



Clinical Research

Perceived vs Actual Knowledge and Risk of Heart Disease in Women: Findings From a Canadian Survey on Heart Health Awareness, Attitudes, and Lifestyle

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ABSTRACT

Background: Heart disease is a leading cause of morbidity and mortality in men and women. Our understanding of heart disease stems chiefly from clinical trials on men, but key features of the disease differ in women. This article reports findings from the first Canadian national survey of women that focuses on knowledge, perceptions, and lifestyle related to heart health.

Methods: A cross-country survey using an adaptation of an instrument used in the United States was undertaken in spring of 2013. Based on online (208) and telephone (1446) responses from a randomly selected sample of women aged 25 or older, a total sample of 1654 weighted percentage estimates were produced. The overall response rate was 12.5%.

Results: Just under half of women were able to name smoking as a risk factor of heart disease, and less than one quarter named hypertension or high cholesterol. Fewer than half of women knew the major symptoms of heart disease. Most women prefer to receive information

RÉSUMÉ

Introduction : La cardiopathie est l'une des principales causes de morbidité et de mortalité chez les hommes et les femmes. Notre compréhension de la cardiopathie provient surtout d'essais cliniques portant sur les hommes. Cependant, les caractéristiques principales de la maladie diffèrent de celles des femmes. Cet article rapporte les conclusions de la première enquête nationale canadienne sur les femmes mettant l'accent sur les connaissances, les perceptions et le mode de vie liés à la santé cardiovasculaire.

Méthodes : Une enquête nationale à l'aide d'une adaptation d'un outil utilisé aux États-Unis a été entreprise au printemps 2013. À partir des réponses en ligne (208) et par téléphone (1446) provenant d'un échantillon de femmes de 25 ans et plus sélectionnées au hasard, un échantillon total de 1654 estimations du pourcentage pondéré ont été produites. Le taux global de réponses était de 12,5 %.

Résultats : Un peu moins de la moitié des femmes étaient capables de citer le tabagisme comme étant un facteur de risque de la

Heart disease remains a leading cause of death among both sexes in Canada. In women, however, its importance is often underrated—especially relative to other diseases. In 2011, the latest year for which data are available, heart disease accounted for 23,363 of all female deaths, compared with 8707 due to lung cancer and 4958 to breast cancer.^{1,2}

Although women and men share most classic cardiovascular disease (CVD) risk factors, with the exception of those stemming from sex-related hormones, the significance of some factors—notably smoking, diabetes and hypertension—is

greater in women than in men.³⁻⁵ As well, symptoms of myocardial infarction and other acute coronary syndromes in women differ somewhat from the symptoms in men (eg, women present with less or no pain, and more often with, dyspnea, nausea, and unexpected fatigue), which can result in misdiagnosis and delayed treatment.⁵⁻⁸ Until recently, most of the clinical trials that form the basis of CVD treatment guidelines have focused on outcomes in men.^{5,9} Sex-based bias also affects clinical decision-making, leading to differences in diagnostic and management approaches between the sexes. Women are less likely to be referred for diagnostic testing or to receive preventive interventions and recommendations, including lipid-lowering therapy, aspirin, and lifestyle advice.¹⁰ As a result, women are often diagnosed with more advanced disease, and a poorer prognosis.¹¹

Perhaps related to older age at diagnosis, treatment appears to be less aggressive in women than men.¹² The typically later age at onset of the disease in women results in a manifestation

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on heart health from their doctor, but only slightly more than half report that their doctor includes discussion of prevention and lifestyle during clinical consultations.

Conclusions: Most women lack knowledge of heart disease symptoms and risk factors, and significant proportions are unaware of their own risk status. The findings underscore the opportunity for patient education and intervention regarding risk and prevention of heart disease.

of additional comorbidities that further complicate identification and treatment of CVD.^{5,9,13-16} Less successful control of hypertension in older women than in men might also compound the challenges of heart disease management.¹⁷

To draw attention to the distinct nature and importance of heart disease in Canadian women, the Canadian Women's Heart Health Centre was recently established as a strategic priority for the University of Ottawa Heart Institute. An early initiative of the Centre was a national survey of women across Canada regarding heart health. In this article we examine findings related to some of the survey's themes: (1) awareness and knowledge of heart disease and heart health; (2) attitudes/values, perceptions, and beliefs regarding heart disease and heart health; and (3) motivations, barriers, and preferences related to seeking out health information or care. The analysis focuses on a comparison of women's perceptions of their heart disease risk with their self-reported risk status.

