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Special Theme Issue:
Women's Heart Health Across the Lifespan

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Women are under-researched, under-diagnosed, and over-dying

– Heart & Stroke Foundation of Canada, 2018

We are very pleased to present our theme issue: *Women's Heart Health Across the Lifespan!* I believe the stars are finally aligning for women's heart health in Canada! For example, the *Heart & Stroke 2018 Heart Report: Ms Understood,* brought the issue of lack of research, diagnoses, treatment, support, and awareness regarding women and heart disease to the fore for many Canadians. Also in 2018, the Canadian Women's Heart Health Alliance was established as a network of experts and advocates, to develop and disseminate evidence-informed strategies to transform clinical practice and enhance collaborative action on women's cardiovascular health in Canada. These are just two examples of the many important women's heart health initiatives that are now popping up across the country.

In this theme issue of the *Canadian Journal of Cardiovascular Nursing*, we are doing our part to increase awareness of women's heart health by publishing an eclectic array of novel, scholarly, informative, and interesting papers. Dr. Davina Banner and a team of researchers, patients, and knowledge users are engaged in patient-oriented research to explore cardiovascular disease (CVD) risk in women with the rare condition of congenital adrenal hyperplasia (CAH). Their paper briefly explores current evidence of cardiometabolic risk for women with CAH and examines opportunities for targeted and patient-centred supports to improve patient outcomes.

Ms. Gurmeet Gujral shares the findings of her Master of Nursing thesis study in which she explored the perceived personal risk of CVD in a cohort of female nurses.

Mr. Gerald Macdonald summarizes the current state of knowledge on the emerging issue of spontaneous coronary artery dissection (SCAD) in women. This paper was inspired by his work with SCAD patients in his role as a Cardiac Nurse Educator in Cardiac Rehabilitation.

Finally, as the Founding Director, Ms. Wendy Wray hopes to inspire other nurses by sharing her story of the development of the Montreal-based Women's Heart Health Initiative.

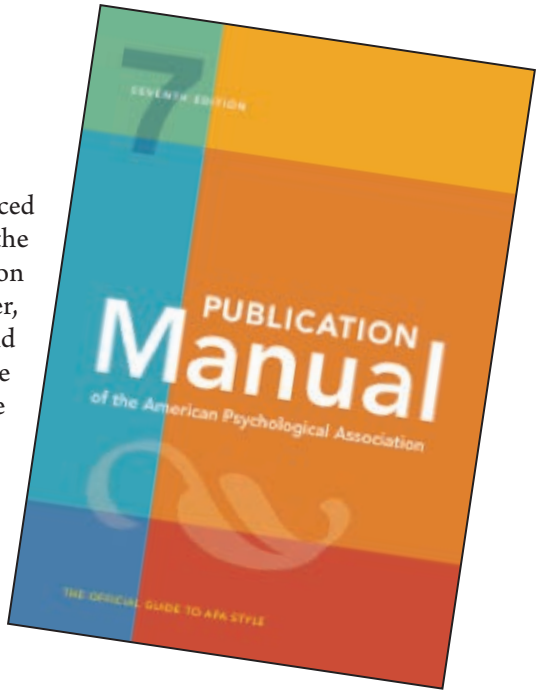
Enjoy!

Jo-Ann V. Sawatzky, RN, PhD
Editor

NEW: APA Manual 7th edition

The American Psychological Association (APA) has recently introduced the 7th edition of the APA Publication Manual, which replaces the 6th edition, published in 2009. The good news is that the 7th edition includes new student-specific resources, including a sample paper, 100+ new reference examples, best practices for ethical writing and avoiding plagiarism, and so much more. For information about the features and changes in the 7th edition, please check out any of the many online resources, such as the CHOICE Media webinar What's New in APA Style—Inside the Seventh Edition of the Publication Manual of the American Psychological Association or visit APA Style and Grammar Guidelines.

PLEASE NOTE: Going forward, all new manuscript submissions to the CJCN must follow the 7th edition guidelines.



Women with Congenital Adrenal Hyperplasia: Promoting Cardiovascular Health Across the Lifespan

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Abstract

Cardiovascular disease (CVD) is a leading cause of mortality and morbidity worldwide, accounting for more than 17.3 million deaths each year. There is growing evidence to suggest CVD is beginning to rise in certain populations, including younger and female populations. This paper explores CVD risk in women with Congenital Adrenal Hyperplasia (CAH), a rare and life-long condition that is characterized by a range of autosomal recessive inherited enzyme deficiencies that impact cortisol biosynthesis pathways. Women with CAH may be particularly vulnerable to poor outcomes due to the influence of existing gender disparities that impact CVD recognition and outcomes, as well as the increased cardiometabolic risks that exist as a result of CAH. Attempts to mitigate and prevent cardiometabolic risks in women living with CAH are discussed, emphasizing targeted, patient-centred and interdisciplinary supports to improve patient outcomes and health-related quality of life. Nurses are in a unique position to support the cardiovascular health of women with CAH.

Keywords: congenital adrenal hyperplasia, cardiovascular disease, women, rare diseases

Banner, D., Hall, J., Callens, N., Dolan, S., Todd, N., Zimmer, L., & Sanders, C. (2020). Women with Congenital Adrenal Hyperplasia: Promoting Cardiovascular Health Across the Lifespan. *Canadian Journal of Cardiovascular Nursing*, *30*(1), 4–9.

Key Highlights

- Congenital adrenal hyperplasia (CAH) is a rare genetic condition that influences steroidogenesis.
- Excessive exposure to mineralocorticoids and glucocorticoids, as well as a failure to adequately regulate androgen levels, gives rise to a cluster of cardiometabolic risks.
- Women with CAH may be vulnerable to poor outcomes due to the influence of existing gender disparities that impact CVD recognition and outcomes.
- Women with CAH may benefit from early access to health education and lifestyle coaching, along with regular screening for major CVD risk factors. Nurses can play a central role in the development and delivery of patient-centred education to prevent and manage CVD risks in women with CAH.

Cardiovascular disease (CVD) is a leading cause of mortality and morbidity worldwide, accounting for more than 17.3 million deaths annually (Benjamin et al., 2017). Despite rapid advances in medical therapies and technology, rates of CVD have remained relatively static and are predicted to rise sharply over coming decades (Cupples, 2019; McClellan et al., 2019). This contrasts with other non-communicable diseases, such as cancer and diabetes, that have been associated with more sustained improvements over recent years (Wang et al., 2016). There is also growing evidence to suggest CVD is beginning to rise in some populations. Of note, adverse CVD trends are being seen in younger and female populations, as well as those who reside in low- and middle-income countries, including those in South Asia (Joseph et al., 2017). As a result, there is a renewed focus on the need to develop and implement effective and targeted interventions that both address risk factors and promote improved health outcomes (Cupples, 2019; Ofori, 2017).

When describing global patterns of CVD, McClellan and colleagues (2019) identified six current *"missed opportunities"* that are contributing to a lack of progress in CVD outcomes. These include the failure to adequately foster risk factor modification and engage patients in their care, along with the failure to diagnose and treat CVD in a timely manner, including providing prompt advanced interventions and early access to palliative care. These gaps in care may be further heightened for persons who live with rare diseases, who are typically faced with complex health challenges and significant barriers when attempting to access timely and responsive healthcare

services (Schieppati et al., 2008). Here, we explore CVD risk in women with congenital adrenal hyperplasia (CAH), a rare and lifelong condition that is characterized by a range of autosomal recessive inherited enzyme deficiencies that impact cortisol biosynthesis pathways and increase cardiometabolic risk. As part of a larger initiative to promote improved health outcomes for persons living with CAH, this paper will briefly explore current evidence of cardiometabolic risk for women with CAH and will examine opportunities for targeted and patient-centred supports to improve patient outcomes. Through this, we hope to raise awareness of cardiometabolic risks in women with CAH and promote earlier access to CVD prevention and risk factor management.

Congenital Adrenal Hyperplasia: An Overview

Considered a "difference of sex development" condition, CAH occurs in response to gene mutations that influence the production of steroids by the adrenal glands (Stewart & Newell-Price, 2015). In CAH, biosynthesis pathway distribution results in negative feedback actions that can lead to inadequate levels of cortisol and potentially aldosterone, as well as elevated levels of androgens (El-Maouche et al., 2019; Jenkins-Jones et al., 2015; Speiser et al., 2018). As a condition, CAH is known to affect males and females equally and exists on a continuum ranging from milder to more severe forms of the disease.

Variations in CAH result in some individuals experiencing a complete loss of steroidogenesis, impacting glucocorticoids, mineralocorticoids, and sex hormones biosynthesis, while other forms may give rise to some residual hormone production (Stewart & Newell-Price, 2015). Partial, considered mild or "non-classic" CAH, is more common and is typically diagnosed later, as symptoms may not emerge until puberty or adulthood. In females experiencing late onset CAH, some virilization of the genitalia and premature pubarche may be noted. In contrast, complete CAH, referred to as "classic" or "salt-wasting," is more frequently noted in the newborn (El-Maouche et al., 2019). In its classic or simple virilizing forms, female infants may present with atypical genitals, while males are phenotypically normal. In Canada, provincial screening for CAH is not consistently offered and is only available in approximately half of the provinces and territories (Canadian PKU and Allied Disorders Inc., 2015).

While advancements in medical management have led to improvement in patient outcomes (Fleming et al., 2017; Krone, 2014), CAH is associated with an average seven-year-lower life expectancy (Hummel et al., 2016) and higher healthcare utilization (Arlt et al., 2010; Gunnarsson et al., 2017; Jenkins-Jones et al., 2015). Furthermore, persons living with CAH commonly report decreased quality of life and poorer mental health (Johannsen et al., 2006). For example, some studies have shown that women with CAH have more psychiatric diagnoses and substance use disorders, in addition to poorer quality of life, compared to age-matched controls (Engberg et al., 2015; Jenkins-Jones et al., 2015).

