ABSTRACT

This study examined the prevalence and profiles of behavioural and biomedical risk factors of heart disease in a randomized community sample of 843 Canadian women. Socio-demographic characteristics were also examined to determine their association with women who have multiple primary risk factors versus risk factor-free women. A greater proportion of high-risk women (n=81) reported to have less education, lower income and employment levels and were more likely to live without a partner than women with no primary risk factors (n=135). These findings contribute to the understanding of the growing complexity of addressing heart health beyond lifestyle behaviours as articulated by the Victoria (1992), Catalonia (1995), Singapore (1998) and Women's International (2000) Declarations on Heart Health. Public health planning should continue to address physical activity, smoking and dietary behaviours across age groups with a concentrated effort to target high-risk, socio-economically disadvantaged women. Risk assessment for heart disease must also include sociodemographic characteristics for tailoring heart health programs in the community.

ABRÉGÉ

Nous avons étudié la prévalence et le profil des facteurs de risque de cardiopathie liés au comportement et aux aspects biomédicaux d'un échantillon aléatoire de 843 Canadiennes vivant dans la collectivité. Nous avons également examiné les caractéristiques socio-démographiques, dont nous avons voulu déterminer les liens avec les femmes présentant plusieurs facteurs de risque primaires et avec celles n'en présentant aucun. Les femmes à risque élevé (n=81) étaient proportionnellement plus nombreuses à déclarer des niveaux d'instruction, de revenu et d'emploi inférieurs et plus susceptibles de vivre sans partenaire que les femmes ne présentant aucun facteur de risque primaire (n=135). Ces constatations jettent un nouvel éclairage sur la question de plus en plus complexe de la santé cardiovasculaire, au delà des habitudes de vie recensées dans les déclarations sur la santé cardiovasculaire de Victoria (1992), de Catalogne (1995) et de Singapour (1998) et la déclaration internationale des femmes (2000). Les planificateurs en santé publique doivent continuer à se pencher sur l'activité physique, le tabagisme et les habitudes alimentaires dans tous les groupes d'âges en concentrant leurs efforts sur les femmes à risque élevé, défavorisées sur le plan socio-économique. En outre, l'évaluation des risques de cardiopathie doit tenir compte des caractéristiques socio-démographiques pour que les programmes de santé cardiovasculaire soient adaptés aux différentes collectivités.

Heart Disease Risk Factor Prevalence and Profiles in a Randomized Community Sample of Canadian Women

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Significant international¹ and national efforts^{2,3} have been implemented recently to address the prevalence of cardiovascular diseases* (CVD) in women. CVD continues to be the leading cause of mortality for Canadian women, accounting for 38% of all deaths in Canadian women.⁴

Ischemic heart disease and stroke, two major components of CVD, rank first and second respectively for all-cause mortality in Canadian women by specific disease.⁵ The rate of death from heart disease and stroke increases significantly after menopause, placing senior women (particularly those aged 75 years and older) at greater risk.⁵ This health burden is expected to magnify as the proportion of senior women in the population increases. Moreover, the notable increase in smoking by young Canadian women will likely lead to an increased CVD burden in the future.

The current social and economic impact of CVD on Canadian women is significant.⁶ CVD ranks equal with injuries, second behind cancer in "Potential Years of Life Lost" (PYLL) for Canadian women.⁵

However, the true extent of the social burden is underestimated for women since PYLL only calculates those years lost prior to age 75 (the age at which women tend to experience most CVD). The economic burden of CVD for Canadian women becomes apparent in the number of hospitalization days,⁷ where the average length of stay for women is significantly higher than that for men (13.1 versus 11.4 days).⁵ In addition, the economic impact of work-related disability and death may have been underestimated in women because of male dominance of the paid workforce. Women are generally more affected by CVD in their older years, men more often during their working years.^{8,9}

The primary modifiable risk factors for heart disease have been identified as hypercholesterolemia, hypertension, smoking, physical inactivity and recently, obesity.^{5,8-10} Although these risk factors apply to men, they affect women differently.¹¹ Moreover, there are factors that are unique to women, such as oral contraceptive use, pregnancy and both natural and surgical menopause.^{2,9} Overall, the strongest risk factors for women appear to be advancing age, low HDL (high-density lipoprotein) levels, tobacco use and diabetes mellitus.¹²