Methods

A survey of women aged 25 years or older who resided in the 10 provinces of Canada was conducted by EKOS Research Associates Inc in the spring of 2013. The survey questionnaire was adapted from an instrument in current use in North America.¹⁸⁻²⁰ The English questionnaire was translated into French; pilot testing was conducted online and by telephone in both languages.

Participants were members of a panel of 90,000 Canadians selected at random using a random-digit dial land line/cell phone hybrid sample frame used by EKOS to conduct surveys. Panelists have the option of completing surveys by telephone or online. A random sample of women aged 25 or older was selected from the panel. Of panelists identified as telephone respondents, 1214 women with valid numbers received requests to participate. Of the 221 who completed the survey, 208 were eligible for the survey for a response rate of 17%. Among online panelists, 18,997 with valid electronic coordinates were requested to participate. Of the 1541 surveyed, 1446 were eligible for the survey for a response rate of 8%. The combined response rate for the 2 response modes was 12.5% and the number of women eligible for the study who completed the survey was 1654. To adjust for differences in participation rates by age group and geographic region, weights were assigned so that the distribution of respondents was the same as measured in the 2011 Canadian Census.²¹ For example, the subgroups of women younger than 45

cardiopathie, et moins d'un quart d'entre elles citaient l'hypertension ou le cholestérol élevé. Moins de la moitié des femmes connaissaient les principaux symptômes de la cardiopathie. La plupart des femmes préfèrent recevoir de l'information sur la santé cardiovasculaire par leur médecin, mais seulement un peu plus de la moitié d'entre elles rapportent que leur médecin aborde la prévention et le mode de vie durant les consultations cliniques.

Conclusions : La plupart des femmes manquent de connaissances sur les symptômes et les facteurs de risque de la cardiopathie et une proportion importante ne connaît pas son propre niveau de risque. Les conclusions font ressortir l'importance de l'éducation et des interventions auprès des patientes concernant le risque et la prévention de la cardiopathie.

years of age and 45-54, who were underrepresented in the responding sample because of a lower response rate, were given respective weights of 1.984 and 1.193, and women in the age groups 55-64 and 65 or older were assigned weights of 0.598 and 0.702, respectively. Univariate and bivariate percentage estimates were calculated based on the weighted data.

Ethics approval for the survey was obtained after review of the questionnaire and survey design by the Ottawa Health Science Network Research Ethics Board.

Heart disease knowledge

Actual knowledge of heart disease was obtained by asking respondents in open-ended questions to identify risk factors and common symptoms.^{14,18,19,22,23} Knowledge related to prevention was assessed by reading a list of possible actions, some of which are supported by evidence as being effective and others not. The list included: eating more fruits and vegetables, exercise, regular medical check-ups, healthy weight, smoking cessation, stress management, hypertension control, taking vitamins, antioxidants, and hormone replacement. Based on the number of correct answers, a knowledge index was developed, with possible scores ranging from 0 to 40. In preliminary analysis, the overall mean score of the heart disease knowledge index was 15.0. Based on the percentage distribution, cut points were assigned to categorize respondents as having a low (0-13), medium (14-17), or high (≥ 18) level of knowledge. The distribution of women by category was 25% low, 45% medium, and 30% high.

Perceived level of heart disease knowledge was assessed by asking: "How informed would you say that you are about heart health and heart disease and the risk factors associated with it?" Respondents ranked their knowledge on a scale of 1 to 5, with 1 or 2 indicating "not informed," 3 indicating "moderately informed," and 4 or 5 indicating "well informed."¹⁸

Heart disease risk

Two indices were derived—1 for medical risk and 1 for lifestyle risk (note that both indices included smoking). Consistent with the approach used by Mosca et al.,¹⁹ medical risk status was assessed according to respondents' self-report rather than clinical measures, using the National Cholesterol Education Program criteria²⁴ (Supplemental Table S1). Categories were defined as high, moderate, or low. Lifestyle risk status was based on scores for the following behaviours:

smoking, exercise, fruit and vegetable consumption, stress, and alcohol consumption (Supplemental Table S2). Low risk was defined as a score of 4-7 points, moderate risk a score of 3, and high risk a score of 0-2.