Women living with CAH typically require ongoing medical management, including lifelong medication to help control and stabilize cortisol and aldosterone levels. In addition, some women with CAH may also require support to optimize menstrual or reproductive health, including manipulation of medication regimes to support regular menses, fertility, and pregnancy. Despite a need for ongoing care, women living with CAH are known to face significant barriers when accessing healthcare. These challenges may arise in response to a lack of CAH knowledge among generalist providers, the inconsistent use of terminology to describe difference of sex development conditions, and previous experiences of stigma or trauma (Engberg et al., 2016; Lee et al., 2006; Lundberg et al., 2018; Meyer-Bahlburg et al., 2017). Adopting a holistic, sensitive, and patient-centred approach to CAH care is essential in supporting the optimal health and wellbeing of women with CAH (Auchus et al., 2010; Lee et al., 2006; Roen, 2019; Roen & Pasterski, 2014; Witchel, 2010).

Congenital Adrenal Hyperplasia and Cardiometabolic Risk: What do we know?

There is emerging evidence that signals to the existence of a cluster of cardiometabolic factors that may give rise to increased CVD risk among persons living with CAH. Of note, elevated rates of hypertension, obesity, and insulin resistance among persons with CAH have been widely reported (Kim & Merke, 2009; Kim et al., 2015; Mooij et al., 2010). Structural changes within the cardiovascular system have also been examined in relation to CAH and early findings suggest that patients with CAH may experience a thickening of the carotid intima (Harrington et al., 2012; Sartorato et al., 2007; Wasniewska et al., 2013), as well as changes in left ventricular mass (Tony Nengom et al., 2017). These vascular changes may give rise to cardiac dysfunction and early atherosclerotic changes (Metwalley at al., 2016). While the underlying mechanisms are unclear (Falhammar et al., 2015), cardiometabolic risks are thought to occur in response to excessive exposure to mineralocorticoids and glucocorticoids, as well as a failure to adequately regulate androgen levels (Arlt et al., 2010).

Obesity and hypertension appear to be early and common risk factors in persons living with CAH (Finkielstain et al., 2012; Goncalves et al., 2009; Improda et al., 2019; Subbarayan et al., 2014). In a recent systematic review and meta-analysis of 20 observational studies, Tamhane and colleagues (2018) examined the cardiovascular and metabolic outcomes in persons with CAH. The meta-analysis of the collated study data revealed that those with CAH experienced increased blood pressure, insulin resistance, and carotid intima thickening when compared to healthy case controls. However, the authors highlighted concerns of bias, as well as varied methodological quality, among the captured studies, and that further research is needed to fully examine the mechanisms and impacts of CVD in persons living with CAH.

The evidence exploring sex-based differences in cardiometabolic risks in CAH is continuing to develop, but is largely limited by a lack of longitudinal data. Falhammar and colleagues (2015) examined cardiovascular and metabolic morbidity in 588 persons from a Swedish CAH registry. While obesity was more prevalent in both sexes when compared with controls matched for age, sex, and place of birth, females with CAH had statistically significant increases in CVD, diabetes, and hypertension when compared to their male counterparts. Further, Falhammar and team (2007) undertook a cohort study of 61 females with CAH. They identified that females aged 30 years or older had higher body mass index and waist-to-hip ratios when compared to younger patients with CAH and age matched controls. These emerging findings appear to suggest that females with CAH may experience unfavourable cardiometabolic risks and outcomes. However, the current literature remains fragmented and is largely limited to smaller cohort studies. Further research is needed to fully extrapolate the pathophysiological mechanisms and long-term sequalae of CAH, particularly with respect to CVD and cardiometabolic risks (Improda et al., 2019).

Promoting Cardiovascular Health Among Women with Congenital Adrenal Hyperplasia

As the largest healthcare discipline, nurses care for patients and community members across the lifespan and have assumed important roles in health promotion and disease prevention (Hayman et al., 2015). For those with CAH, advanced practice nurses, along with other members of the interdisciplinary team, may be responsible for delivering specialized CAH services. Other regulated nurses, such as licenced practical nurses and registered nurses, may also be engaged in caring for patients with CAH across a diverse range of acute and community settings. In all cases, nurses have a vital role in promoting the cardiovascular health of women with CAH.

While there are gaps and variations in the published CAH literature, there is increasing evidence to suggest that those with CAH are exposed to complex cardiometabolic factors that may increase their risk of CVD (Improda et al., 2019). As these risks may occur principally in response to excessive exposure to mineralocorticoids and glucocorticoids, and a failure to adequately regulate androgen levels, ongoing support to optimize the medical management of CAH should be prioritized. In addition, interventions aimed at mitigating and preventing cardiometabolic risks should be promoted. Thus, persons with CAH may benefit from early access to health education and lifestyle coaching, in addition to routine screening for major CVD risk factors (Speiser et al., 2018). Adopting a proactive and upstream approach to CVD prevention may yield long-term improvements in health outcomes for those with CAH.

While all patients with CAH appear to face increased cardiometabolic risk, women with CAH may be particularly vulnerable to poor outcomes due to the influence of existing gender disparities that impact CVD recognition and outcomes. For example, there is already a significant body of literature identifying that women often fail to recognize CVD risk and symptoms (Bairey Merz et al., 2017; Ramachandran et al., 2016; Smith et al., 2018). Further, women are less likely to receive evidence-based interventions to prevent and manage CVD and experience worse outcomes, as a result (Garcia et al., 2016; Gujral & Sawatzky, 2017; Isakadze et al., 2019; McDonnell et al., 2018). Explanations for this have included the increased occurrence of atypical symptoms of CVD among women (Garcia et al., 2016; Rubini Gimenez et al., 2014), as well as a lack of awareness of gender-specific CVD risks and presentations among healthcare providers (Lee et al., 2017; McDonnell et al., 2018). Overall, the lack of awareness of CVD risk, in concert with the early cardiometabolic consequences of this condition, creates a recipe for poor health outcomes among women with CAH.

Current clinical guidelines that delineate the prevention and management of CVD are relevant for women with CAH and should be used to inform care (Speiser et al., 2018). However, health education and promotion strategies may need to be tailored in order to effectively target this at-risk population of women. Women living with CAH should be supported to adopt healthy lifestyle behaviours, including eating a healthy, nutritious diet, refraining from smoking, undertaking regular monitoring of blood pressure and cholesterol, maintaining a healthy blood pressure and weight, undertaking regular physical activity, and reducing stress (Mosca et al., 2011). Furthermore, utilizing effective and evidence-based approaches to health education and coaching strategies across the lifespan has the potential to improve the uptake of healthy behaviours and, in turn, mitigate and reduce CVD risk among women with CAH. Nurses continue to play an important role in patient education, including the delivery of formal primary and secondary CVD prevention programs (Berra et al., 2006). As such, nurses are well positioned to develop and lead initiatives that provide targeted patient-centred CVD education that complements existing interdisciplinary CAH care across the lifespan.

Educational resources for women with CAH are very limited and may fail to account for information needs across the lifespan. To address this issue, educational interventions that are tailored for women and girls with CAH across the lifespan may be valuable. During early childhood, accessible health education should be provided to parents and caregivers for the purposes of promoting the early adoption of healthy lifestyle behaviours. Delivering family-based health promotion interventions, particularly to parents of young children, may address behavioural risk factors and promote improved health in later life (Vedanthan et al., 2016). Through such interventions, parents may benefit from information that identifies potential risk factors for CVD and delineates the early and increased cardiometabolic risks among persons with CAH. Resources could include written leaflets and food guides. Moreover, child-friendly educational materials, in the

form of comics or videos, may also be useful when sharing information with younger children living with CAH.

During adolescence, persons with CAH may benefit from health promotion interventions and lifestyle counselling, particularly as this is often a period during which significant changes in diet and physical activity can occur (Expert Panel on Integrated Guidelines for Cardiovascular Health and Risk Reduction in Children and Adolescents, 2011; Ng et al., 2014; Shay et al., 2013). Establishing healthy lifestyle practices during this stage has the potential to influence long-term cardiovascular health and quality of life (Shay et al., 2013).

In early adulthood, women with CAH may be accessing care to support ongoing medical management of CAH, as well as potentially accessing specialist services for menstrual or reproductive health. At this time, women may be increasingly focused on adopting healthy lifestyle practices and may benefit from opportunistic screening, as well as education to address risk factors and promote ongoing screening. Finally, as women with CAH enter mid-to-later life, ongoing regular screening and early access to CVD care should remain a priority. Educational interventions to foster sustained lifestyle modification, including mobile apps and motivational interviewing, may prove beneficial and have shown potential for sustained CVD risk reduction (Chow et al., 2016; de Castro & Sawatzky, 2018; van Nes & Sawatzky, 2010).

In order to optimize health outcomes, there is the need to support the creation of health education and coaching interventions for women with CAH that are patient-centred, targeted and, where possible, developed in partnership with girls and women with CAH. To date, there are limited educational resources that focus upon CAH and, more specifically, CAH and CVD. To address this gap, our team has begun to develop educational resources for girls and women with CAH. This has included a website with information resources on CAH, leaflet on CAH and menstruation, and an infographic on CVD risks for women with CAH (https://cahcanada.ca/). These resources have been co-created with, and evaluated by, persons with lived experience of CAH, healthcare providers, and researchers. Team members are continuing to develop global CAH collaborations and are working to develop educational interventions that foster health and wellbeing among persons with CAH.

Conclusion

To summarize, CAH is characterized by a range of autosomal recessive inherited enzyme deficiencies. Alike to other rare diseases, persons with CAH face complex healthcare challenges, including the need for lifelong medications and interdisciplinary care. Women with CAH experience cardiometabolic risks that may increase their risk of CVD. Furthermore, women are known to experience significant barriers when seeking help and receiving CVD care. Targeted health education and coaching interventions that promote heart health across the lifespan are urgently needed and have the potential to improve the health and wellbeing of women with CAH. Nurses are in a unique position to support the cardiovascular health of women with CAH and may assume important roles in the development and delivery of preventative healthcare services.

