DOI 10.15302/J-SSCAE-2017.02.020

Strategies and Measures for the Prevention and Control of Hypertension in Canada

Sun Dianjun[1], Zhao Yashuang[2], Zhang Wei[1], Lv Yanjie[3], Tian Ye[4], Zhang Yong[3], Gao Yanhui[1], Li Xia[2], Fu Jinming[2], Yang Baofeng[3]

1. Key Laboratory of Etiology and Epidemiology of the National Health and Family Planning Commission, Harbin Medical University, Harbin 150081, China
2. Department of Epidemiology, Public Health College, Harbin Medical University, Harbin 150081, China
3. Department of Pharmacology, College of Pharmacy, Harbin Medical University, Harbin150081, China
4. The First Affiliated Hospital of Harbin Medical University, Harbin 150001, China

Abstract: Hypertension is a public health issue worldwide. At present, Canada is one of the few countries that have achieved remarkable success in the prevention and control of hypertension. Canada has accumulated a considerable amount of advanced knowledge and experience in the control of hypertension and in the implementation of effective measures against it. This article presents updated information on the prevalence of hypertension in Canada, as well as the development of strategies and measures to control it, including the Canadian Hypertensive Education Program, public policies, community interventions, and healthcare systems. We have summarized these advances to provide a basis for the development of policies related to hypertension prevention and control in China.

Keywords: hypertension; awareness rate; control rate; treatment rate

1 Introduction

Hypertension (HTN) is a public health issue worldwide. The prevalence of HTN in China has shown consistent growth, and a long-term commitment to its prevention and control is needed. Therefore, the Chinese Academy of Engineering established a major consulting research project, "International Comparative Study on Strategies for the Prevention and Control of a Major Disease (Hypertension) in China's Cold Regions," to systematically examine prevention and control strategies and scientific research on HTN at an international level, and provide published evidence for the prevention and control of HTN in China. At present, Canada is one of the few countries that have achieved remarkable success in the prevention and control of HTN. It has accumulated a considerable amount of advanced knowledge and experience in the control of HTN and in the implementation of effective measures against it. In September 2016, the project team visited the University of Calgary, where the Chairperson of the Canadian Hypertension Prevention Union is located, for extensive meetings with related specialists. Here, the authors present strategies and measures for the prevention and control of HTN in Canada.

2 Prevalence of hypertension in Canada

In the last two decades, the prevalence of HTN in Canada has been relatively stable, at 21.7% in 1992 and 22.6% in 2012–2013. However, awareness of HTN increased from 56.9% in 1992 to 82.5% in 2009, and treatment for HTN increased from 34.6% in 1992 to 79.0%. The control of HTN has obviously

Received date: December 20, 2016; **Revised date:** March 28, 2017

Corresponding author: Sun Dianjun, Key Laboratory of Etiology and Epidemiology of the National Health and Family Planning Commission, Harbin Medical University, Professor. Major research field is epidemiology. E-mail: hrbmusdj@163.com

Funding program: CAE Advisory Project "International Comparative Study on Strategies for the Prevention and Control of a Major Disease (Hypertension) in China's Cold Regions" (2015-XZ-32)

Chinese version: Sun Dianjun et al. Strategies and Measures for the Prevention and Control of Hypertension in Canada. *Strategic Study of CAE*, https://doi.org/10.15302/J-SSCAE-2017.02.020

improved, showing an increase from 13.2% in 1992 to 64.6% in 2009, and 68.1% in 2012–2013 [1]. The eastern region of the country (near the Atlantic Ocean) reported the highest prevalence and incidence of HTN, which was higher than that of the western region [2].

3 Control strategies and measures of hypertension

3.1 Blood pressure in Canada and the Canadian hypertensive education program

Canada has achieved remarkable success in the prevention and control of HTN. However, the control of HTN was unsuccessful historically because the management of chronic non-communicable diseases (including hypertension) was overseen by primary-care providers (PCPs). If a patient with HTN needed to see a specialist, a referral from a family physician was generally required in Canada. The screening, diagnosis, and control of HTN was not coordinated efficiently [3].

