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Canadian Council of Cardiovascular Nurses

Conseil canadien des infirmières et infirmiers en soins cardiovasculaires

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Letter to the Editor

I read with interest the randomized control trial (RCT) by Sherrard and colleagues (2015) on the use of interactive voice response to improve management of acute coronary syndrome. The authors appropriately state in their methods that they computed a relative risk for the outcome measures. However, in reading Table 3, I noted that risk of medication compliance in the IVR group (84.7%) could not have possibly been twice that of the Usual Care group (71.7%). It became clear that the authors computed an odds ratio, not a relative risk, probably using logistic regression command, instead of the binomial regression one in SAS. Unfortunately, this is not an uncommon error made by researchers. Although the odds ratio closely approximates the relative risk if an outcome is rare (less than 10%), when the outcome is very common, like medication compliance, they can be importantly different (Davies, Crombie, & Tavakoli, 1998). In this case, the relative risk (95% CI) = 1.18 (1.12, 1.25), which is a much different inference than the one identified in the table, which is actually an odds ratio = 2.18 (1.67, 2.86).

The authors are aware that when we have studies with complete denominators, as in this RCT, we should use them whenever possible. We just need to remember when we are using a computer to assist us, we should grossly view the data to assure the computer-generated result is consistent with the data. ♥

Sincerely,
Mary Barger PhD, MPH
Associate Professor
Hahn School of Nursing and Bob and Betty Institute for Nursing Research
San Diego, CA

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Response from the Authors

We agree with the comment that an odds ratio was calculated for both the primary composite and medication compliance outcomes. For clarity, we are providing the relative risk for the primary composite outcome = 1.20 (1.04, 1.32) and medication compliance = 1.18 (1.12, 1.25). The substantive finding of statistical significance remains unchanged and the interpretation remains the same.

Thank you,
Christine Struthers, RN, MScN
APN Chronic Cardiac Care

CCCN SCIENTIFIC SESSION CALL FOR ABSTRACTS

In conjunction with the Canadian Cardiovascular Congress

Vancouver, BC, October 21–24, 2017

CCCN is announcing a Call for Abstracts related to any aspect of cardiovascular and/or cerebrovascular nursing for presentation at the Scientific Sessions of the Canadian Council of Cardiovascular Nurses in Vancouver, BC, October 21–24, 2017.

Abstract submissions are invited for presentation in English or French. Please indicate on the abstract form the language in which you would like to present. Abstracts are invited as four presentation options:

Workshop: Workshop presenters will offer an interactive discussion and analysis of a clinical topic or practice issue in a forum lasting 50–60 minutes. Abstracts for workshop sessions must meet the same criteria as other submissions, and must outline the educational objectives, proposed content area and method of presentation (i.e., case study, multiple choice questions) for attendees to interact with one another and the presenters.

Oral: Paper presentations will be 15 minutes in length with an additional 5 minutes allotted for questions.

Poster: Posters will be displayed over two days of the CCCN conference. Presenters must be available at their poster location for 30 minutes on one of the two days. Poster presenters may be selected by the abstract review committee to present their poster as a moderated oral poster session.

Oral or poster: Submitters are willing to have their abstract considered by the abstract review committee for an oral or poster presentation.

Submissions are peer-reviewed in one of two categories: research and non-research. An abstract submission is reviewed in the "research" category if it describes some aspect of an original piece of research, either as 'completed research' or 'research in progress'.

The "non-research" category includes abstracts that do not describe an original piece of research (i.e., theoretical or clinical application).

Abstracts are considered under one of the following themes: ACS/AMI, Stroke, Pediatrics and Congenital Heart Disease, Dysrhythmia Management, Health Promotion, Nursing Education, Health Services, Patient Safety, Heart Failure/Transplant, Cardiac Surgery and Other.

The submission of an abstract constitutes a commitment by the author(s) to attend the meeting and to present. All presenting authors must register for the meeting and are responsible for their own transportation and accommodation. Abstract grading is performed by blind review, and notification of acceptance or rejection of an abstract occurs by email in May–June 2017.

Students are invited to submit their abstract to be considered for an oral or poster presentation award at the CCCN Scientific Annual Meeting. Each award recognizes excellence in a clinical or research presentation. Successful candidates are awarded a free one-year membership and certificate of achievement. To be eligible for an oral or a poster presentation award:

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3. Student must be the lead- or co-author, and the presenting author at the CCCN National Scientific Session, and
4. Student must be a current member of CCCN.