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Exploring the Perception of Personal Cardiovascular Disease Risk Among Female Nurses

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Abstract

Background: *Although an accurate perception of personal cardiovascular disease (CVD) risk may influence risk factor reduction behaviours, few studies have explored actual and perceived personal risk in healthy women. Therefore, the purpose of this study was to explore actual and perceived personal risk of CVD in women across the lifespan.*

Methods: *This cross-sectional survey study included a convenience sample of female registered nurses, who reported no personal history of CVD (N=816).*

Results: *Perception of personal CVD risk was significantly related to age, fearing CVD as one's greatest health risk, discussing CVD risk with one's primary healthcare provider, and a positive family history of CVD.*

Conclusion: *This study provides novel evidence related to the perception of personal risk for CVD among women. Nurses can play a central role in improving CVD outcomes in women by advocating for more effective CVD risk assessment and awareness strategies for cardiovascular health promotion in women of all ages.*

Keywords: cardiovascular disease, gender, sex, risk perception, women

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Key Highlights

- Accurate perception of personal CVD risk is essential for women to engage in risk-reducing health behaviours.
- Key predictors of perceived personal CVD risk in nurses included: increasing age, fearing CVD as one's great health risk, discussing CVD with a PHCP, and family history of CVD.
- Nurses in primary care are ideally situated to assess actual and perceived personal CVD risk in women across the lifespan and to address prevention strategies accordingly.

Background

Globally, cardiovascular disease (CVD) is the leading cause of death in women, accounting for 8.6 million annual deaths (World Heart Federation [WHF], 2017). Although CVD is a major threat to women's health, it is often under-diagnosed, under-treated, and under-researched (Heart & Stroke Foundation, 2018). Moreover, despite the longstanding evidence of increasing risk in the post-menopausal years, recent evidence suggests that younger women are also at risk for CVD (Arnott et al., 2019; Bullock-Palmer et al., 2019; Gujral & Sawatzky, 2017; Heart and Stroke Foundation, 2014; Srivaratharajah & Abramson, 2019; Vikulova et al., 2019; Wilmot et al., 2015).

Prevention is key to reducing the overall mortality and burden of CVD among women. While general awareness of CVD risk among women is improving (Mosca et al., 2013), this trend has not translated into an accurate understanding of personal risk perception or engagement in risk-reducing health behaviours (Kling et al., 2013). As the population is aging, and rates of key modifiable risk factors, such as obesity and inactivity tend to increase with age (Benjamin et al., 2018), there is an urgent need for more effective strategies for primary and secondary prevention.

Personal perceptions about a disease will impact the individual's health promotion actions (Wang et al., 2009). Accurate perceptions of personal risk for disease may also predict intent to engage in preventative behaviours and healthy

lifestyles (Cainzos-Achirica & Blaha, 2015). For example, women with an accurate personal perception of breast cancer risk are more likely to adhere to early detection strategies, such as mammogram screening (Diefenbach et al., 1999; Drossaert et al., 1996; Griva et al., 2013; Katapodi et al., 2004; Seitz et al., 2017).

Despite a general increase in awareness of CVD, many women still do not have an accurate personal perception of their own risk for CVD (Mosca et al., 2013). This may be due to a number of factors, such as underestimating their health risks, and general optimism about health, especially in younger individuals (Imes & Lewis, 2014). For example, a study of African-American women (N=281) found that, despite having several risk factors for CVD, participants perceived their personal CVD risk as low (Robinson et al., 2018). Accurate perception of personal risk is important because it may lead individuals to make healthier lifestyle or other disease-preventative decisions (Cainzos-Achirica & Blaha, 2015). Identifying factors that influence personal perception of CVD risk among women may also provide insight into the development of more effective strategies to promote CVD prevention. Therefore, the purpose of this research was to explore perceived personal risk of CVD in the population of adult women.

This study was guided by the health belief model (HBM). The HBM is a psychological, health-related change model that acknowledges the importance of individual perceptions of perceived threat or risk of disease, as well as demographic, sociopsychological, and structural factors, and cues to action that modify the perceived risk (Rosenstock, 1974). Accordingly, the three research questions were: 1) What are the individual perceptions of personal CVD risk? 2) What is the relationship between perception of personal CVD risk and modifying variables? 3) What is the relationship between actual and perceived personal risk of CVD, in the study sample?

Methods

This quantitative study utilized a cross-sectional survey design. The study sample was randomly drawn from female registered nurses (RNs) in a central Canadian, urban setting. Nursing is primarily a female profession, with a broad span of ages, thus providing a suitable and convenient sample of the target population of adult women across the lifespan. As well, including only RNs provided a relatively homogenous sample in terms of level of education, as well as basic knowledge of CVD risk, and the ability to accurately complete a health-related questionnaire due to their education. This sound rationale for recruiting a cohort of female nurses was grounded in the similar logic used in the renowned Nurses Health Study, which was initiated in 1976, and continues to contribute to important scientific knowledge about risk factors for major chronic diseases in women (Nurses Health Study, 2016).

Study procedures were initiated following approval by the University of Manitoba's research ethics board. The College of Registered Nurses of Manitoba (CRNM) randomly sent invitation emails to 7,000 Winnipeg members. Because CRNM members are not identified by sex, this email highlighted the inclusion criteria of female RNs, as well as no history of any form of CVD. The e-mail invitation included a link to the study questionnaire; consent was implied by return of the completed questionnaire.

Measurement Instruments

Guided by the HBM, individual perceptions of personal risk for CVD were operationalized by the 20-item Perception of Risk of Heart Disease Scale (PRHDS; Ammouri & Neuberger, 2008). The PRHDS has a possible range of total scores on a continuum between 20 and 80 (higher scores = higher perceived risk), with specific categories (i.e., low, medium, high risk) being implied, but not well defined. This reliable and valid tool (total scale reliability = .80; Ammouri & Neuberger, 2008) has been used in several previous studies to measure perception of CVD risk (Cioe et al., 2014; Garza et al., 2013; Poomsrikaew et al., 2012). Actual CVD risk, a modifying factor in the HBM, was measured with a non-laboratory-based, CVD risk survey (Gaziano et al., 2008). This risk assessment tool has been compared to laboratory-based CVD risk scales and has been found to be comparable in accurately predicting CVD events (Spearman's ρ = 0.88 to 0.986; Gazinao, 2008). Lastly, we developed a questionnaire to elicit information on several additional modifying factors that may influence personal risk perception, including demographic variables (i.e., age, education, socioeconomic status, and cues to action [i.e., biggest perceived health threat, communication with primary healthcare providers (PHCP) about CVD risk, awareness of CVD prevention campaigns, & family history]).

Data Analysis

Using SPSS Software, we applied bivariate and multivariate analyses to the study data. The relationships between CVD risk perception and modifying/demographic variables were initially examined by using bivariate analyses, including Spearman's rank correlation coefficient or Spearman's ρ, t-tests, and ANOVA. Multivariate analyses were used to further examine interrelationships and to enable us to determine which variables significantly influenced personal perceived risk of CVD. Level of significance was set at $p < .05$.

Results

Data for this study were collected in the spring of 2018. Of the 7,000 surveys sent, 6,809 were successfully delivered, 884 were returned, and 68 were excluded for not meeting the inclusion criteria and/or incomplete questionnaires, for a final sample of 816 participants (response rate = 12%).

Based on available CRNM data, this study sample was representative of nurses in Manitoba in terms of age, gender, primary role as a nurse, and type of nursing education. The descriptive statistics (see Table 1) revealed that the average study participant was a 45-year-old staff nurse, with an undergraduate degree. The sample had low rates of diabetes (5%), smoking (4%), and hypertension (14%); however, 57% were overweight/obese (BMI ≥ 25kg/m^2). Most (~ 75%) were at a very low/low (46% & 29% respectively), 20% were at moderate, and 5% were at high/very high actual risk for CVD, as measured by the risk assessment survey (Gaziano, et al., 2008).

Table 1. *Sample Description: Demographic Factors (N=816)*

Factor	**#/Mean/Range**	**% of total/SD**
Age	Mean= 45.1/ Range = 22–76	SD=13.18
Primary role as a registered nurse		
Staff nurse	*n* = 540	66.2%
Administrator/manager	*n* = 79	9.7%
Other	*n* =197	24.15%
Education		
Diploma	*n* = 226	27.7%
Bachelor degree in nursing	*n* = 502	61.5%
Other	*n* = 88	10.7%
Greatest health fear		
CVD	*n* = 346	42.4%
Breast Cancer	*n* = 150	18.4%
Other (e.g., other cancers, diabetes)	*n* = 320	39.2%
Discussed CVD with PHCP		
Yes	*n* = 224	27.5%
Cardiologist referral		
Yes	*n* = 107	13.1%
Awareness of CVD prevention campaigns		
Yes	*n*= 330	40.4%
Family history of CVD		
Yes	*n* = 617	75.6%
Combined household income		
<$75,000	*n* = 131	16%
$75,001–$125,000	*n* = 340	41.6%
>$125,001	*n* = 319	38.2%

Note: SD = Standard deviation; CVD = Cardiovascular disease; PHCP = Primary Healthcare Provider

Although 13% (*n* = 107) of participants reported that they had been referred to a cardiologist, we retained this cohort because study criteria clearly outlined the exclusion of those with a history of CVD, and nurses would presumably know the difference between a referral and a diagnosis of CVD. While most (76%) participants reported having a family history of CVD, and 42% reported CVD as their greatest health fear, less than 30% had discussed their own risk for CVD with their PHCP. Among the women who had discussed their personal CVD risk with their primary PHCP, 75.6% reported having a family history of CVD, 57.1% were either overweight or obese, and they were older than those who had not had this discussion (mean age 52 versus 43 years). However, only 41.9% of those at moderate [actual] risk and 50% of those at high [actual] risk had discussed their risk with their HCP. Last, of those who reported awareness of CVD prevention campaigns (40.4%), the majority cited the Heart and Stroke Foundation of Canada. Conversely, nearly 60% of participants were reportedly not aware of any CVD prevention campaigns. There was no significant age difference between those who were and those who were not aware of any CVD campaigns.

