

Geographic and Demographic Variation in the Prevalence of the Metabolic Syndrome in Canada

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A B S T R A C T

OBJECTIVE

To explore geographic and demographic variation in the prevalence of the metabolic syndrome in Canada.

METHODS

The sample included 18 945 adult participants (20 to 74 years) in the Canadian Heart Health Surveys (1986 to 1992). The metabolic syndrome was defined as a cluster of 3 or more of the following: low high-density lipoprotein cholesterol, high triglycerides, high body mass index, high blood pressure and self-reported diabetes.

RESULTS

The prevalence of the metabolic syndrome increased from Western to Atlantic Canada. Rural, low income and low education groups typically had a high prevalence of the metabolic syndrome. In a multivariate analysis, the odds of the metabolic syndrome were in general inversely related to socioeconomic status, and the relationship between educational attainment and the metabolic syndrome was particularly pronounced in women. However, these relationships showed considerable variation by sex and geographic region.

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R É S U M É

OBJECTIF

Explorer les variations géographiques et démographiques de la prévalence du syndrome métabolique au Canada.

MÉTHODES

L'échantillon comprenait 18 945 adultes (de 20 à 74 ans) qui avaient répondu aux sondages sur la santé cardiovasculaire au Canada (1986 à 1992). La présence d'au moins 3 des facteurs suivants constituait le syndrome métabolique : faible taux de cholestérol des lipoprotéines de haute densité, taux élevé de triglycérides, indice de masse corporelle élevé, hypertension et diabète selon le patient.

RÉSULTATS

La prévalence du syndrome métabolique allait en augmentant de l'Ouest canadien au Canada Atlantique. La prévalence du syndrome métabolique était typiquement plus élevée dans les régions rurales et dans les groupes à faible revenu et sous-scolarisés. Selon une analyse multidimensionnelle, il y avait en général un rapport inverse entre les risques de syndrome métabolique et le statut socio-économique et le rapport entre le niveau de scolarisation et le syndrome métabolique était particulièrement marqué chez les femmes. Cependant, ces rapports variaient beaucoup en fonction du sexe et de la région.

CONCLUSION

La prévalence du syndrome métabolique au Canada varie selon les régions et il faudra que d'autres recherches soient menées pour clarifier les facteurs associés au syndrome métabolique.

MOTS CLÉS

Épidémiologie, facteurs de risque, santé de la population, syndrome X

CONCLUSIONS

The distribution of the metabolic syndrome in Canada is regionally diverse and further research is required to clarify the factors associated with the metabolic syndrome.

KEYWORDS

Epidemiology, population health, risk factors, syndrome X.

INTRODUCTION

Population-based efforts to reduce the impact of cardiovascular disease (CVD) now recognize that the surveillance and primary prevention of the metabolic syndrome, a cluster of atherogenic risk factors that elevate the risk of diabetes, CVD and mortality (1), as essential to realizing this goal. The limited information available suggests that the prevalence of the metabolic syndrome in Canada is high, increases with age (2) and varies considerably across ethnic groups (3).

There is consistent evidence for an inverse relationship between socioeconomic status and CVD in which individuals with the lowest social status experience a disproportionately high prevalence of risk factors, morbidity and mortality (4). Such associations can now be considered within the context of a proposed biological pathway between socioeconomic status and subclinical atherosclerosis (5,6), and serves to potentiate the clinical importance of recognizing and addressing inequities in health through risk factor screening in low socioeconomic status groups.

Previous studies from the Canadian Heart Health Surveys (CHHS) have described regional and rural/urban disparities in CVD risk factors (7) and risk factor knowledge (8), with Atlantic provinces showing the lowest levels of risk factor knowledge and highest prevalence of risk factors. Moreover, despite impressive reductions in CVD-related mortality since the 1950s, the disparity in CVD outcomes between low and high socioeconomic status groups appears to be increasing (9). Given that 8 in 10 Canadians have at least 1 CVD risk factor (10), the realization that risk factors tend to cluster in individuals of low socioeconomic status (11) should be a particular focus for public health policy.

Amidst reports of regional disparities in CV outcomes (12), a description of social gradients in the metabolic syndrome within broad geographic units may be informative for the coordination, allocation and delivery of patient-centred care within the context of primary risk factor screening. Thus, the purpose of this study is to describe the geographic and demographic prevalence of the metabolic syndrome and explore socioeconomic factors (educational attainment and income adequacy) that may be associated with differences in the prevalence of the metabolic syndrome between geographic regions.

Based on previous research on the geographic variation in lifestyle-related CV risk factors (13,14), we expected that the

prevalence of the metabolic syndrome would decrease across provinces, following an east-to-west gradient, and would be higher in rural compared with urban areas. Furthermore, consistent with a previous report of metabolic syndrome and socioeconomic status (15), we expected that the metabolic syndrome would be high in individuals reporting low income adequacy and low educational attainment, but that these factors would be significantly associated with the metabolic syndrome in women, but not men, once traditional CVD determinants were accounted for.

METHODS

Participants and survey design

Secondary data analysis was conducted on a probability sample of adult participants (20 to 74 years) from the CHHS (1986 to 1992) who completed both the questionnaire and clinic portions of the survey. The CHHS were a series of provincially coordinated cross-sectional surveys on CVD risk factors and heart health knowledge of Canadians. Potential survey participants were identified within the medical insurance registry of each province and randomly sampled within 6 age-by-sex strata using a 2-stage probability design that selected approximately 2000 responses per province (16). The resulting weighted sample is considered both geographically and demographically representative of the non-institutionalized (i.e. excluding reservations, incarcerated individuals, military personnel, students residing in residences, etc.) Canadian population. Data were not collected in the Northwest Territories, Yukon Territory or Nunavut.

After initial phone contact, participants were visited by study nurses to collect the questionnaire portion of the survey during a home-based face-to-face interview. Within 2 weeks, participants then presented for a clinic exam during which blood chemistry, blood pressure (BP), anthropometry and other physical measurements were collected. Approximately 69% of identified participants completed both the home visit and clinical portions of the survey (16). Written informed consent was obtained from all participants prior to the start of the home interview.

BP was measured at the beginning and end of the home interview, as well as 2 additional times during the clinic examination; the average of the 4 measurements was used in all analyses. Eight-hour fasting blood samples were drawn and

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