Seventy-three percent (73%) of Canadian women aged 18-74 years possess one or more major lifestyle risk factors for heart disease (i.e., regular cigarette smoker, high blood pressure, elevated blood cholesterol or sedentary lifestyle) with 33% in this age group having two or more of these major risk factors when obesity is included.^{4,5} Women who have multiple risk factors are at increased risk for developing CVD, therefore there is a great urgency to identify and intervene in this particular population.^{4,5}

In addition to biomedical and lifestyle behavioural factors, there is a growing

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* CVD represents all diseases of the circulatory system classified according to ICD-9 390-459, including acute myocardial infarction, ischemic heart disease, valvular heart disease, peripheral vascular disease, arrhythmias, high blood pressure and stroke.

body of literature that associates socio-demographic characteristics with heart disease in women and men, such as the socioeconomic indicators (e.g., education level, employment status and income) and, of particular relevance for women, social isolation.^{6,13-23} There is also a need to explore other sociodemographic variables that may be associated with heart disease.

Major national²⁴ and international^{1,8,25,26} initiatives call for a broad understanding of heart health and its determinants, which includes addressing the interaction of lifestyle and biological factors, socioeconomic environment (e.g., gender, income, social status, employment, education, culture), physical environment, and access to and availability of appropriate health services.¹

The purpose of this study was to examine the prevalence and profiles of heart disease risk factors in a randomized community sample of Canadian women. The specific objectives were: 1) to determine the prevalence of biomedical and lifestyle behavioural risk factors; 2) to assess the prevalence of primary risk factors; and 3) to determine the sociodemographic characteristics associated with those women who possess multiple primary risk factors.

METHODS

Participants and procedures

Participants were a random sample of 1,602 adults between the ages of 18 and 65 years from the Ottawa-Carleton region of Ontario, Canada. A computer-assisted telephone interviewer (CATI) system randomly generated resident telephone numbers

Variable	N (843)	%
Age	18-24	84
	25-44	469
	45-65	278
Education	Primary school (8 years or less)	5
	Some high school	44
	Completed high school	192
	Some college or technical school	55
	Completed college or technical school	176
	Some university (no degree)	75
	Completed university (degree)	211
Marital Status	Completed post graduate university degree	84
	Single (never married)	199
	Married or common law	499
	Divorced/Separated	118
	Widowed	19
Employment*	Full-time worker (>30hrs/week)	451
	Part-time worker	118
	Unemployed	29
	Retired	43
	A homemaker	74
	A student	58
	Unable to work	19
	Self-employed	45
	Seasonal	1
	Other	3
Income	Meets needs very well	246
	Meets needs adequately	468
	Not adequate for needs	77
	Very inadequate for needs	37

* Employment was dichotomized for the analyses: employed (i.e., full-time) versus not employed (i.e., all remaining categories).
Note: There are missing data for some of the variables; therefore, not all of the n totals will equal 843.

from the region's telephone exchange. One adult from each household was randomly selected based on birthdate. The 20-minute telephone survey was administered by trained professional interviewers and was conducted during March 1997. The telephone randomization protocol produced 4,122 eligible households (i.e., at home, appropriate age, English-speaking). Of the 4,122 eligible households, there were 1,876 refusals by the household member answering the telephone and a further 644 refusals by the selected house-

hold adult, resulting in 1,602 respondents (843 women) of eligible households. This corresponds to a response rate of 71.4% of the selected household individuals and 38.9% of all eligible households. The sampling details are reported elsewhere.²⁷⁻²⁹

Measures

The survey protocol consisted of questions related to sociodemographic and biomedical characteristics, and items measuring behaviours related to cardiovascular disease. The demographic variables includ-