In 1986, a strategy for the prevention and control of HTN was developed by a joint federal and provincial government committee, which was essentially a recommendation to unite government and non-government organizations to implement interventions for the prevention and control of HTN [4]. In 1990, Blood Pressure Canada and the Canadian Hypertension Society reached consensus regarding lifestyle recommendations for the prevention and control of HTN [5]. In the late 1990s, the rate of controlling HTN in the United States was twice as high as that of Canada, prompting Blood Pressure Canada to update its national strategy for the prevention and control of HTN. Thus, the Canadian Hypertensive Education Program (CHEP) was developed, and it improved blood pressure (BP) control by establishing three task forces. The first one was the "Recommendations Task Force," which entailed a unique and rigorous process; the second was the "Implementation Task Force," which was established to accomplish a considerable amount of work; and the third was the "Outcomes Task Force," which was later established to evaluate the effects of the guidelines using national data. Accordingly, CHEP also developed a steering committee consisting of representatives from government, the primary healthcare sector, the Heart and Stroke Foundation of Canada, and hypertension societies to supervise the implementation at a higher level. Annually, CHEP convened related specialists to conduct in-depth analyses of the latest research results, including those on lifestyle and drug interventions using randomized controlled trials (RCTs), systematic reviews, and meta-analyses. The classification of each study's level of evidence by grade was based on its credibility, with four grades corresponding to four levels of evidence. Grade A represents evidence from well-designed, high-quality, large-scale RCTs or systematic reviews (including meta-analyses) of RCTs, and the research results can be directly applied to clinical patients. Grade B represents evidence from a RCT or a predefined subgroup analysis; the accuracy is slightly lower than that of Grade A, and there are some differences between the study population and clinical patients. Grade C represents evidence from low-accuracy clinical studies; the research targets surrogate outcomes or the evidence is from non-randomized observational studies. Grade D represents evidence based on the opinions of or consensus among related specialists. Therefore, the latest evidence-based data are rapidly transformed to instruct clinical practice and are included in the next year's guidelines (e.g., BP measurement, diagnosis of HTN, risk evaluation, and prevention and treatment guidelines), so that hypertensive patients will benefit from the latest clinical investigations as soon as possible.

The CHEP Hypertension Guidelines are updated every year. In contrast, the *European Guidelines for Treatment of Hypertension* are published approximately every 6 years by the Joint Committee of the European Society of Hypertension (ESH) and the European Society of Cardiology (ESC). The American Joint National Committee (JNC) on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure publishes a version of the JNC high blood pressure guidelines every 4 to 6 years, and the *Guidelines for the Prevention and Treatment of Hypertension in China* are updated every 5 years by the Revision Committee. Each year, updated content of the CHEP guidelines is highlighted in the summary section, and labelled "New Recommendations" in the main text, so that readers can easily understand the updated content of the new version and compare it with the previous one. In the CHEP guidelines, each recommendation is accompanied by a "background reference." If there is updated content, the RCT, systematic review, or meta-analysis on which it is based are clearly shown, whereas other more authoritative guidelines must be read thoroughly to grasp the updated content.

Due to the implementation of the CHEP program, the awareness, treatment, and control rates of HTN showed remarkable improvement, and the rates of death and hospitalization from cardiovascular diseases and stroke decreased significantly [1,6,7]. To the best of our knowledge, few programs or guidelines have generated such evidence of effects on national death and disability rates.

In the late 1990s, Blood Pressure Canada along with the Canadian Hypertension Society set aside special funds for the prevention and control of HTN. Blood Pressure Canada developed two programs in 2006. One program was based on a CHEP recommendation to use plain language to conduct educational activities for hypertensive patients and Canadians with risk factors, using various community organizations and the media to disseminate knowledge of hypertension prevention and treatment to the public and to hypertensive patients. Non-professional publications and brochures were put in public places, such as hotels and restaurants, and a variety of websites were used to conduct multi-faceted, comprehensive publicity and education [8]. The other program aimed to educate the public and healthcare pro-

fessionals to advocate for policies to reduce dietary sodium. The national dietary sodium policy of Canada is intended to reduce dietary sodium to the recommended levels proposed by 24 national health and scientific organizations (i.e., 2.3 g/day/person by 2016) [9].

In Canada, HTN control has evolved into an organized, structured, and standardized model, and a unique management system has been established. It is noteworthy that the management of HTN in Canada involves a comprehensive approach to the management of risk factors, including important recommendations for healthy behavior to prevent obesity, diabetes, and HTN. In addition, CHEP increasingly incorporates the best evidence into the recommendations to manage serum lipids and smoking cessation, and provides best-practice guidelines for reducing the risk of cerebrovascular disease.