The individual personal perception of CVD risk in female RNs (Research question #1) was measured by the PRHDS questionnaire. Participants' scores ranged between 41 and 72 (mean score = 53.5), suggesting moderate self-perceived CVD risk. Multiple regression analysis was used to determine the relationship between perception of personal CVD risk and the modifying variables (Research question #2; see Table 2). Based on this analysis, four variables were found to have a statistically significant, positive association with personal perception of risk: increasing age, greatest health fear is CVD, having had a discussion with their PHCP regarding CVD risk, and family history of CVD. However, it is important to note that these independent variables only explained 10% of the variability of the dependent variable of perceived personal CVD risk. Finally, although there was a significant relationship between actual and perceived personal risk of CVD based on bi-variate, Spearman's ρ (p = < .05; Research question #3), actual risk did not emerge as significant in the regression model.

Table 2. *Summary of Multiple Regression Analysis of Significant Predictors of Personal Perception of Heart Disease Risk*

Variable	***B***	**SE_B**	**β**
Intercept	51.634	.647	
Age	.027	.013	.076*
Greatest health fear is CVD	-.841	.141	-.202*
Discussion with PHCP re CVD risk	1.143	.374	.108*
Family history of CVD	1.558	.369	.142*

Note: *B*= unstandardized regression coefficient, SE_B = Standard error of the coefficient; β = standardized coefficients. PHCP = Primary Healthcare Provider.
* $p < .05$; R^2 =10.1%

Discussion

The following discussion addresses the three research questions, as well as the study limitations. Implications for nursing practice, education, and future research are also discussed.

Individual Perceptions of Personal Risk

Based on the PRHDS, the women in this study were predominantly in the mid-range category for perception of personal CVD risk. This finding is inconsistent with previous evidence, which suggests that women generally underestimate their risk for CVD (Alwan et al., 2009; McDonnell et al, 2014; Monsuez et al., 2017; Robinson et al., 2018). For example, Alwan et al. (2009) found that women tended to underestimate their risk for CVD, as they were more likely to fear breast cancer over CVD. As well, they associated CVD with men. Moreover, Alwan and associates (2009) also found lower perceived risk to be more common in those with higher education, social economic status. The difference in perceived risk findings in this study was likely due to the higher and more accurate than average level of CVD knowledge that nurses have because of their nursing education.

Modifying Factors and Perceived Personal Risk of CVD

In the multivariate analysis, four factors emerged as significant predictors of perceived personal risk for CVD: age, greatest health fear is CVD, discussion of CVD risk with a PHCP, and family history of CVD. Age has been consistently found to affect perceived personal risk of CVD. More specifically, older adults tend to perceive their CVD risk as higher, as well as more accurately in regard to their actual risk (Ammouri & Neuberger, 2008; Hamilton & Lobel, 2012). Similarly, in this study, the age of participants had a significant effect on their personal perception of risk for CVD. This was expected, as older adults tend to have a greater understanding of their risk because of their experiences, greater knowledge of health-related information, and are more likely to act on their health concerns (Hamilton & Lobel, 2012). In addition, as the prevalence of heart disease increases with age (Public Health Agency of Canada, 2017), it follows that women also typically develop an increasing number of risk factors and/or symptoms related to CVD as they age, thus likely increasing their awareness of risk.

While more than 40% of participants identified CVD as their greatest health fear, almost 20% feared breast cancer most. These results differ from previous literature, as women typically fear breast cancer over any other disease (Berry et al., 2015; National Heart, Lung, and Blood Institute, 2012). However, typically younger women fear increased susceptibility to breast cancer relative to CVD, and older women fear CVD over breast cancer (Berry et al., 2015). Thus, the age (mean = 45 years), as well as the nursing education background of the participants may explain the findings in the current study.

Discussion of CVD risk with a PHCP is generally considered essential for women to be knowledgeable and aware of their personal health risks. However, despite being a generally well-educated cohort, especially related to health, less than 30% of study participants reportedly had discussions about their CVD risk with their PHCP. Similarly, the Heart and Stroke Foundation of Canada (2018) reports only 20% of women's doctors talk to them regularly about heart health. Our findings suggest that a positive family history and older age likely influences these conversations, which, in turn, may imply that younger women with no family history are disadvantaged in this regard. Previous studies have reported similar findings, supporting the contention that communication between healthcare providers and women in regard to CVD risk is generally lacking (Hart, 2005; Leifheit-Limson et al., 2015). Thus, CVD risk awareness strategies must include the public, as well as PHCPs.

Finally, family history of CVD was also a significant predictor of perceived risk for CVD. This is consistent with the literature reports that having a family history of CVD has a greater effect on personal perception of CVD risk, in comparison to not having such a family history (Claassen et al., 2012; Humphries et al., 1997). However, as healthcare professionals, the participants in this study sample may more accurately perceive a greater seriousness and severity when their family members experience a form of CVD, thus increasing their own perception of personal risk.

Perceived and Actual Risk of CVD

Few studies have explored the relationship between perceived and actual CVD risk. However, women have generally been found to underestimate their actual CVD risk (Abed et al., 2015; Hammond et al., 2007; McDonnell et al., 2014; Monsuez et al., 2017; Robinson et al., 2018). In the current study, actual CVD risk was determined by using a non-laboratory-based CVD assessment tool developed by Gaziano and associates (2008). According to this scale, the majority of participants were in the very low or low categories of actual risk for CVD. Moreover, although the bivariate analysis did reveal a significant relationship between these variables, the correlation was only weakly positive. These findings suggest that there may be issues with the instrumentation, and that there is need for further research using tools that are more convincingly reliable and valid measures of actual and perceived CVD risk.

Limitations and Strengths

The key limitation of this study is that the results may not be applicable to the general population of women, as nurses likely have higher health literacy compared to the general female population. Although an underlying assumption was that RNs would, or should, have a higher degree of CVD risk

knowledge and more accurate personal perceptions of risk, important insights were gleaned from the findings that this is not always true. Importantly, this study achieved a relatively large sample of women with a broad range of ages, which has been lacking in the research literature to date. As well, based on available CRNM data, this study sample was representative of nurses in Manitoba. Moreover, the fairly large sample size also substantiates the representativeness of the sample. A second limitation was the study instrumentation, as the PRHDS and the non-laboratory-based CVD risk assessment tool have not been widely used in previous literature; however, the results were meaningful and successfully addressed the study purpose and research questions. Third, although this study identified several key factors that affect personal perception of risk, these variables only accounted for a small number of the possible influencing factors; therefore, further research is needed to explore additional factors that may affect perceived personal CVD risk in women.

Implications for Nurses

This study has important implications for nursing in the areas of clinical practice, education, and research. In the area of clinical practice, nurses in the primary care setting play an important role in primary prevention of CVD in women. Consistent with previous research, our findings suggest that perception of personal risk increases with age in women. However, younger women may also be at risk. In fact, the Heart and Stroke Foundation (2014) recommends that CVD risk assessments should begin at age 20. Our findings also suggest that women may not be aware of their CVD risk. In addition, only one-third of study participants reported they had discussed CVD risk with their PHCP. Although there are many possible reasons for these findings, previous research suggests that physicians lack the time, as well as the knowledge to address CVD risk in women (Thakkar et al., 2016). These factors highlight the important role of primary care nurse practitioners (NPs) in the area of primary prevention of CVD in women, because their evidence-based, holistic approach to care includes risk assessment, education, and individualized strategies for prevention.

Implications for education begin within the nursing discipline itself. The findings of our study suggest that nurses may not be as knowledgeable about their personal CVD risk as one might expect. Because perception of risk for CVD can influence personal health-related decisions, it is imperative for nurses to be educated about their own risk. Therefore, it is important for this information to be integrated into undergraduate nursing program curricula. In addition, Kiamco-Millman and Pinto-Zipp (2013) reported a direct correlation between nurses' awareness, knowledge of evidence-based guidelines, and recommendations for CVD prevention and their intentions and ability to educate their female patients. This evidence lends support for the Canadian Public Health Association's (2010) recommendation that "public health/community health nurses must take the time to inform themselves about current community health issues and new technologies, so they can properly apply public health science and epidemiological principles to their work" (p. 16).

Although this study provided novel evidence regarding the perception of personal risk for CVD among female RNs, further research in the area of perceived CVD risk in women is needed. Future research should aim to explain additional components of the HBM, including other possible modifying factors that influence perception of personal CVD risk, such as self-efficacy, ethnicity, and perceived benefits and barriers to accurate risk perception. Furthermore, exploring nursing strategies to increase the accurate perception of personal risk for CVD among women across the lifespan may lead to improved health outcomes in this population.

Conclusion

The purpose of this study was to explore the perception of personal risk for CVD among female nurses and factors that influence this perception, as well as the relationship between actual and perceived personal risk, within the context of the health belief model (HBM). Perception of personal CVD risk was significantly related to age, fearing CVD as one's greatest health risk, having discussed CVD risk with one's primary healthcare provider, and a positive family history of CVD. Accurate perception of risk for disease is essential for individuals to engage in risk-reducing health behaviours, thus reducing their personal burden of CVD.

This study contributes to a relatively small body of existing literature by providing novel research evidence related to the perception of risk for CVD among female nurses of all ages, Furthermore, this study highlights the importance of exploring additional variables that may influence perception of risk. Future nursing research should continue to use the HBM to explore other modifying factors that may influence perceived personal risk for CVD in women, and how these factors can be utilized to develop primary CVD prevention strategies for women across the lifespan.