To assess understanding of their potential for heart disease, respondents were asked to rate their personal risk as low, moderate, or high.

Attitudes toward responsibility for health

Opinions of who should be responsible for maintaining one's health were assessed by asking, how much of your health is the responsibility of your health care provider (Supplemental Table S3).^{19,22,25,26} To assess the extent to which clinical consultations (are perceived to) include mention of primary prevention, respondents were asked to agree or disagree with the statement, "Discussing prevention and healthy lifestyle practices is a regular part of my visit with my health care professional."¹⁸

Motivations, barriers, and sources of health information or care

From a list, respondents were asked to indicate all possible reasons for having taken actions to improve their health (Supplemental Table S3). Respondents were also asked to identify any barriers to taking action to improve their health (Supplemental Table S3).^{19,20}

An open-ended question asked respondents about sources of information on heart health: "If you were looking for information on heart health or heart disease, where would you look?" Responses were categorized (eg, "broadcast media" included any mentions of TV or radio; "print publications" included mentions of pamphlets, magazines, journals, newspapers, etc), and frequencies were tabulated.

Results

The sociodemographic characteristics of the survey respondents are shown in Table 1.

Awareness, knowledge of heart disease, and heart health

When asked in an open-ended question to name possible symptoms of heart disease, fewer than half of the women (43%) named chest pain, and 38% named shortness of breath or difficulty breathing while exercising. Pain spreading to the shoulder or neck or arm was named by 29% (Fig. 1). Awareness of some symptoms increased with education and higher household income (chest pain, unusual fatigue, shortness of breath, light headedness, nausea). Women younger than the age of 45 years were generally less apt to identify any possible symptoms. The most commonly mentioned symptoms were more apt to be identified by women who were at least 55 years old. Related to this, awareness of many of the symptoms of heart disease in women was also associated with knowing someone with heart disease.

The most frequently named modifiable heart disease risk factors were overweight/obesity, physical inactivity, and smoking. These were followed by diet (lack of fruits and vegetables), stress, high blood pressure, high cholesterol levels, and diabetes. Awareness of a number of medical risk factors (overweight, high blood pressure, high cholesterol) and

lifestyle risk factors (smoking, physical inactivity) linked to heart disease is greater among women with higher education and affluence. Women between the ages of 55 and 64 years were more likely than other women to be aware of a number of risk factors.

The scores of 30% of respondents placed them in the "low" range of the knowledge index, 45% were in the "medium" range, and 25% in the "high" range (Table 2). Significant differences in scores emerged according to socioeconomic status: high scores were twice as likely among university-educated women (30%) than in those reporting secondary education or less (15%) (Fig. 2). Women from households in which income was \$100,000 or more were also more likely (31%) to score in the high range than those with an income of less than \$40,000 (21%) (Fig. 3).

Self-ratings of perceived knowledge of heart disease were distributed as follows: 9% were categorized as not informed, 48% as moderately informed, 43% as well informed. Women in Ontario were more apt to rate themselves as informed about heart disease and heart health, compared with other parts of Canada. Feeling uninformed about heart health and heart disease was more common among women with lower incomes and education, and those who were younger than 45 years of age, and who did not know anyone with heart disease.

Table 1. Sociodemographic characteristics of survey respondents; national sample, women 25 or older, Canada, 2013

Characteristic	%
Age group, years	
25-34	19
35-44	18
45-54	22
55-64	18
65-74	17
≥75	6
Education	
Elementary school or less	1
Secondary school	10
Some post-secondary	10
College, vocational, or trade school	24
Undergraduate university	30
Graduate or professional	25
Annual household income	
<\$20,000	8
\$20,000 to <\$40,000	13
\$40,000 to <\$60,000	15
\$60,000 to <\$80,000	12
\$80,000 to <\$100,000	13
\$100,000 to <\$120,000	11
\$120,000 to <\$150,000	6
\$150,000 or more	8
No answer	15
Employment status	
Working full-time	33
Working part-time (<35 h/wk)	10
Self-employed	9
Student (not working)	2
Unemployed, looking for work	3
Not in workforce	9
Retired	25
Other	9
Marital status	
Single (never married)	17
Married/common law	62
Divorced/separated	13
Widowed	8