3.2 Public policy

In 2010, Blood Pressure Canada coordinated with other hypertension prevention and control organizations to develop a new strategy. Their overall goal was to decrease the prevalence of adult HTN to 13% by 2020 and increase the control rate to 78%. By developing a multi-pronged comprehensive strategy, Canadian residents could meet the exercise and nutrition standards recommended by the government. The strategy included: ① relocating health services and focusing on health management for chronic diseases, early diagnosis and treatment, reduction of blood pressure to normal levels, and prevention of related diseases; ② building a healthy environment and setting up an electronic healthcare system; and ③ establishing new partnerships with government, non-government, and other institutions, such as health, research, and commercial organizations at different levels, to improve coordination of disease management and health promotion. Community projects were implemented on a large scale to increase residents' awareness of HTN and mobilize their participation in its prevention and control. Other measures were included to improve individuals' skills to manage their HTN, to increase the HTN diagnosis and control rates, and to continuously update and evaluate the effects of interventions for HTN prevention and control. They were also implemented to provide evidence for decision-making, and to apply electronic information technology and systems, which can rapidly exploit the full potential for the prevention, diagnosis, treatment, and control of HTN. Canadian health and scientific organizations assessed the strategy, and prioritized the implementation of monitoring healthy food policies as the most important step to prevent and control HTN. In 2011, the Canadian Hypertension Advisory Commission was in charge of monitoring the implementation of the strategy and received broad support from the health and scientific community. The strategy also included: ① restricting the marketing of unhealthy food to children; ② using public funds to purchase only healthy foods; ③ implementing fiscal policies to subsidize healthy foods; ④ implementing easy-to-understand food labels that provide health implications; ⑤ enhancing research, monitoring, and evaluation related to foods; and ⑥ implementing other policies, including reducing unhealthy alcohol consumption and increasing physical activity.

3.3 Community interventions

Recently, Canadian community-and pharmacy-based programs were initiated among high-risk groups for HTN, which have shown encouraging results. The Cardiovascular Health Awareness Program (CHAP) is a prevention and management program for cerebrovascular disease and stroke that is patient-centered, interdisciplinary, multi-pronged, and community-driven for the elderly population [10]. Local health administrators conduct CHAPs regularly in community pharmacies. Participants are introduced to pharmacies by family physicians and local advertising. The pharmacies provide BP readings and information, such as physical activity, diet, body mass index (BMI), and smoking status, and the information is recorded by peer volunteers who also provide health education. Using these risk factors, a cerebrovascular disease and stroke risk assessment is completed and recommendations are proposed based on the participant's risk status; the assessment and suggestions are shared with the family physician, pharmacist, and the participants themselves on the internet. The age-matched peer health educators also give health-related information about lifestyle modifications to the participants, recommend the local available resources, provide support to participants to adhere to their medications, and encourage and support self-care behaviors. The CHAP program has been recognized nationally and internationally because of its innovative methods and success.

3.4 The role of the healthcare system in hypertension control in Canada

Healthcare is universal in Canada and jointly funded by the federal and provincial governments, whereas it is provided and managed by provincial and local governments according to the federal Canada Health Act. Healthy food-, smoking-, and other public-health policies for chronic diseases are well accepted by the public as ways to prevent HTN and reduce the risk of cerebrovascular disease. However, individuals who do not visit healthcare settings regularly or do not visit according to an appointed time are a concern. The evolution of Canada's healthcare system provides conditions and assurances to increase levels of HTN diagnosis, treatment, and control.

Healthcare in Canada is shifting from a focus on the management of HTN as an individual disease to a model of family healthcare [11]. The universal healthcare system is very convenient in that each Canadian has a PCP. Theoretically, there should be no healthcare gap, ensuring that each eligible individ-

ual is screened and diagnosed, has followed-up, and is treated to control chronic diseases, including HTN.

The medical community model requires the ability to establish cross-disciplinary teams and tasks. Family physicians can improve their levels of certain knowledge and skills through training. Other healthcare professionals, such as chronic-disease nurses, pharmacists, dietitians, and lifestyle coaches who have complementary knowledge and skills, are organized as a team to meet the various needs of patients with chronic diseases. Currently, in most provinces of Canada, primary healthcare is being organized into practice groups of various sizes involving cross-disciplinary teams. They participate in related data collection using management tools, share electronic medical records (EMR) and disease registries to meet the goals of disease management, and form a "medical (neighborhood) community." Collectively, Canadian healthcare is moving toward the model of every Canadian having a "medical home in a medical community." In this way, comprehensive health care is integrated and patients with chronic diseases, such as HTN, will be provided better healthcare.

