

Clinical Research

Comparison of Diagnosed, Self-Reported, and Physically-Measured Hypertension in Canada

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ABSTRACT

Background: Hypertension is a substantial health concern because it poses significant risks for cardiovascular morbidity and mortality and is highly prevalent in the population. Tracking hypertension is important because it is a risk factor for other conditions, but prevalence estimates might vary depending on the data source used.

Methods: This report describes 3 national population-based data sources for estimating hypertension prevalence in Canada and discusses their strengths and weaknesses to aid in their use for policy and program planning. They are compared based on: sample coverage, case identification, and prevalence estimates.

Results: Each source produces a different measure of hypertension prevalence, as follows: (1) diagnosed hypertension from the Canadian Chronic Disease Surveillance System (CCDSS) (2007/2008); (2) self-reported diagnosed hypertension from the Canadian Community Health Survey (CCHS) (2007–2008); and, (3) physically-measured hypertension from the Canadian Health Measures Survey (CHMS)

RÉSUMÉ

Introduction : L'hypertension est une préoccupation de santé considérable puisqu'elle pose des risques significatifs de morbidité et de mortalité, et qu'elle est fortement prévalente dans la population. Le suivi de l'hypertension est important parce qu'elle est un facteur de risque d'autres affections. Néanmoins, les estimations de la prévalence pourraient varier en fonction de la source de données utilisée.

Méthodes : Ce rapport décrit 3 sources de données nationales sur la population pour l'estimation de la prévalence de l'hypertension au Canada, et discute de leurs forces et de leurs faiblesses pour faciliter leur utilisation à la planification des politiques et des programmes. Elles sont comparées en fonction de la couverture de l'échantillon, de l'identification des cas et des estimations de la prévalence.

Résultats : Chaque source produit une mesure différente de la prévalence de l'hypertension comme suit : 1) le diagnostic de l'hypertension du Système national de surveillance des maladies

The World Health Organization estimates that raised blood pressure (BP) (systolic BP ≥ 115 mm Hg) annually causes more than 7 million deaths globally and accounts for 51% of cerebrovascular disease and 45% of ischemic heart disease.¹ In Canada, hypertension affects approximately 1 in 5 adults.² However, prevalence is estimated differently by 3 different national approaches. These differences are important for estimating health care needs, associated costs, and the projection of resource requirements. Furthermore, differing estimates might cause confusion or mislead our understanding of the overall picture of hypertension among Canadians,

which could affect the evaluation of hypertension management.

The purpose of this study was to compare the 3 different estimates of hypertension arising from the 3 national population-based data sources, and highlight their strengths and limitations.

Methods

Data sources

The 3 sources of hypertension prevalence information at the Canadian national level are (1) the Canadian Chronic Disease Surveillance System (CCDSS) administered by the Public Health Agency of Canada, (2) the Canadian Community Health Survey (CCHS) administered by Statistics Canada, and (3) the Canadian Health Measures Survey (CHMS) administered by Statistics Canada.^{3–5}

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(2007-2009). Crude rates and counts of hypertension prevalence among individuals aged 20 to 79 years of age, excluding pregnant women, are compared, resulting in prevalence ranging from 18.2% in self-report data to 20.3% in diagnosed data. The data sources differ in terms of target population, case identification, and limitations, which affects the estimates.

Conclusions: Each source has unique strengths and is best suited for addressing particular research questions. For example, diagnosed hypertension can be used to determine health care utilization patterns, self-reported to examine health determinants, and measured high blood pressure to improve awareness, treatment, and control. Combined, they can address multiple issues and increase our knowledge of hypertension in Canada.

