lifestyle modification. Taken as a whole, the CVD risk profiles suggests that many Laval adults on a waiting list for a family

physician classified as priority 3, would greatly benefit from having a regular source of primary healthcare to prevent, delay, and manage their cardiovascular health.

The attendees learned about and were referred to free or low-cost community-based programs and resources, which are often not well known and are frequently underutilized. Close to half of the attendees were referred to lifestyle programs offered by the local health authority. And a further 5% were referred to a family physician practicing in local family health teams (GMF) or to an emergency room to address urgent health problems identified at the sessions. This suggests the importance of having a more detailed screening process that prioritizes patient health needs using more objective criteria. Finally, many participants had the opportunity to learn more about their modifiable and non-modifiable risk factors that might have resulted in the initiation or reinforcement of healthy lifestyle while awaiting assignment to a family physician.

There were also some limitations and challenges. First, despite efforts to encourage participation with personalized letters, to offer sessions at different times of day (morning, afternoon and evening) and in close proximity to participants' homes as well as reimbursement of parking fees, the overall turnout was low. Second, no follow-up was conducted with participants to check if they had used the resources or attended the programs or services they were referred to. Third, the structure, organization, and management of waiting lists changed during the intervention period. All regional waiting lists are now centrally managed by the Québec Ministry of Health and Social Services and priority codes have been redefined. These changes make it difficult to extrapolate the results obtained under GACO to the new Family Doctor Finder (*GAMF: Guichet d'accès à un médecin de famille*) waiting list structure.

Conclusion

Despite low participation rate, CHAP was successfully implemented and helped to identify participants in need of short-term medical follow-up. Participants were referred to local resources, which may have been unknown or underutilized, and helped to initiate or reinforce a healthy lifestyle. Participation in the program led to reprioritization and hence accelerated access to a family physician for a minority of attendees.

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Author Contributions

JK, MTL, and MG conceptualized the study protocol and its implementation. JK and MG carried out analyses, ABC and JK drafted the initial manuscript, and reviewed and revised the manuscript. All authors assisted with data interpretation and synthesis and reviewed and revised the manuscript. JK, MTL, MG, and ABC read and approved the final manuscript as submitted and agreed to be accountable for all aspects of the work.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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Consent and Confidentiality

The study protocol was approved by the scientific and research ethics committee of the Laval regional health authority (CISSS: Centre intégré de santé et de services sociaux de Laval). Participants and volunteers provided written consent to participate.

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Supplemental Material

Supplemental material for this article is available online.

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