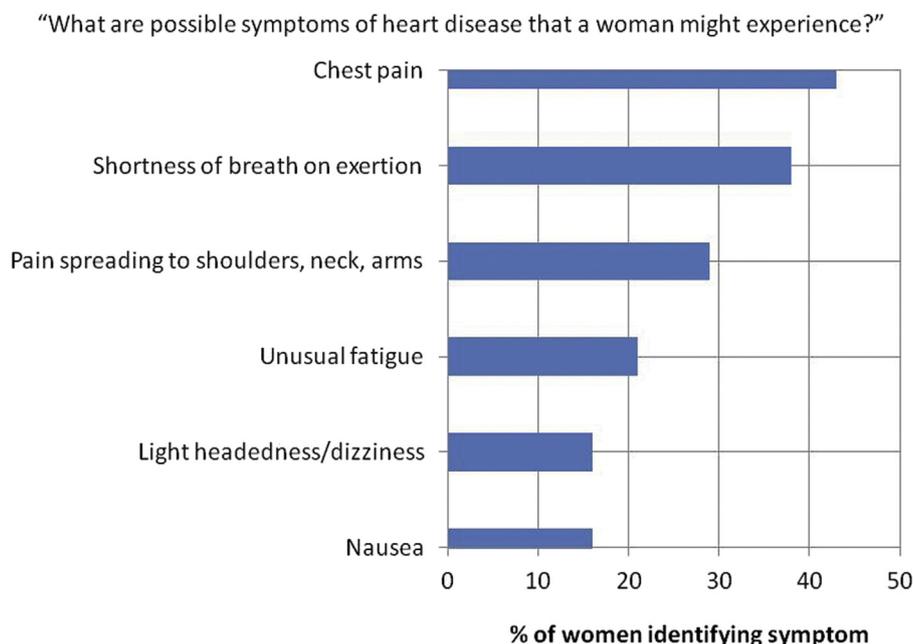


Figure 1. Knowledge of heart disease symptoms.

In a comparison of actual and perceived heart disease knowledge, four-fifths (80%) of respondents with a low knowledge score perceived that they were moderately or well informed. Of those with a moderate level of actual knowledge, 44% reported themselves to be well informed. Altogether, 41% of women overestimated their level of heart disease knowledge.

Actual, perceived heart risk

Based on medical risk factors, one-sixth (17%) of women were at high risk of heart disease, a quarter (25%) at moderate risk, and 58% at low risk. Of women at high risk, 60% perceived their level of risk to be low or moderate (Table 3). Of those at moderate risk, 15% perceived their risk to be low. Overall, 15% of women underestimated their risk, based on personal and family medical history and the presence of medical conditions. The most alarming might be that it is women who are at the greatest medical risk and those with CVD who are the most likely to fall into this category. Twenty-three percent of those at high medical risk and 29% of those diagnosed with heart disease scored in the mid to lower range on knowledge, but reported their knowledge levels to be high.

According to lifestyle practices 40% were at high risk, 34% at medium risk, and 26% at low risk. Of those at high risk,

78% perceived their risk as low or moderate, and of those at moderate risk, 31% perceived their risk to be low (Table 4). To summarize, an estimated 39% of women underestimated their personal risk as conferred by lifestyle.

Lifestyle risk varied with socioeconomic conditions in a pattern similar to that for heart disease knowledge. Nearly 6 in 10 women with secondary education or less were classified as being at high risk, compared with 35% of those with university education (Fig. 4). Thirty-eight percent to 42% of women with the highest household incomes, the highest education, and younger than the age of 45 years rated their risk as low. Among women with lower education levels, and who were 55 years of age or older, 16%-23% rated themselves as being at high risk for developing heart disease.

Attitudes and beliefs regarding responsibility for health

Nearly 4 in 5 Canadian women believed that they were completely or largely responsible for their health, and 15% perceived the responsibility to be mutually shared with their health care professional. Just over half (55%) of women reported that they routinely discuss prevention and lifestyle practices with their health care provider. Women reporting the highest education and income, highest knowledge of CVD, and lowest actual and perceived risk of CVD were the most likely to see their personal health as largely their own responsibility. Women age 55 and older were more likely to discuss heart disease prevention as part of their regular visit with their doctor.

One in 10 women reported having been diagnosed with heart disease, nearly two-thirds (65%) of whom recognized their condition to be chronic and to require continuous management of risk factors. However, 35% viewed the condition as transient; when treated, they had resumed their prediagnosis lifestyle.