TABLE II
Risk Factors by Age Group

Age Group	Current Smoker	Obesity*	Sedentary†	High Blood Cholesterol‡	High Blood Pressure‡	High-fat Diet¶	Diabetes§	Family History of CVD††
18-24 n=84	25.0%	6.1%	32.0%	3.6%	7.1%	48.6%	0%	34.9%
25-44 n=469	27.5%	20.1%	37.0%	11.2%	11.1%	38.8%	3.6%	50.4%
45-65 n=278	21.6%	26.1%	47.8%	22.4%	22.3%	38.7%	2.2%	65.4%

* Overweight/Obese: Body mass index ≥ 26
† Sedentary: Energy expenditure < 1.5 kilocalories per kilogram per day
‡ High blood cholesterol and pressure: As indicated by physician or health professional
¶ High-fat diet: Not avoiding high-fat foods for the past 6 months
§ Diabetes: Type 1 or Type 2
†† Family History of CVD: Close blood relative (e.g., parent, brother, sister) with heart disease (e.g., heart attack, stroke &/or angina)

TABLE III
Primary Risk Factor Clusters by Age Group

Age Group	0 Risk Factors	1 Risk Factor	2 Risk Factors	3 Risk Factors	4 Risk Factors	5 Risk Factors
18-24	23.1%	48.8%	24.4%	3.7%	0%	0%
25-44	16.0%	46.1%	30.1%	5.8%	2.1%	0%
45-65	17.2%	42.1%	24.1%	11.1%	5.0%	0.4%

Primary risk factors include: current smoker, obesity, sedentary, high blood cholesterol & high blood pressure

TABLE IV
Demographic Comparisons Between Extreme Groups

Variable	Zero Risk Factor Group (n = 135)		Three or More Risk Factors Group (n = 81)		Results	
	Mean	(SD)	Mean	(SD)	t-Score	
Age	38.8	(11.78)	44.9	(11.72)	-0.37	p<0.001
Number of Children	2.0	(0.72)	1.7	(0.80)	1.71	p<0.05
	%	(n)	%	(n)	χ^2_c	
Education						
Degree	46.7	(63)	19.8	(16)	14.67	p<0.001
No degree	56.3	(72)	80.2	(65)		
Income						
Adequate	88.6	(117)	72.5	(58)	8.00	p=0.005
Inadequate	11.4	(15)	27.5	(22)		
Employment						
Employed	71.4	(95)	64.2	(52)	0.91	p>0.05
Not employed	28.6	(38)	35.8	(29)		
Marital Status						
Partner	67.4	(89)	53.1	(43)	3.80	p=0.05
No partner	32.6	(43)	46.9	(38)		

χ^2_c Indicates a continuity-adjusted Chi square analysis

ed sex, age, education level, marital status, employment status and income (Table I provides the response options to the sociodemographic variables). Biomedical variables included family history of cardiovascular disease (see Table II for the item), diabetes (assessed by a 5-item algorithm to determine Type 1 or Type 2 diabetes), hypertension and elevated blood cholesterol. Hypertension and elevated blood cholesterol were assessed by the following two items: "Have you ever been told by your doctor or health professional that you have high blood pressure?" and "Have you ever been told by your doctor or health professional that you have high cholesterol?" Self-reported measures of height and weight were obtained to calculate body mass index (height/weight²). The health behaviour items consisted of smoking status, level of physical activity and high-fat diet behaviour. Smoking was assessed by a three-item measure to determine smoking status (current, previous, and non-smoker). Activity level was calculated as energy expenditure (kilocalories/kilogram/day) from the frequency, duration and intensity of 20 pre-listed and other self-reported activities within the past month. The ener-

gy expenditure assessment was based on the instrument employed in the 1990 Ontario Health Survey,³⁰ which has been compared with the validated Minnesota Leisure Time Physical Activity Questionnaire.³¹ Dietary-fat behaviour was assessed by the Trans-theoretical Model's five-level stage measure of behaviour change (Precontemplation – stage 1, to Maintenance – stage 5) which asked "Do you consistently avoid eating high-fat foods?" and had five response options ranging from "Pre-contemplation" (i.e., "No, and I do not intend to within the next 6 months") to "Maintenance" (i.e., "Yes, and I have for more than 6 months"). This measure has been used for similar type surveys and has been validated with dietary fat intake.^{32,33} All of the sociodemographic, biomedical and lifestyle measures employed in this study have been employed and justified in other community- and population-based published studies.^{27-29,34,35}