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Spontaneous Coronary Artery Dissection (SCAD): An Emerging Issue in Women's Heart Health

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Abstract

Spontaneous coronary artery dissection, or SCAD, is gaining an increasing amount of attention as an important area of concern related to women and heart disease. Approximately 25% of heart attacks in women under age 60 are caused by SCAD. However, there is little information about SCAD in the nursing literature. In this paper, the author reviews the most recently-available literature on this puzzling condition, and summarizes the current state of knowledge of the anatomy, pathophysiology, epidemiology, etiology, diagnosis, and treatment recommendations for women with SCAD. The key considerations for cardiovascular nurses caring for these patients are also discussed.

Keywords: cardiovascular nursing, coronary artery disease, acute coronary syndrome, coronary artery dissection, spontaneous, women

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Key Highlights

- Once thought of as rare, SCAD occurs more frequently in women and often in the absence of traditional cardiovascular risk factors.
- Although diagnosing SCAD can be challenging, newer imaging modalities such as IVUS and OCT are adding to the diagnostic accuracy of conventional angiography.
- Unlike in atherosclerotic ACS, conservative medical management is currently recommended over revascularization interventions in most cases of SCAD.
- Cardiovascular nurses play a key role in educating and supporting SCAD patients and their families to understand and cope with this frightening and often life-changing clinical event.

Background

Spontaneous coronary artery dissection (SCAD) is defined as a non-traumatic and non-iatrogenic separation or tear of the layers of a coronary arterial wall (Gilhofer & Saw, 2019; Saw, 2014). SCAD was once thought to be quite a rare cause of acute coronary syndome (ACS). However, according to the Heart and Stroke Foundation of Canada (2018), approximately 25% of heart attacks in women under age 60 are caused by SCAD and most SCAD patients (~90%) are otherwise healthy, young women.

As the sole RN member of a two-person cardiac rehabilitation programme (CRP) in northwestern Alberta, I was struck by a relative cluster of referrals for three women who had experienced SCAD over a six-month period in 2018–19. This started me thinking: What is SCAD? How prevalent is it? What causes it? How is it diagnosed? How is it managed?, and What are the nursing implications? The purpose of this article is to answer these questions, based on a review of the relevant available literature, and to share this learning with other cardiovascular nurses.

Methods

The literature search was done using Google Scholar, CINAHL, and PubMed, with *spontaneous coronary artery dissection* as the key search terms. Search results were then further filtered by adding a second keyword *nurs** for nurse/nurses/nursing in the publication title field, to determine how many articles were published in nursing journals. Freely accessible articles were downloaded directly, and additional articles requiring a journal subscription were requested from my employer's online reference library service. One of the seminal papers retrieved, which has also informed my own clinical practice, was the *American Heart Association Scientific Statement on SCAD* (Hayes et al., 2018). Also of note, Dr. Jacqueline Saw of the University of British Columbia has published numerous papers in this field of research.

Anatomy and Pathophysiology

The two principal epicardial coronary arteries that perfuse the myocardium include the right coronary artery (RCA) and the left main coronary artery (LMCA). The LMCA divides almost immediately into the left anterior descending artery (LAD) and the left circumflex artery (LCx) (Brashers & McCance, 2010). Like all arteries of the body, the coronary artery walls have three layers: the outermost layer, the *tunica adventitia*; the middle layer, or *tunica media*; and the innermost layer, the *tunica intima* (Brashers & McCance, 2010). The most common cause of ACS

is atherosclerotic coronary artery disease (CAD). In atherosclerotic CAD, atherosclerotic plaque development occurs gradually between the medial and intimal layers in a slow process over many years. The pathophysiology of ACS includes plaque rupture, platelet activation and aggregation, and activation of the coagulation cascade, leading to partial or complete obstruction of blood flow in the affected artery (Thygesen et al., 2019).

The pathophysiology of SCAD, however, is quite different. For reasons that are not yet well understood, layers of the coronary arterial wall separate, creating a false lumen. Blood enters the false lumen and forms an *intramural hematoma* (IMH), which first restricts, then occludes coronary artery blood flow, leading to ACS (Gilhofer & Saw, 2019; Hayes et al., 2018; Tweet et al., 2018). While SCAD can occur in any of the coronary arteries, the most common location (32–46% of cases) is in the LAD (Gilhofer & Saw, 2019).

Epidemiology

Once thought to be very rare, SCAD has been diagnosed much more frequently in recent years. For example, Saw et al. (2017) reported that approximately 1,500 cases of SCAD had been reported in the literature, half of which had been published in the previous five years.

The first documentation of SCAD, based on autopsy findings, was published as a case report in 1931, in a letter to the *British Medical Journal* (Pretty, 1931). More recent literature (Clare et al., 2019; Gilhofer & Saw, 2019) suggests SCAD has a prevalence of approximately 1–4% of all cases of ACS. SCAD occurs primarily in women; in fact, Gilhofer and Saw (2019) report that more than 90% of SCAD cases occur in women, and SCAD is now thought to represent the etiology of up to 35% of ACS in women ≤ 50 years of age (Tweet et al., 2018). SCAD often occurs in the absence of the traditional risk factors for atherosclerotic CAD, and may be the most common cause of acute myocardial infarction (AMI) in pregnancy (Clare et al., 2019; Gilhofer & Saw, 2019; Tweet et al., 2018). Saw et al. (2019) recently published the results of a multi-centre, prospective observational study, with a North American cohort of 750 SCAD patients, in which 88.5% were women; 55% of the women were post-menopausal, and 33.9% had no known cardiovascular disease risk factors.

Etiology

The etiology of SCAD is not yet well-understood and there appears to be some doubt about whether there is only one etiological type of SCAD, or whether this is a heterogeneous entity. Several authors (Gilhofer & Saw, 2019; Tweet et al., 2018) describe a number of predisposing and precipitating risk factors, including:

Physical and mental/emotional stress. Saw et al. (2019) found precipitating stressors in more than 66% of SCAD cases, including physical stress, such as unusual exertion or isometric effort (i.e., heavy lifting), or use of the Valsalva manoeuvre in 29%, and emotional stress in 50% of cases.

Fibromuscular dysplasia (FMD). FMD is a systemic, non-inflammatory vascular disease that can affect multiple vascular beds. It can lead to non-atherosclerotic arterial stenoses, tortuosity, aneurysm, or dissection (Hayes, et al., 2018). The reported prevalence of FMD in SCAD patients varies; for example, while Clare et al. (2019) found FMD in 1 in 10 SCAD patients, Saw et al. (2019) detected FMD in almost 57% of SCAD patients who were screened. However, not all SCAD patients were screened for FMD in these studies (Clare et al., 2019; Saw et al., 2019).

Pregnancy. Pregnancy, and multi-parity in particular, appear to be risk factors for SCAD (Saw et al., 2019; Tweet, Hayes et al., 2017). Saw et al. (2019) found that 20% of their cohort reported four or more pregnancies and/or births. Women diagnosed with pregnancy-associated SCAD also tend to have more severe SCAD events than cases of SCAD not associated with pregnancy (Tweet et al., 2017), and are at higher risk of major in-hospital adverse events (Saw et al., 2019).

Hormonal therapy/changes. Hormone therapy also appears to be associated with a higher incidence of SCAD (Eng et al., 2015). Saw et al. (2017) found that current or past hormone therapy, including oral contraceptives, fertility treatments, estrogen, progesterone, beta-human chorionic gonadotropin, and testosterone, was present in 11.6% of their SCAD cohort. In a more recent study, Saw et al. (2019) reported that 55% of women with SCAD were post-menopausal, and 10% were on active hormonal therapy.

Coronary anatomy. Increased coronary artery tortuosity has been postulated as a possible risk factor for SCAD (Eleid et al., 2014). However, based on their findings, Saw et al. (2017) concluded that the coronary artery tortuosity seen in SCAD patients appears to be due to FMD and, therefore, may not be an independent predictor of SCAD.

Other potential causes/risk factors. Connective tissue disorders and other arteriopathies besides FMD have been investigated as potential causes of, or risk factors for SCAD (Saw, Aymong et al., 2014). For example, Henkins et al. (2016) reported detecting heritable connective tissue disorders in 5.1% of SCAD patients who were tested. Although Clare et al. (2019) found rheumatological diseases in 2.4% of SCAD and 2.7% of non-SCAD ACS patients, these differences were not statistically significant. In the large Canadian multi-centre study, Saw et al. (2019) found systemic inflammatory disease in 4.7% of SCAD cases. Saw et al. (2019) also reported only two cases (0.3%) in which cocaine or amphetamine use was listed as a precipitating factor. Finally, many cases appear to be idiopathic; for example, Saw et al. (2019) were unable to identify any precipitating factors in 33.6%, and found no predisposing conditions in 50.0% of SCAD cases.

Diagnosing SCAD

Presenting symptoms of SCAD tend to be very similar to those of atherosclerotic ACS. As such, central chest discomfort

of varying intensity, with or without radiation to other areas of the upper body, is common. While women's clinical presentation with ACS can be more variable and sometimes more subtle than in men (Heart & Stroke, 2018; Mehta et al., 2016), the most common symptom of ACS in both men and women is chest pain (Chandrasekhar et al., 2018; Ferry et al., 2019).

In the large Canadian SCAD Study (Saw et al., 2019), 29.7% of SCAD patients presented as ST-segment elevation myocardial infarction (STEMI), 69.9% as non-ST-segment elevation MI (NSTEMI), and 0.4% as unstable angina. Ventricular tachycardia or fibrillation occurred in 8.1%, and cardioversion or defibrillation was required in 3.9%. Cardiac biomarkers, such as troponins, rose in 97.6% of cases. Echocardiogram or angiographic imaging showed regional wall-motion abnormalities in 82.3%, but global left ventricular ejection fraction (LVEF) was normal in 70.6%. Notably, their study sample was largely female (88.5%).