4 Conclusions

Since 1992, the prevalence of HTN has been stable; the rates of HTN diagnosis, treatment, and control have increased significantly after years of focused efforts, especially the control rate, which reached the international advanced level (68.1%). Through the control of HTN, the mortality and hospitalization rates related to cerebrovascular disease have significantly decreased. The strategies for the prevention and control of HTN in Canada are as follows: implement prevention first and evidence-based control, focus on community interventions, diversify professional roles within primary healthcare systems, use methods for the comprehensive prevention and control of HTN risk, and reduce the harm caused by chronic high blood pressure. The following measures are recommended to eliminate HTN through prevention and control. First, a national hypertensive education program should be developed to form an alliance between public health and national policy makers to promote the participation of primary health practitioners in the prevention and control of HTN and to disseminate information to the general public. Second, non-governmental professional organizations should play an important role in the prevention and control of HTN, similar to Blood Pressure Canada and the Canadian Hypertension Society, as discussed in relation to the CHEP program. This includes creating a committee of specialists to implement the latest research results. This committee of experts would review and assess empirical evidence to create guidelines for the diagnosis, evaluation, prevention, and treatment of HTN, and revise them periodically based on the newest research results and evidence-based medicine to guide the diagnosis, evaluation, prevention, and treatment of HTN. Third, health education and health promotion should be emphasized using various community organizations, the media, and other information outlets to disseminate knowledge about hypertension prevention and treatment to the public and hypertensive patients, including putting publications and brochures in various public places. Fourth, as done in Canada, a comprehensive approach that emphasizes a low-sodium diet should be used to manage the risk factors for HTN. Fifth, attention should be paid to community interventions that improve interprofessional primary healthcare by primary healthcare practitioners to provide three levels of prevention against HTN and other chronic diseases. The above prevention and control strategies and measures for HTN that are employed in Canada are worthy of attention in China.

References

[1] McAlister FA, Wilkins K, Joffres M, et al. Changes in the rates of awareness, treatment and control of hypertension in Canada over the past two decades. CMAJ, 2011, 183(9):1007–1013.

[2] Robitaille C,Dai S,Waters C, et al. Diagnosed hypertension in Canada: incidence, prevalence and associated mortality. CMAJ,2012, 184(1):49–56.

[3] Schiffrin EL, Campbell NR, Feldman RD, et al. Hypertension in Canada: Past, Present, and Future. Annals of Global Health, 2016,82(2):288–299.

[4] Chockalingam A,Campbell N,Ruddy T,et al. Canadiannationalhigh blood pressureprevention and controlstrategy.Can J Cardiol,2000, 16(9):1087–1093.

[5] Chockalingam A, Abbott D, Bass M, et al. Recommendations of the Canadian consensus conference on nonpharmacological approaches to the management of high blood pressure. Can Med Assoc J, 1990, 142(12): 1397–1409.

[6] Campbell NRC, Brant R, Johansen H, et al. Increases in antihypertensive prescriptions and reductions in cardiovascular events in Canada. Hypertension, 2009, 53(2): 128–134.

[7] McAlister FA, Feldman RD, Wyard K, et al. The impact of the Canadian Hypertension Education Programme in its first decade. Eur Heart J, 2009, 30(12):1434–1439.

[8] Campbell NR, Petrella R, Kaczorowski J. Public education on hypertension: a new initative to improve the prevention, treatment and control of hypertension in Canada. Can J Cardiol, 2006, 22(7):599–603.

[9] Sodium Working Group. Sodium reduction strategy for Canada: Recommendations of the sodium working group[R]. Ottawa: Health Canada, 2010:1–61.

[10] Kaczorowski J,Chambers LW,Dolovich L, et al. Improving cardiovascular health at population level: 39 community cluster randomised trial of Cardiovascular Health Awareness Program (CHAP). BMJ, 2011(342):d442.

[11] Gutkin C. The future of family practice in Canada: the patient's medical home. Canadian Family Physician, 2011, 57(10):1224.