Please note: CCCN has an online submission process and all abstracts must be submitted on the website at www.cccn.ca. The online submission process opens **February 16 and closes April 4, 2017 at 2400 hours**. For more information, visit www.cccn.ca or contact info@cccn.ca

READ CAREFULLY—FAILURE TO COMPLY WITH INSTRUCTIONS WILL LEAD TO DISQUALIFICATION OF AN ABSTRACT.

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3. Abstracts will be published in the language of original submission unless provided in both official languages.
4. Abstracts must be submitted under only one, of the following presentation categories and will be considered ONLY for the selected category:
   - Workshop
   - Oral
   - Poster
   - Oral or poster presentation
5. DO NOT use headings. Abstracts must be submitted in narrative (paragraph) format.
6. Common abbreviations may be used (i.e., mm Hg), but all other abbreviations must be explained the first time they are used (i.e., "…the Heart Health Survey (HHS) found that…").
7. DO NOT underline or use bold print within the body of an abstract to emphasize words or phrases.
8. It is recommended that abstracts be composed in a word processing program (e.g., WORD) and then cut and pasted into the abstract template. Please ensure that all spelling and/or grammatical errors are corrected before pasting into the abstract template.

B. SPECIAL ADDITIONAL GUIDELINES FOR RESEARCH ABSTRACTS

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   - Results of the study; and
   - Conclusions, including implications for practice.
2. If study is in progress and results/conclusions are not available, it is necessary to include the potential implications for clinical practice.

C. SPECIAL ADDITIONAL GUIDELINES FOR NON-RESEARCH ABSTRACTS

1. Organize and present the non-research project according to:
   - Statement of purpose;
   - A description of the issue/program/technique that will be presented;
   - Summary of major conclusions; and
   - Description of the significance and implications for practice.

D. POLICIES

1. Abstracts must conform to instructions and be submitted by **April 4, 2017, at 2400 hrs.**
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3. There is no limit on the number of abstracts that an author's name may appear on for submission.

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Acute Coronary Syndromes Symptom Presentation Among Persons of South Asian Descent: A Comprehensive Literature Review

Tanya Kurich, MN, NP, Gerri C. Lasiuk, BA (Psych) PhD, RPN, RN, CPMHN(C), and Colleen M. Norris, RN, MN, PhD (Epidemiology), FAHA

Abstract

A plethora of research has focused on the importance of seeking timely treatment in the event of an acute coronary syndrome. However, little attention has been given to symptom presentation in acute coronary syndromes, specifically among persons of South Asian descent. South Asians are of particular importance, as they have the highest burden of cardiovascular disease among any other ethnic group. A detailed analysis of typical versus atypical, location, characteristics, and intensity of symptoms in acute coronary syndromes is provided. The literature suggests that persons of South Asian descent are more likely to present with atypical symptoms, whereas Caucasian males typically present with classical symptoms. Further research is required and critical to creating awareness among health practitioners when considering differentials and timely treatment in acute coronary syndromes among South Asians.

Key words: coronary artery disease, acute coronary syndrome, ACS, delay, time factors, symptom, admission, presentation, South Asian

Kurich, T., Lasiuk, G.C., & Morris, C.M. (2017). Acute Coronary Syndromes Symptom Presentation Among Persons of South Asian Descent: A Comprehensive Literature Review. *Canadian Journal of Cardiovascular Nursing*, *27*(1), 6–13.

Highlights

- Limited evidence exists to describe acute coronary syndromes among persons of South Asian descent
- Analysis of typical versus atypical, location, characteristics, and intensity of symptoms in acute coronary syndromes among South Asians provided
- Results indicate persons of South Asian descent are more likely to present with atypical symptoms, whereas Caucasian males typically present with classical symptoms

Persons of South Asian descent are those whose ancestry originates from the Indian subcontinent including India, Pakistan, Sri Lanka, Nepal and Bangladesh. These individuals have the highest burden of cardiovascular disease with reported prevalence rates that are approximately two- to six-fold greater than other ethnic groups (Bainey & Jugdutt, 2009). It is estimated that "the number of productive lives lost due to coronary artery disease (CAD) in India is projected to increase from 7.1 million in 2004 to 17.9 million in 2030" (Nair & Prabhakaran, 2012, p. 307). It is imperative to note that South Asians represent 25% of the total visible minority population in Canada and 4.8% of Canada's total population according to the 2011 census (Statistics Canada, 2011). As this population increases in Canada, the incidence of cardiovascular disease is also expected to rise, potentially placing a strain on our healthcare system. Since heart disease is largely preventable, public education initiatives targeted to persons of South Asian descent will be instrumental in reducing the overall burden of cardiovascular disease in Canada.