Coronary Artery Imaging for SCAD

As in atherosclerotic ACS, the currently recommended first-line diagnostic procedure for suspected SCAD is cardiac catheterization with selective coronary angiography (Gilhofer & Saw, 2019; Hayes et al., 2018; Tweet et al., 2018). Saw (2014) published a simple, yet widely-cited (e.g., Jamil et al., 2020; Lobo et al., 2019; Tweet et al., 2018) angiographic classification of SCAD. However, in isolation, conventional angiography may be inadequate for accurately diagnosing SCAD. Therefore, when available, two newer intracoronary imaging modalities have become instrumental in diagnosing SCAD in cases when angiographic findings are equivocal or unclear (Gilhofer & Saw, 2019; Hayes at al., 2018). These two imaging modalities are *intravascular ultrasound* (IVUS), and *optical coherence tomography* (OCT). As both of these intravascular imaging tools have inherent risks, the recent scientific statement from the American Heart Association included an algorithm for deciding on the use of IVUS and/or OCT in diagnosing SCAD (Hayes et al., 2018).

Systemic Vascular Screening

Since SCAD has been associated with FMD, at rates ranging from 17% to 86%, (Hayes et al., 2018; Saw et al., 2019; Tweet et al., 2018), screening for systemic vasculopathies such as FMD is warranted in cases of confirmed SCAD. This screening should include a detailed, vascular-focused history and physical assessment, followed by systemic vascular imaging using appropriate high-resolution imaging modalities, as findings may be subtle (Gilhofer & Saw, 2019; Hayes et al., 2018).

SCAD Management

The goal of SCAD management is to alleviate symptoms, prevent recurrence, and improve outcomes (Hayes et al., 2018). However, recommendations for clinical management of SCAD remain largely based on expert consensus, rather than on large-scale clinical trials (Gilhofer & Saw, 2019; Hayes et al., 2018; Kim & Tweet, 2019).

Revascularization

Although there is little clinical trial data evaluating invasive (i.e., coronary revascularization via percutaneous coronary intervention [PCI]) versus conservative management strategies in SCAD, a number of observational studies have been published in recent years, reporting on SCAD revascularization outcomes (Clare et al. 2019; Jamil et al., 2020; Lobo et al., 2019; Saw et al., 2019). For example, in Saw et al.'s (2019) Canadian SCAD study, 86.4% were managed conservatively, 14.1% underwent PCI and 0.7% had coronary artery bypass grafting (CABG). Coronary blood flow improved as a result of PCI in 57.6% of patients, did not change after PCI in 38.8%, and actually became worse after PCI in 3.9%. Most recently, Jamil et al. (2020) conducted a meta-analysis of 22 non-randomized observational studies comparing initial revascularization to conservative management. They found no significant difference in risks of major in-hospital adverse events between the two approaches. This comes as good news, as significant risks of PCI in SCAD include iatrogenic rupture of an already weakened coronary artery or extension of the dissection due to the pressure of balloon inflation, and inadvertent introduction of a guidewire into the false lumen (Hayes et al., 2018). Moreover, based on the natural history of SCAD, others also suggest that vascular healing tends to take place over time (Alfonso et al., 2012; Hayes et al., 2018; Saw et al., 2016). Nevertheless, Saw et al. (2019) reported that recurrent AMI occurred in 4%, and unplanned revascularization was required in 2.5% of patients; thus, some authors (Hayes et al., 2018; Gilhofer & Saw, 2019; Tweet et al., 2018) recommend keeping these patients in hospital for several days for close monitoring.

Fibrinolytic Therapy

Several studies (Lobo et al., 2019; Saw et al., 2017; Saw et al., 2019) have reported on the use of fibrinolytic therapy in SCAD patients who presented with STEMI, ranging in frequency from 2.5 to 7.5% of these patients. None of these studies reported outcomes specific to the use of fibrinolytic therapy in STEMI-SCAD. Moreover, several others (Gilhofer & Saw, 2019; Hayes et al, 2018; Saw et al., 2016) recommend against its use.

As a resident of and health professional in a small, urban community in northern Alberta, I am acutely aware of the lack of timely access to many healthcare resources, including cardiac catheterization, in the vast expanses of rural and remote areas in Canada. Unfortunately, since SCAD can only be diagnosed angiographically, women who present emergently with STEMI in many parts of the country may receive fibrinolytic therapy in the absence of a definitive differential diagnosis of atherosclerotic AMI or SCAD.

Pharmacological Management

In the absence of randomized clinical trial data on SCAD, current expert opinion makes a number of recommendations for pharmacological therapy, including:

Beta blockers. The postulated mechanism of beta blockers action in SCAD is a reduction in coronary arterial wall shear stress (Gilhofer & Saw, 2019). Despite a continued lack of randomized clinical trial data (Gilhofer & Saw, 2019), there appears to be a strong consensus that beta-adrenergic receptor blocking agents are a keystone of medical therapy for SCAD (Hayes et al., 2018; Jamil et al., 2020; Tweet et al., 2018).

Platelet inhibition. For those SCAD patients treated conservatively (i.e., without PCI), there is controversy about the value of single-agent anti-platelet therapy with ASA, and even more about dual anti-platelet therapy (Gilhofer & Saw, 2019). However, experts agree that the use of daily low-dose acetylsalicylic acid (ASA) is reasonable (Hayes et al., 2018; Saw et al., 2016; Tweet et al., 2018). Dual anti-platelet therapy in conservatively-managed patients should be offered only on a case-by-case basis, after careful consideration of the risks and benefits, including risk of menorrhagia in pre-menopausal women (Hayes et al., 2018; Tweet et al., 2018).

Renin-angiotensin-aldosterone system antagonists. Current expert opinion recommends the use of *angiotensin-converting enzyme inhibitors* (ACE-Is) or *angiotensin-II receptor blockers* (ARBs) in cases when there is significant post-event, left ventricular dysfunction (Gilhofer & Saw, 2019; Jamil et al., 2020; Tweet et al., 2018). Women of childbearing age, which includes many with SCAD, should be counselled about potential teratogenicity of ACE-Is and ARBs (Bastow & Holmes, 2017).

Lipid-lowering therapy. Expert opinion reserves lipid-lowering therapy (i.e., statins) for those patients with pre-existing dyslipidemia or documented atherosclerotic cardiovascular disease remote from the site of SCAD (Gilhofer & Saw, 2019; Hayes at al., 2018; Jamil et al., 2020).

Anti-anginal therapy. A persistent chest pain syndrome is reportedly common after SCAD, occurring in up to one-half of post-SCAD patients in the community (Tweet, Codsi, et al., 2017). The etiology of this is unclear, but in pre-menopausal women it appears to be linked to the menstrual cycle (Tweet, Codsi et al., 2017). Calcium-channel blockers and long-acting nitrates, either daily or intermittently on days when the patient can expect to have symptoms, may be offered (Hayes et al., 2018).

Cardiac Rehabilitation

While evidence of the benefits of exercise-based cardiac rehabilitation programs (CRPs) in atherosclerotic CAD is fairly robust and it has become a routine practice to offer CRPs to these patients, there is little comparable evidence on the role of CRPs in SCAD. Silber and colleagues (2015) published a brief report on a small sample of women post-SCAD (N = 9) who attended a CRP in the United States. They concluded that a CRP is probably safe for this population, but recommended a larger study (Silber et al., 2015).

Chou et al. (2016) reported on the implementation of a dedicated, SCAD-specific CRP in Vancouver, B.C., which emphasizes somewhat lower intensity of aerobic exercise than the norm, targeting a peak exercise heart rate in the range of *resting plus 50-70% of Heart Rate Reserve*, and limiting resistance training to low weights (i.e., 2–12 pounds, or 0.91–5.44 kg) with high repetitions. Patients (N = 70) attended once a week, for a minimum of one month and up to six months. Along with the usual supervised exercise, and health behaviour and dietary counselling, there was a strong emphasis on psychosocial supports. In this study, Chou et al. (2016) reported a 37% reduction in chest pain between program entry and exit ($p < 0.001$). They also reported that at program completion, participants increased their exercise capacity, on average, one metabolic equivalent ($p < 0.001$). However, such a dedicated SCAD-specific CRP is unlikely to be practical in all communities where cardiac rehabilitation is offered, depending on the size of the population served and the resources available to the CRP. In addition, participation in a CRP is well documented to be lower among women than men (Samayoa et al., 2014).

Recovery and Prognosis

The most recent research literature indicates that in-hospital SCAD mortality rates are low, averaging no greater than 1% (Jamil et al., 2020). Similarly, longer-term mortality rates (i.e., 30 days to 3 years) are also low, ranging from 1.2% at three years (Saw et al., 2017) to 2.4% at two years (Clare et al., 2019). Similarly, Lobo et al. (2019) reported three-year survival after STEMI-SCAD to be 98%, versus 72% for age- and sex-matched STEMI-ATH patients ($p < 0.001$).

Rates of recurrent SCAD reported in the literature vary widely (i.e., 0–37%), depending on how recurrence is defined and the length of follow-up (Hayes et al., 2018; Saw et al., 2017). For example, in the Vancouver study, Saw et al. (2017) defined "recurrent SCAD" as a new SCAD in either a different artery, or a different segment of the initial dissected artery as the index SCAD event. Based on this definition, their rate of SCAD recurrence over the 4.5 years of their study was 10.4%. In the larger multi-centre Canadian SCAD study (Saw et al., 2019), the rate of recurrence was 4.0% in hospital, and 2.1% after discharge. However, Gilhofer and Saw (2019) suggest lifetime rates of SCAD recurrence may be as high as 35%.

Implications for Cardiovascular Nurses

Women diagnosed with SCAD do not fit the stereotypical picture of an ACS patient: they tend to be younger and exhibit fewer, if any, of the usual cardiovascular risk factors. They will undoubtedly be shocked that this has happened to them, and will have many questions about what the future holds for them (Wagers et al., 2018). Therefore, cardiovascular nurses play a central role in patient and family education and support.