Statistical analysis

Percentages were calculated to examine: 1) the prevalence of biomedical and behavioural risk factors (*Objective 1*), and 2) pri-

mary risk factor clusters (*Objective 2*) across three age groups (i.e., 18-24, 25-44, 45-65 years of age) arbitrarily based on a wide spectrum of the literature. Chi-square analyses and t-tests were employed to examine the differences in sociodemographic variables between contrasting risk factor groups, i.e., those women with no primary risk factors versus those with three or more primary risk factors (*Objective 3*).

RESULTS

The mean age of the sample of 843 women was 39.2 (SD=11.1). The modal characteristics presented in Table I include: 35.1% completed a university degree; 59.8% were married or living common law; 53.6% were employed 30 hours or greater per week; and 56.5% indicated that their present level of household income meets their needs adequately. Table II provides the percentage of women by the three age groups for seven biomedical and behavioural risk factors of heart disease (*Objective 1*). Table III shows the clustering prevalence of the five primary risk factors of heart disease (i.e., tobacco smoking, hypertension, elevated blood cholesterol, sedentary lifestyle and obesity) across the three age groups (*Objective 2*). Table IV provides the results of the demographic differences between the zero risk factor group (n=135), i.e., low-risk group, and the three (or more) risk factor group (n=81), i.e., high-risk group. The high-risk group was significantly (p<0.05) older and had fewer children. A greater proportion of the high-risk group was less educated (p<0.001), had less adequate income (p=0.005) and lived without a partner (p=0.05) than the low-risk group (*Objective 3*). Even though a greater proportion of the high-risk women were unemployed in comparison to the low-risk group, this difference was not statistically significant. Post-hoc analyses on the demo-

graphic variables for each of the three age categories revealed differences only in the 25-44 year age group, where differences in educational and income levels between the two contrasting groups were evident. Table V shows Chi-square results on the demographic variables between the extreme groups for the 25-44 year old age group (n=103). A greater proportion of the high-risk group in this age category was less educated ($p=0.005$) and reported to have less adequate income ($p<0.01$) than the low-risk group (*Objective 3*).

DISCUSSION

With respect to the first study objective, the high prevalence in the behaviours of smoking, sedentary behaviour and high-fat diet across all three age groups reinforces the need for all individuals and groups involved in comprehensive heart health promotion to address these lifestyle behaviours in our community. From a population attributable risk perspective, the promotion of smoking cessation, physical activity and low-fat diet in concert with addressing the unique socioenvironmental factors impinging on women will have significant impact towards the reduction of CVD in our population.

In terms of primary risk factor prevalence (*Objective 2*), the three age groups were relatively comparable on the distribution of risk factor clusters. These results reinforce that all three age groups require continued heart health promotion.

As expected, older age was associated with multiple primary risk factors. Even though age is a non-modifiable risk factor for CVD, lifestyle and clinical interventions should be targeted to reduce the CVD risk of older women (especially in our aging population).

Consistent with the literature, the sociodemographic factors of education and income were related to the risk factors of CVD. The results of the study's third objective reinforce the need to intensify our public health efforts in targeting socioeconomically disadvantaged women, i.e., less educated and lower-income women. Further, it appears that women living without a partner may be at a greater CVD risk and programs must further iden-

Variable	Zero Risk Factor Group (n = 69)		Three or More Risk Factors Group (n = 34)		Results	
	%	(n)	%	(n)	χ^2_c	
Education						
Degree	44.9	(31)	14.7	(5)	7.87	$p=0.005$
No degree	55.1	(38)	85.3	(29)		
Income						
Adequate	92.4	(61)	69.7	(23)	7.16	$p<0.01$
Inadequate	7.6	(5)	30.3	(10)		
Employment						
Employed	71.6	(48)	76.4	(26)	0.78	$p>0.05$
Not employed	28.3	(19)	23.5	(8)		
Marital Status						
Partner	80.5	(54)	64.7	(22)	2.26	$p>0.05$
No partner	19.4	(13)	35.3	(12)		

χ^2_c Indicates a continuity-adjusted Chi square analysis

tify these particular women. Our results reinforce that social isolation is an important factor to address with respect to women and CVD. Given that low income is often associated with low educational attainment⁵ and that partnerless women tend to have low incomes, public health efforts may do well to actively seek out single, socioeconomically disadvantaged women. Identification strategies could include targeting social welfare programs, housing commissions and women's shelters.