Table 2. Percentage distributions of level of perceived knowledge vs level of actual knowledge; women aged 25 or older, Canada, 2013

Perceived level of knowledge	Actual knowledge			
	Total (n = 1654)	Low (n = 434)	Medium (n = 760)	High (n = 460)
Not informed	9	19	5	3
Moderately informed	48	51	51	37
Well informed	43	29	44	59

Data are presented as percentage.

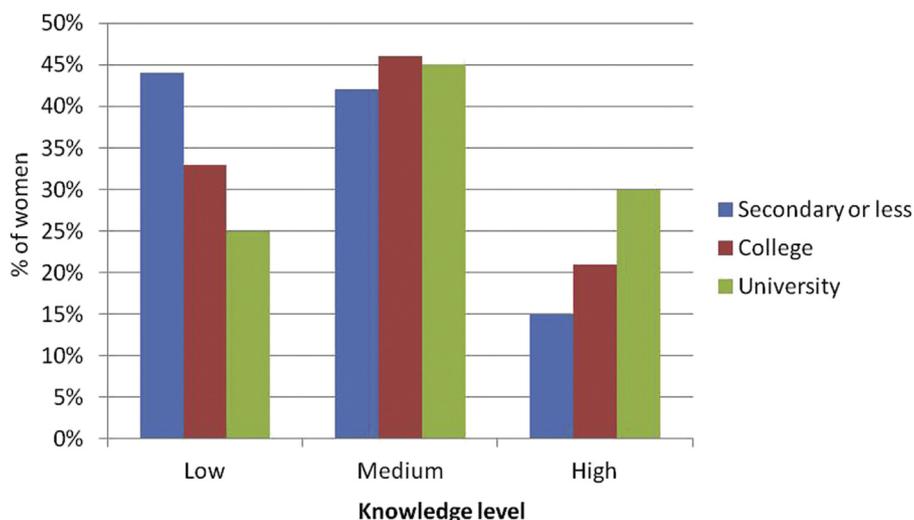


Figure 2. Heart disease knowledge level, according to level of education.

Responses to attitudinal questions indicated that most Canadian women believe that leading a heart-healthy lifestyle is important. Nearly two-thirds (65%) reported that they are the person in the family with the greatest influence over the family’s health. Women who consider themselves to be among the most informed, and those who scored highest on the knowledge index believed that they had the greatest influence over their families. These points of view were also more often espoused by women who perceived their own personal risk of CVD as being low. Women reporting fewer actual (medical or lifestyle) risk factors were also more apt to be confident and see their influence as positive with families.

Motivations and barriers to seeking health information or care

Women who reported that they had taken measures to improve their health gave the following reasons: to feel better (92%), to live longer (82%), and to avoid taking medications (74%).

For women aged younger than 45 years, wanting to feel better was the most frequently cited reason, and those aged 45-64 were more likely to be motivated by a desire to stop taking medications. For older women, a doctor’s advice or publicity about heart disease were the most frequent influences.

Less affluent and educated women were more likely to have taken action because their doctor, a friend, or a family member encouraged them to; because a family member or friend developed heart disease, got sick, or died; and because they heard or read something related to heart health. Women with at most a college education were also more likely to have taken action because they wanted to avoid using medications, and women with at most a high school education were more likely to have taken action for their family.

Sources of health information

Most women (62%) reported that their preferred source of information about heart disease was their doctor. Others included health-promoting organizations (46%) and the