Women who have experienced SCAD may be at higher risk of recurrent SCAD, especially if they become pregnant or give birth. Therefore, women of childbearing age are generally advised to avoid becoming pregnant (Hayes et al., 2018; Saw et al., 2016; Tweet et al., 2018). Where a precipitant cause is thought to be exogenous hormone therapy, such as oral contraceptives, estrogen replacement therapy, or fertility treatment, further hormone therapy should be avoided unless the benefits outweigh the risks (Hayes et al., 2018).

The available literature appears to support regular exercise and physical activity following completion of a CRP. However, current expert recommendations (Gilhofer & Saw, 2019; Hayes et al. 2018; Tweet et al., 2018) suggest continued avoidance of high levels of exertion such as highly-competitive or contact sports, exercise to exhaustion, abrupt commencement of exercise without adequate warm-up, exercise in extremes of temperature or terrain, or any physical activity that includes the Valsalva manoeuvre.

SCAD is a life-altering event, especially in relatively young, previously healthy women. Recurrence rates in most published studies exceed one in 10 (Saw et al., 2017; Tweet et al., 2017). SCAD survivors also face ongoing lifestyle restrictions and limitations; consequently, these women may experience varying periods of emotional and psychological adjustment, including anxiety, depression, post-traumatic stress, and/or grief reactions for the life they were living prior to the SCAD event (Hayes et al., 2018; Wagers et al., 2018).

Therefore, for all of these reasons and more, SCAD patient and family education is critically important. Cardiovascular nurses working in the clinical setting should ensure that women with SCAD are informed about strategies to reduce the risk of a recurrent SCAD event, including the importance of following treatment recommendations. CRP referrals should be supported and encouraged. Although current guidelines post-AMI include screening for depression and anxiety, young women with SCAD may be overlooked. Therefore, cardiovascular nurses should also initiate psychosocial assessments, and provide information about available sources of ongoing support, such as SCAD peer support groups. Cardiovascular nurses in the community setting should seize opportunities to educate women of all ages about their potential risk for SCAD, signs and symptoms of SCAD, and actions to take if they suspect an occurrence of SCAD.

Conclusion

Once thought to be quite rare, SCAD is being diagnosed in a higher proportion of ACS cases than ever before, due to increasing awareness and improved coronary vascular imaging techniques. Unlike atherosclerotic ACS, SCAD predominantly occurs in women, and younger women in particular; it often occurs in the absence of typical risk factors for CAD; and, therefore, it can be especially devastating. Cardiovascular nurses have a crucial role in educating and supporting women with SCAD and their families, as well as women of all ages regarding their potential risk for SCAD. The goal of this overview of current evidence related to SCAD in women was to enable cardiovascular nurses to provide optimal care to these patients. It is my hope that this goal has been accomplished.

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When Opportunity Knocks: The Women's Healthy Heart Initiative Story

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Abstract

Although heart disease is largely preventable, there is still little emphasis on providing Canadians with primary preventative care. As nurses, we know what to do. The challenge, however, is how to deliver this evidence-based preventive care—effectively and efficiently. Until very recently, women's unique needs related to heart disease prevention were largely ignored. Therefore, to address these needs, we designed, developed, and implemented a novel, nurse-led, collaborative program of preventive cardiovascular care for women. Our Women's Healthy Heart Initiative (WHHI) aims to enable women to recognize and proactively reduce their risk of heart disease. I am sharing the story of our Montreal-based WHHI because I want nurses to realize the impact of this model of care on women's heart health. I also hope this story will inspire you, as a nurse, to seize an opportunity, when it knocks, to make a difference in your patients' lives.

Keywords: cardiovascular risk factors, preventive health care, women, health services, advanced nursing practice

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Key Highlights

- In heart disease, women are a disadvantaged and underserved population.
- Nurses' holistic and health promotion approach is well suited to disease prevention.
- The nurse-led WHHI has shown favourable short-term results, including lowering elevated blood pressure and cholesterol, weight loss, and patient satisfaction.
- The nurse-led clinic focus on health promotion and behavioural lifestyle change has the potential of improving risk reduction and providing accessibility to preventive cardiovascular care for women.

The Beginning

For 26 years, my nursing career path was very rewarding, but not unusual. After obtaining my RN through a community college program, I had worked for many years as a staff nurse, and almost exclusively in cardiology. I was mid-career, working part-time as a staff nurse in the Montreal Royal Victoria Hospital (RVH) Coronary Care Unit (CCU), and part-time in our pre-angiogram/angioplasty outpatient clinic. In addition, I had three teenagers living at home. My life was full and, truth be told, I was quite content with my life. Yet, one day, an opportunity knocked that would change the course of my nursing career.

On this day in 2002, my nurse educator asked if I would be interested in collaborating with a staff cardiologist to establish an outpatient heart disease treatment clinic, based on a physician-nurse collaborative model of care. In my view, this was a perfect opportunity for developing a new model of preventive care delivery in our institution, and for my professional growth. Over the next five years, this collaborative role in primary and secondary preventive care would evolve to become the foundation of what was yet to come.

This new professional challenge provided the impetus for me to return to school to pursue my Bachelor of Nursing Science (BNSc) degree. Once I achieved the BNSc, I yearned for more. Hence, I enrolled and completed my Master of Nursing (MN) three years later. I now felt more prepared for and confident in my clinic role and, as it turned out, for what was to come. It was through one of my MN program assignments that I learned about nurse-led clinics.

In the Fall of 2008, a second day transformed my professional life. I attended a presentation at an international cardiology conference. It was not the content of the presentation that had an impact on me—it was the presenters. The presentation was delivered collaboratively by a nurse and a physician. It was this clearly effective, interprofessional collaboration that inspired me to pursue the novel model of nurse-led, collaborative healthcare that was to come.

At the time, I was aware that heart disease was still considered a man's disease and, despite the mounting evidence to the contrary, this mistaken belief persisted. The consequence was that too few women realized that, just like men, they were also at risk of developing heart disease. Adding to my concern was that many of the women I had met in the pre-angiogram area mentioned their difficulty in finding support and information about women having heart attacks. They commented that all the information they could find about heart attacks was about men. Thus, I realized that informing women and healthcare professionals of this issue was a challenge I wanted to take on.

I can still remember the 'aha' moment, and the feeling of excitement when the idea of addressing this gap in care, my new-found knowledge about nurse-led clinics, and my recently acquired expertise in the preventive collaborative practice came together. It dawned on me that if I managed to make this happen, I could really make a difference! And so, I returned from the international conference, inspired, and ready to take on this challenge.

Initiating the Plan

My first step was to draft a nurse-led clinical model of care for women at risk of cardiovascular disease (CVD). I initially presented my ideas to the cardiologist I had been working with, and we brainstormed to develop the philosophic underpinnings and mission of the new project. Our basic philosophy was that heart disease is preventable as many risk factors, such as elevated cholesterol, high blood pressure, diabetes, physical inactivity, obesity, poor nutrition, and smoking, are modifiable. Our mission was necessarily proactive, so we settled on 'increasing the awareness of women's risk of heart disease and empowering women in improving their heart health.'

We considered several factors in deciding on our clinical approach. First there are two main differences between 1) a nurse-led model, and 2) a medical model. Nursing focuses on the patient while, in contrast, the medical model focuses on disease (Breier-Mackie, 2006; Lauver et al., 2002). Also, in the nurse-led model, the approach focuses on a holistic view of health promotion and lifestyle behavioural change within the context of physical, emotional, and spiritual aspects of health (Page et al., 2005; Shadewaldt & Schultz, 2011; Wong & Chung, 2006). As this approach reflects nursing philosophy, a nurse-led clinic seemed the perfect fit for what we wanted to do.

Next, to foster patient engagement in making lifestyle changes, we planned to practice patient-centred care (Lauver et al., 2002) and to use motivational interviewing (Thompson et al., 2011). We also planned to engage a dietitian and physical activity trainer on an as-needed basis. Finally, a vital aspect of our organizational plan was that, although nurses would lead the clinical process, they would work in close collaboration with the clinic physicians. We presented our completed plan to my director of nursing who was impressed and very supportive and encouraged us to operationalize our plan.

The WHHI Clinic Plan

The Women's Heart Health Initiative (WHHI) aimed to increase women's awareness of their risk of heart disease and to empower women to adopt and maintain a heart healthy lifestyle. We established the target population as 45- to 65-year-old women. I proposed a non-referral model of care, as many women in Quebec do not have family doctors and, therefore, would be unable to get a referral. I believed strongly that we needed to avoid this potential barrier to care. Hence, we would aim to recruit patients in a variety of ways, including: 1) word of mouth, 2) a WHHI-specific website, and 3) a paper-based information pamphlet. The latter two strategies would be particularly helpful to raise awareness of the clinic in the general public.

Clinic workflow was established as follows. Recruited patients would be seen in a one-hour initial appointment with a clinic nurse. During this initial visit, nurses would document the patient's cardiac, medical, lifestyle, and family histories, and cardiac-related symptoms; complete a detailed cardiac physical exam including blood pressure and BMI; and assess lifestyle motivation readiness for change based on the Transtheoretical Model (Prochaska & DiClemente, 1982). Bloodwork and an ECG would also be completed. All documentation would be stored in a database shared by both clinic nurses and cardiologists. Before leaving the clinic, the patient would receive a follow-up appointment with the nurse in four to six weeks, and an appointment with one of our two cardiologists. The frequency of subsequent return visits was determined individually based on need. To engage patients in their care, our approach would be patient-centred, and we would use principles of motivational interviewing. In preparation for the first follow-up visit, the nurse and physician would review each patient and develop a proposed plan of care to discuss with the patient. Using this clinical framework, we were ready to operationalize our plan.