Although a greater proportion of the low-risk group were employed in comparison to the high-risk group, employment status did not statistically vary significantly between the two contrasting risk factor groups. The National Population Health Survey revealed that unemployment was significantly associated with heart disease for Canadian women and further research in this area suggests that employment may exert a beneficial influence on coronary risk in women.³⁶⁻³⁸ Our study's non-significant result may be explained by the overall high socioeconomic catchment area and a study response bias. Overall, the demographic profile of this sample was higher on socioeconomic indicators than most community- or population-based studies. It may be that a significant proportion of employed women in the high-risk factor group have busy jobs with other multiple domestic demands that result in poor lifestyle behaviours (i.e., physical activity and dietary choices),³⁹⁻⁴¹ thus negating a significant group difference on this particular socioeconomic measure. For example, the aver-

age age of this subsample was in the child-bearing years, which may influence demands and leisure-time activities. Even though working women generally appear to be in better health than women who stay in the home or unemployed women,^{36,42-44} there is some evidence that a moderate amount of overtime work corresponds to an increased risk of myocardial infarction in women.⁴⁵

Our study revealed that the low-risk group had more children than the high-risk group, which is somewhat unexpected. It has been suggested that multiple roles, which include children, may be associated with heart disease risk,⁴⁶ however more research is clearly needed to examine the dynamic interplay between multiple roles of women and CVD.^{9,46}

In terms of age stratification, our results suggest that there could be more focussed efforts in heart health promotion with the 25-45 year age group; further research should explore this issue.

There are methodological limitations of the study that must be acknowledged. First, even though the sample of respondents was large and the demographic characteristics reflected the study's catchment area, the overall response rate was modest, thus limiting the representativeness of the findings. Second, despite the use of validated behavioural and biomedical assessments employed in the survey protocol, self-reported assessments and telephone protocols have to be interpreted with some caution. Further, in addition to community-based surveys, future studies should provide more in-depth, qualitative assessments

to further validate the findings reported in the study. Third, given that this sample is relatively advantaged in terms of education and youthfulness (i.e., young age with respect to risk of heart disease), the study's findings must be interpreted appropriately. There is a need for future research to examine social factors related to CVD of women over 65 years of age.

The prevention and treatment of CVD in women must employ multiple intervention strategies within and between various intervention levels of the ecological framework (i.e., individual, social, organizational, community and government policy/legislation) using existing infrastructures and specialized roles of different community organizations and government. These strategies must be integrated, and should be monitored to assess appropriate outcomes of individual change (i.e., cognitive and behavioural) and to support environmental change (i.e., change of social, organizational and political contexts). The 1998 Singapore Declaration²⁶ and The 2000 Victoria Declaration on Women, Heart Diseases and Stroke¹ reinforce such approaches for promoting heart health in our population.

It is also important to monitor the prevalence of CVD risk factors in Canadian women in order to have reliable data for making public health recommendations. Community-based surveys and other qualitative methodologies should include similar-type assessment protocols as outlined in this study in order to profile their communities to tailor heart health programs. Collaborative inter-disciplinary research and national databases should also be designed to investigate and monitor the efficacy of medical management issues related to the diagnosis, treatment and prognosis of CVD in Canadian women.² As well as leading directly to health outcomes, the resulting information could provide – in conjunction with the Canadian Framework Policy on surveillance on the mortality and risk factors of CVD – a continuous, structured knowledge base to guide the efforts in heart and stroke prevention and treatment for Canadian women.²

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Mais la pauvreté n'aurait-elle vraiment aucun rapport avec la santé?