CCDSS: diagnosed hypertension. Administrative health data, employed for surveillance by the CCDSS, are comprised of patient-level diagnostic data from medical claims submitted for reimbursement by physicians and from hospital discharge abstracts (in-patient services) from all 13 jurisdictions across Canada (see case definition in Table 1). It represents a secondary source of data, not collected for the purpose of determining prevalence. The CCDSS data cannot specify the criteria that individual physicians use to determine hypertension diagnoses, although there are guidelines for assessing hypertension in Canada.⁶ CCDSS data are compiled by jurisdictions annually and submitted in aggregate to the Public Health Agency of Canada. Prevalence is calculated cumulatively; persons that are identified as hypertensive in 1 year are carried forward as prevalent cases in subsequent years.³ Currently, the CCDSS has been validated for persons aged 20 and older and data exist from fiscal year 1995/1996 onward.

Past research has validated the CCDSS hypertension case definition against the CCHS⁷ and chart review.^{8,9} These studies have found sensitivity ranging between 66% and 72%; specificity ranging between 95% and 97%; positive predictive value ranging between 76.8% and 87%; and negative predictive value ranging between 88% and 93.2%, with an average κ of 0.675.

CCHS: self-reported diagnosed hypertension. The CCHS was designed to fill information gaps regarding health status, health care utilization, and determinants of health. It uses a complex sampling strategy and “gathers health-related data at the subprovincial levels of geography”¹⁰ and is representative of the Canadian household. Hypertension is estimated from questions about whether a respondent recalls receiving a medical diagnosis of hypertension or taking medication for high BP (see Table 1). Thus, the CCHS measure is a self-report of diagnosed hypertension; respondents are only asked about diagnosis or treatment by a health care professional. The CCHS provides cross-sectional information on

chroniques (SNSMC) (2007-2008); 2) le diagnostic d'hypertension déclarée par le patient de l'Enquête sur la santé dans les collectivités canadiennes (ESCC) (2007-2008); 3) l'hypertension mesurée physiquement de l'Enquête canadienne sur les mesures de la santé (ECMS) (2007-2009). Les taux bruts et les comptes de la prévalence de l'hypertension chez les individus âgés de 20 à 79 ans, excluant les femmes enceintes, sont comparés et montrent une prévalence se situant entre 18,2 % dans les données déclarées par le patient à 20,3 % dans les données diagnostiques. Les sources de données diffèrent en ce qui concerne la population cible, l'identification des cas et les limitations, qui influencent les estimations.

Conclusions : Chaque source a des forces uniques et est faite pour traiter des questions particulières de la recherche. Par exemple, le diagnostic de l'hypertension peut être utilisé pour déterminer les modèles d'utilisation des soins de santé, le diagnostic d'hypertension déclarée par le patient, pour examiner les déterminants de la santé, et l'hypertension mesurée physiquement, pour améliorer la prise de conscience, le traitement et la maîtrise. Combinés, ils peuvent répondre aux problèmes multiples et améliorer notre connaissance de l'hypertension au Canada.

persons aged 12 years and older from 2001 onward. There have been no published studies reporting the validity of hypertension measures in the CCHS.

CHMS: measured hypertension. The CHMS, a cross-sectional survey representative of the Canadian household population, consists of 2 components. The first is a questionnaire administered to residents of private dwellings, which asks respondents to self-report on a variety of health topics, including questions about hypertension.⁵ The second is a visit to a mobile clinic where physical measures are taken, including BP readings. Respondents with higher than average BP are advised of this and encouraged to seek physician care. Here, hypertension was defined by a combination of self-reported and physically-measured information (see Table 1). This study uses CHMS (cycle 1), conducted between 2007 and 2009 and included persons between 6 and 79 years of age. A second cycle, collected between 2009 and 2011, had not been released at the time of analysis.

There have been no published studies that validate the CHMS against another hypertension definition; however, 1 study has demonstrated that the BP measurement equipment in the CHMS is highly reliable, precise, and accurate, with little intertester variability.¹¹

Comparison questions

The data were compared on the following:

- Target population: What proportion of the Canadian population is captured, and who is included or excluded? If gaps in coverage exist, how significant are these for estimating hypertension prevalence?
- Case identification: How do the sources determine a hypertensive ‘case’? What are the implications of these approaches to prevalence estimates?
- Prevalence estimates: What is the prevalence of hypertension estimated by each source? We provide details on prevalence estimation in the next section.

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