Making the Plan a Reality

Making the plan a reality required several additional steps, including garnering advocate and financial support, establishing staffing needs, and building collaborative relationships with our cardiologists. To move forward, I needed champions. I already had the support of my collaborative cardiologist colleague who was institutionally championing the project, and I had attained permission to proceed from my Director of Nursing, so the next challenge was to secure funding. Lucky for me, while walking through our cardiology department one day, I was approached by a pharmaceutical representative who asked me about my work. I seized the opportunity to tell her about my evolving idea for the women's heart health clinic. Fast-forward to one month later: I was presenting my project to her superiors and was offered three years of partial funding. We were nearly there!

With partial funding in hand, I had the ammunition I needed to approach our Chief of Cardiology with a request to match this secured funding. He informed me that, coincidentally, the RVH Foundation was in the process of establishing a Women's Health Initiative. The leaders of the Women's Health Initiative were thrilled to learn about our project, as they were actively looking for women's health initiatives to support and they agreed to match the funds.

The next step involved determining our staffing needs. In the first year, we hoped to enroll 100 women. In these early days, I would be the only clinic nurse, but I would need additional physician support. We met with staff cardiologists who I thought might be interested to discuss the project. As expected, there was varying interest and concern, including scheduling

availability, limited experience working in collaborative practice, and the proposed non-referral aspect of the clinic model. They were concerned about allowing the clinic to be non-referral, because patient volumes would be too high; this was allayed when we agreed on a three-month trial to assess patient numbers. The cardiologist I had already been working with in the prevention clinic shared his experiences in collaborative practice, which appeared to address their other reservations.

An important aspect of developing our collaborative relationship was convincing the cardiologists to agree to act as preceptors so that the clinic nurses could learn the much-needed enhanced cardiac assessment skills. The nurse and physician team agreed that because of the increased level of autonomy and expanded nursing role in this clinic, staff nurses would be required to have at least 10 years of cardiology experience and would receive advanced training from the cardiologists to acquire enhanced cardiac assessment skills, such as physical exams, auscultation of heart sounds, and chest pain evaluation.

The WHHI: Our First 10 years

The Women's Healthy Heart Initiative opened in May 2009, a mere six months after the seed for the idea was planted. In that short time, we successfully obtained permission, funding, and staffing, and established a clinic workflow process. Patients were recruited via word of mouth, the VGH Foundation, and the WHHI website, as well as paper-based information pamphlets, which were distributed within the hospital and in the community, at public meetings and events. In the last five years, we have also added an annual information session for the general public, where we have guest speakers who talk about heart disease risk factors. During the first year, with one nurse and one half-day clinic per week, we enrolled just over 100 women. Ten years later, now with three nurses, three cardiologists, and three half-day clinics per week, we have seen a total of more than 1,000 women.

At the five-year mark, we reviewed the WHHI's first 319 patients, from which we gleaned important insights about our patients and our clinic. First, we discovered that 76% of the women had a family history of heart disease. Although we do not know for certain this was their motivation to attend our clinic, it makes sense. Women likely know that family history is an important risk factor for CVD; if it happened to their close family members, it could happen to them. This was an interesting insight for us about why patients came to our clinic and it supported the contention that women seem to be increasingly aware of their risk. It was also helpful in terms of patient recruitment, as we subsequently placed more emphasis on this risk factor in our recruitment strategies. Second, we learned that the average age of participants was 58, which was a bit older than our target population. We hypothesized that younger women tend not to enroll because they may be less concerned about their health, less aware of their risk, or too busy with family and work obligations. Recruitment strategies that we are now trying, include distributing our pamphlets and information in local OBS/GYN clinics in addition to giving more frequent public talks and information sessions.

Third, we found that many of the women had reported symptoms such as chest pain, shortness of breath, or palpitations. As would be expected in primary prevention, and knowing that most first cardiac events in women occur in the seventh decade of life, it was not surprising to us that most of the chest pain symptoms turned out not to be of cardiac origin. For the few women who did have angina, most described associated symptoms, such as fatigue and shortness of breath, which we know may occur more commonly in women compared to men.

Fourth, we documented and published our favourable results in treating elevated cholesterol, high blood pressure, and assisting our patients to lose weight. Notably, we also made a number of new diagnoses of untreated hypertension, elevated cholesterol, and diabetes (Wray, 2014). Fifth, from the patient perspective, our patient satisfaction survey was exceptionally positive. Women felt 'listened to' and many asked why this type of care was not more readily available. This served to reinforce the importance to us of getting the word out about our clinic, which we are doing through our public and professional talks, networking, and other communication strategies.

Finally, we learned that the clinic served four distinct groups of women:

1. Women who had a major clinical finding, such as a very high blood pressure and who needed follow-up within a few days, which was determined by the nurse and physician together.
2. Women free of symptoms and considered stable who would return in four to six weeks to discuss test results, risk assessment, and a care plan, or to follow up on treatment initiation.
3. Women interested in working on lifestyle changes, who preferred to return in eight to 10 weeks for support and encouragement.
4. Women who were at a low risk for heart disease, who already fulfilled all the lifestyle recommendations and did not require ongoing follow-up. These women were asked to return every 18 to 24 months but, should the need arise, they could call in to be seen in clinic at any time. Many said they found this accessibility to care reassuring.

In assessing the clinic performance and moving forward, this information served as a guide for setting the frequency of follow-up appointments and, also, since some patients needed to come in less often than others, we observed it was allowing us to increase our patient capacity.

There are several additional interesting findings about this novel, nurse-led clinic that are worthy of discussion. The non-referral model appeared to have a positive effect on the women's motivation for behavior change. Overall, it appeared that because the women were self-referred, they were more responsive to suggestions for change and they were more engaged in making lifestyle changes. It is also possible that

our patient-centered focus is having the effect we hoped for. Second, based on staff feedback and performance, it became clear, over time, that the nurses' ongoing preceptorship with the cardiologists was instrumental in successfully establishing dynamic inter-professional collaborative rapport and trust.

Going Forward

Over the last 10 years, we have also been faced with ongoing challenges that continue to plague us. One major barrier is the lack of priority for disease prevention in our healthcare system. As a result, we have not been able to establish long-term, sustainable funding, and we remain exclusively funded by private donations. I am convinced that one of the most important reasons for our survival in the system is the ongoing support of our Chiefs of Cardiology, as well as our collaborative cardiologists avidly championing our clinic, both organizationally and in fundraising. Also, related to lack of funding, while this type of clinic should ideally be located within the community, we remain hospital based. Therefore, we are constantly challenged by space issues, and patients are challenged by accessibility and cost.

Moving forward, we plan to continue to enroll new patients, and support former patients by expanding the number of clinics and increasing nursing staff. We are collaborating with other Canadian women and heart disease-related professional groups, such as the Canadian Women's Heart Health Alliance and the annual Wear Red Canada day, an event we initiated locally in 2009. Recently, we also held a successful Women's Heart Health Symposium for local healthcare professionals, which we plan to make an annual event. From a research perspective, at present we are conducting a pilot project investigating the effectiveness of an individually tailored, home-based fitness program.

Reflections

I believe the WHHI project is a story of opportunity, passion, and determination, along with a certain degree of luck. The opportunity to develop, establish, and practise in a nurse-led model of care, and to make a difference in women's heart health has been my most satisfying career experience to date. Even though I am in the latter part of my career, I continue to learn and grow professionally and, most importantly, I am contributing to my full potential. My job satisfaction is amazing, which, in turn, invigorates and energizes me, and I want other nurses to find equally satisfying opportunities that ignite their passions. Our patients often tell us that *we have changed their lives*, that they *found in us what they needed to be healthier, but had been unable find any help before*, and that *we saved their life* because they were feeling helpless or lost with regard to knowledge about or how to improve their heart health.

I recently asked one of the WHHI's first patients what the clinic has meant to her, she responded, "my world." At the time of her self-referral, she had just experienced a myocardial infarction and, on discharge, had no follow-up plan, had been diagnosed with yet untreated diabetes, had uncontrolled hypertension, and was terrified. As she was recounting her story, we were both overcome with emotion. I was overwhelmed at having had the opportunity to have helped her so profoundly. The existence and success of this nurse-led, collaborative preventive care clinic demonstrates what is, indeed, possible.

According to the Heart and Stroke Foundation 2018 Report on women and heart disease, women continue to be undertreated, under-diagnosed, and under-researched (Heart & Stroke Foundation of Canada, 2018). Cardiovascular nurses have such an important role in addressing this unnecessary gap in care and have a great opportunity to serve women at risk. And so, looking ahead, I am cheering you on, my nursing colleagues. Our female cardiac patients continue to face many challenges. As cardiovascular nurses, we have the knowledge, skills, values, and passion to help our patient meet these challenges. I truly hope my story and the story of the WHHI will encourage you to seize the opportunity when it knocks, and create your own story of successfully facilitating women's heart health.

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CALL FOR NOMINATIONS FOR THE BOARD OF DIRECTORS

Members of the Canadian Council of Cardiovascular Nurses in good standing are invited to nominate members for the following positions:

- Director of Conference Programming
- Director of Health Promotion and Advocacy
- Director of Professional Education
- Director of Provincial Divisions

All nominations shall be accompanied by the signed consent of the nominated member and a signature of a member in good standing supporting the nomination.

Nominees must be members in good standing with the Canadian Council of Cardiovascular Nurses. The nominees must be prepared to serve a three-year term commencing after the first board meeting following the Annual General Meeting.

All nominations must be received by **April 24, 2020** to be valid. Nominations will **NOT** be accepted from the floor at the Annual General Meeting.

For more information on each position and for the nominations form, please visit:
https://www.cccn.ca/media.php?mid=50214

Should you have any questions on the above positions, please contact David Miriguay, CCCN Executive Director at **david@cccn.ca** or at 613-406-3548.

Notice

The CCCN Annual General Meeting will be held by teleconference and details will follow via email

CCCN Annual General Meeting

Date: Friday May 22, 2020

Time: 13:00

Avis

Assemblée généralle annuelle du CCIISC

Date : le 22 mai, 2020

Heure : 13 h 00