Tel n'est bien entendu pas le cas, car les rapports entre la pauvreté et la santé ont mobilisé une génération d'activistes de la santé communautaire au Canada. Cette mobilisation a donné naissance aux mouvements des villes en santé et des communautés en santé qui se sont rapidement répandus partout au Canada, puis dans le reste du monde. Alors que les néo-conservateurs campaient sur leurs positions en niant tout rapport entre la pauvreté et la santé, les activistes de la santé pour leur part commençaient à établir des structures communautaires pour améliorer la santé des personnes vivant dans la pauvreté. Et, comme Putnam aurait pu le prédire, ils sont parvenus à renforcer le gouvernement par la base.

Au début des années 80, les activistes en santé communautaire de Toronto ont demandé avec insistance au *Toronto Board of Health* de mettre en place, à l'aide de conseils consultatifs communautaires, une structure populaire supervisée par la santé publique qui pourrait interagir avec les structures politiques. À leur insistance, le *Toronto Board of Health* créa des conseils de santé communautaire dans quatre secteurs de la ville. Ces conseils jouèrent le rôle de système de détection précoce pour les questions de santé publique comme le sida et la contamination par le plomb. Ils surent également exercer des pressions sur les conseils municipaux, les maires et les ministres de la Santé pour les obliger à mettre en oeuvre des politiques et à accorder des fonds pour étudier les rap-

ports existant entre la pauvreté et la santé. Ces conseils devinrent vraiment la voix de leur communauté.

En 1998 ils furent emportés, comme ce fut d'ailleurs le cas de toutes les autres structures politiques autonomes, lorsque le gouvernement ontarien prit la décision de fusionner les gouvernements locaux pour donner naissance à la nouvelle mégapole de Toronto. La disparition des conseils fut un échec pour les activistes de la santé. Bien que des membres de la communauté furent nommés par le *Toronto Board of Health* de 1998 à 2000, la voix du peuple fut étouffée et rapidement remplacée par les aboiements éditoriaux des médias locaux et le bruit de quelques politiciens. C'est ce bruit qui commença à dicter le programme de la santé publique, ce qui mécontenta les activistes de la santé communautaire qui envisagèrent alors d'obtenir le rétablissement des conseils consultatifs de la santé.

En 2000, ils parvinrent à convaincre le *Toronto Board of Health* d'organiser une série de tables rondes sur la santé, au printemps et à l'automne, pour prendre le pouls des besoins de santé locaux, ainsi que pour solliciter des conseils quant à la participation des citoyens. Ces derniers, aidés par des représentants d'organismes populaires, recensèrent des centaines de questions de santé bien précises, dont beaucoup avaient échappé au radar des systèmes de surveillance de la santé publique. Ainsi, bien qu'au cours des dernières élections, le gouvernement provincial ait fait une campagne plus politicienne que démagogique en injectant beaucoup d'argent, les sans-abri, les personnes âgées et les malades mentaux ont néanmoins été pour leur part oubliés. Mais les participants n'ont pas eu la

mémoire courte. Ils ont exigé que l'on se penche sur le sort des groupes marginalisés par les politiques néo-conservatrices. Et, en formulant leurs conseils quant à la participation citoyenne, ils ont imaginé un solide système composé de six conseils de santé communautaire représentant un ensemble de secteurs, dotés du pouvoir d'organiser des tables rondes, des assemblées publiques locales et des groupes de travail, pour continuer de rassembler les communautés afin qu'elles puissent définir elles-mêmes leurs propres besoins et enjeux s'agissant de leur santé. Le *Toronto Board of Health* a accepté les recommandations des différentes tables rondes sur la santé en février 2001 et les conseils de santé communautaire seront rétablis dans un proche avenir.

Le mouvement de la santé communautaire a réagi aux tendances néo-conservatrices des vingt dernières années par une action originale axée sur la mise sur pied de structures communautaires. Plutôt que d'accepter une santé publique marginalisée, les activistes de la santé communautaire doivent continuer de mobiliser la population pour qu'elle fasse valoir ses besoins et milite au plan politique pour obtenir satisfaction de ces besoins, en remettant le public au coeur de la santé publique, la population au coeur de la santé de la population, et le gouvernement au coeur de la gouvernance dans l'intérêt de tous.

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