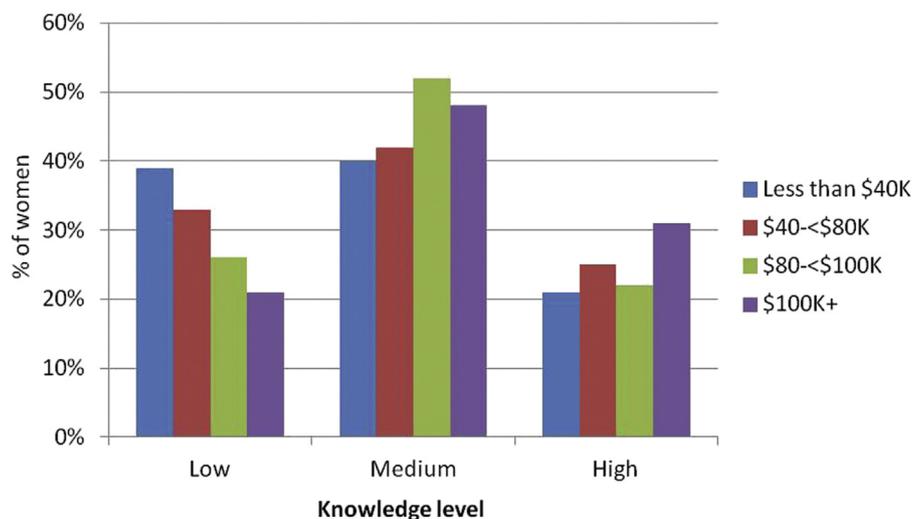


Figure 3. Heart disease knowledge level, according to household income.

Table 3. Percentage distributions of level of perceived heart disease risk vs level of actual risk based on medical factors; women aged 25 or older, Canada, 2013

Perceived risk	Actual risk			
	Total (n = 1642)	Low (n = 742)	Moderate (n = 537)	High (n = 363)
Low	32	44	15	9
Moderate	52	47	63	51
High	12	4	20	37
Don't know	4	5	2	3

Data are presented as percentage.

Internet (41%). Preference for doctors was particularly high among women in Ontario, Atlantic Canada, and in British Columbia. More affluent and educated women were more likely to use the Internet to get information about heart health. Less affluent women were more likely to get information from cardiologists, a provincial government, and newsletters. College-educated women were more likely to prefer health programs on TV, pharmacists, and pamphlets or brochures, compared with women with more education or with at most a high school education.

Some print and broadcast media sources were more likely to be preferred by older women relative to the younger cohort, particularly TV health programs, newspapers, newsletters, and books. Those who presented with different levels of risk based on medical and lifestyle factors preferred different information sources: women with high medical risk more often mentioned heart specialists, TV news, and news media generally, and pharmacies; and women with low medical risk more likely preferred Web sites. Women at lower risk based on lifestyle choices were more apt to point to books, health journals, pharmacists, and newspapers as key sources compared with women who were at higher risk based on lifestyle choices.

Discussion

This research highlights substantial gaps in women's knowledge of heart disease symptoms and the most important

Table 4. Percentage distributions of level of perceived heart disease risk vs level of actual risk based on lifestyle practices; women aged 25 or older, Canada, 2013

Perceived risk	Actual risk			
	Total (n = 1654)	Low (n = 454)	Moderate (n = 610)	High (n = 578)
Low	32	45	31	24
Moderate	52	44	54	54
High	12	8	11	16
Don't know	4	3	3	6

Data are presented as percentage.

risk factors of heart disease—notably, smoking, dyslipidemia, diabetes, and hypertension.⁴ Only 4 in 10 women could name chest pain as a symptom of heart disease, and a smaller proportion could identify symptoms including dyspnea, radiating pain, or typical prodromal symptoms. Such shortcomings might contribute to the greater number of unrecognized myocardial infarctions in women than in men, not to mention inappropriate treatment of acute events and premature discharge from emergency care.^{7,13,16} Fewer than half of the women identified smoking as a risk factor, and less than a quarter were able to name the other leading risk factors. Furthermore, women's awareness of their lack of knowledge was generally deficient, as reflected in inconsistencies in perceived and actual knowledge.

Similar discrepancies emerged regarding women's awareness of their own heart disease risk. A substantial proportion of women classified as at risk of heart disease by virtue of their lifestyle practices or medical history significantly underestimated their level of risk. Women from low educational or socioeconomic backgrounds were less likely to appreciate their risk or strategies that might attenuate it.

Although many women's understanding of heart disease and awareness of their own risk status might be less than optimal, most assume that their health is largely their own responsibility. This outlook is encouraging but could be more fully exploited, as suggested by the finding that just over half

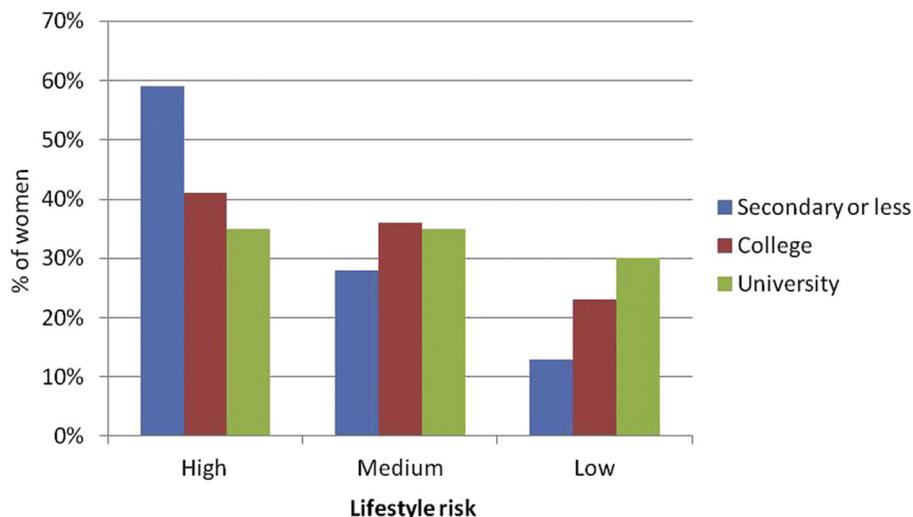


Figure 4. Level of heart disease risk according to lifestyle level of education.

of physician encounters include discussion of prevention and lifestyle. Women's strong preference for a physician to be their primary source of information regarding heart health emphasizes the potential opportunity for patient education. For example, the finding that more than a third of women who had been treated for heart disease assumed that they could resume their prediagnosis lifestyle underscores the need to better inform patients of the disease's chronicity and the effects that day-to-day risk-reducing activities can have on its trajectory.

Previous reports of differences between perceived and actual heart disease risk are scarce, and methodological differences limit the comparability of the findings with those of the present study. However, the general results are consistent with the findings herein. Mosca et al., in a 2005 survey of women in the United States, reported that 30% underestimated their level of risk.¹⁹ In a clinically based study in The Netherlands, 17% of patients who consulted a general practitioner were assessed as being at high risk of heart disease, of whom four-fifths perceived their risk as being lower.²⁷ Similarly, results from the Reassessing European Attitudes about Cardiovascular Treatment (REACT) study indicated that 37% of people (men and women together) were at high cardiovascular risk (2 or more risk factors present), but only 13% self-reported high risk.²⁸

Limitations

This was a cross-sectional study, thus causality between correlates cannot be inferred. The data were based on self-report, and no external verification of the validity of responses was undertaken. The response rate was low; the degree to which respondents and nonrespondents were dissimilar, and the extent to which such differences might have biased the findings is unknown. Survey participants could have chosen to respond using the Internet or telephone; the choice in survey modes might have biased the results.

Conclusions

To our knowledge, our survey is the first to assess knowledge, attitudes, and perceptions regarding heart disease among Canadian women. The survey complements other Canadian programs such as the Heart and Stroke Foundation's public education campaign, "The Heart Truth," aimed at women and health care practitioners.²⁹ These initiatives reflect a growing awareness of the particular nature of heart disease in women, and the protective measures that can be taken.

Age and heredity aside, many risk factors of heart disease derive from lifestyle and cultural influences, and are theoretically modifiable. However, change presupposes a requisite set of knowledge and attitudes. Results of the survey suggest that despite the fact that women are generally predisposed to take on responsibility for their heart health, a significant proportion lack the knowledge or insight to do so. Furthermore, many who are at risk of developing heart disease due to lifestyle practices are unaware of their risk, and of ameliorative measures that could be taken.

An important finding from these results is that even in a society in which electronic media would seem to prevail, most women prefer to receive information regarding heart health

from their doctor. Women need to be better informed, and together with their receptive outlook, present physicians an excellent opportunity to offer guidance regarding lifestyle practices, and the benefits of primary and secondary prevention.

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Disclosures

The authors have no conflicts of interest to disclose.

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Supplementary Material

To access the supplementary material accompanying this article, visit the online version of the *Canadian Journal of Cardiology* at www.onlinecjc.ca and at <http://dx.doi.org/10.1016/j.cjca.2014.05.007>.

Erratum



In the article, "Hypertension in Developing Countries" by Tibazarwa and Damasceno, published in the May issue (*Can J Cardiol* 2014;30:527-33), there is an error on page 530. In the second paragraph, the fourth sentence should read as follows:

In many parts of the poorer world, even if a sphygmomanometer was available, the measurement of blood pressure is **not** routinely done during primary health care consultations.