Recognizing the signs of acute coronary syndrome (ACS) and seeking immediate care are vital to survival. ACS refers to a range of clinical presentations associated with obstruction of the coronary arteries, including stable angina, unstable angina, ST elevated myocardial infarction (STEMI) or non-ST elevated myocardial infarction (NSTEMI). "Previous reports have suggested that atypical presentations in patients with myocardial infarction have led to an increased risk of delays in seeking medical attention, less aggressive clinical management and a worse in-hospital mortality" (Teoh, Lalondrelle, Roughton, Grocott-Mason, & Dubrey, 2007, p. 183). It is equally important that health care professionals and the public have the ability to discern both typical and atypical symptoms of ACS. Typical symptoms include chest pain or discomfort, often radiating to the left arm or jaw, as well as nausea, vomiting and diaphoresis. While the typical symptoms of ACS are generally well recognized, the atypical symptoms create an anomaly for recognition, diagnosis, and timely treatment.

Inspiration to explore this topic arose from a clinical observation that persons of South Asian descent are more likely to present with atypical ACS symptoms than are persons from other ethnic groups. These atypical ACS symptoms include sensations in the neck, jaw, shoulders, back, and/or generalized weakness. In other words, atypical symptoms are regarded as a presentation not accompanied by chest pain. It is uncertain whether persons of South Asian descent present with these symptoms or a subset of the symptoms seen in the general population. Thus, inquiry into the nature of ACS symptoms experienced by persons of South Asian heritage is of importance to determine any differences in symptomology.

This integrative review employed methods described in the literature, as noted by Whittemore and Knafl (2005), to explore published research on the symptom presentation of ACS in South Asians, as well as to understand factors that may contribute to delay in seeking treatment. Integrative reviews are useful for identifying central issues associated with phenomena of interest, linking related areas of work, detecting gaps in the literature, evaluating the strength of empirical evidence, and suggesting areas for additional study (Russell, 2005). This method was chosen because it facilitates the review and synthesis of theoretical literature, qualitative research, and quantitative studies (Whittemore & Knafl, 2005). Most importantly, identifying any differences in the symptom presentation of ACS between persons of South Asian descent and Caucasians is the purpose of this review. Due to the nature of this study (review), no ethical review was required.

Method

An electronic search was performed of Cumulative Index to Nursing and Allied Health Literature (CINAHL) Plus with Full Text, Medline, PubMed databases, and the Google Scholar search engine using the following terms *coronary artery disease, acute coronary syndrome, ACS, delay, time factors, symptom, admission, presentation, South Asian, Indian, Pakistani, Sri Lankan, Nepalese, Bangladeshi,* and *atypical*. Inclusion criteria for the review were 1) peer-reviewed research reports; 2) published in the English language; 3) that focus on persons of South Asian descent and coronary artery disease or ACS, symptom presentation, and/or delay in seeking treatment. Studies were excluded if they were 1) published in a non-peer review journal, or 2) did not focus on persons of South Asian descent.

A total of 707 (N=707) abstracts were generated from initial searches of CINAHL (373), Medline (214), Pub Med (82), and Google Scholar (38). In the first phase of the review, titles and abstracts of these articles were screened for relevance and 682 were excluded for not meeting inclusion criteria. The full text of 25 potentially eligible reports was retrieved and read several times to determine eligibility for the final review. In addition, the reference list of each article was manually scanned for supplementary literature that addressed the research question; these hand searches yielded another 23 articles. The full texts of the remaining 48 articles advanced to the second stage of the review and was read in its entirety for relevance to the review question. Fourteen (14) articles were included in the final full review (see Figure 1). The literature reserved for review includes reported results from studies that employed various research methods including questionnaires, semi-structured interviews, quantitative techniques, prospective surveys, and retrospective data collection.

These 14 articles retained for full review (see Table 1) addressed the proposed research examining ACS symptoms,

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Figure 1: Flow Diagram of Article Identification for Inclusion in Full Review

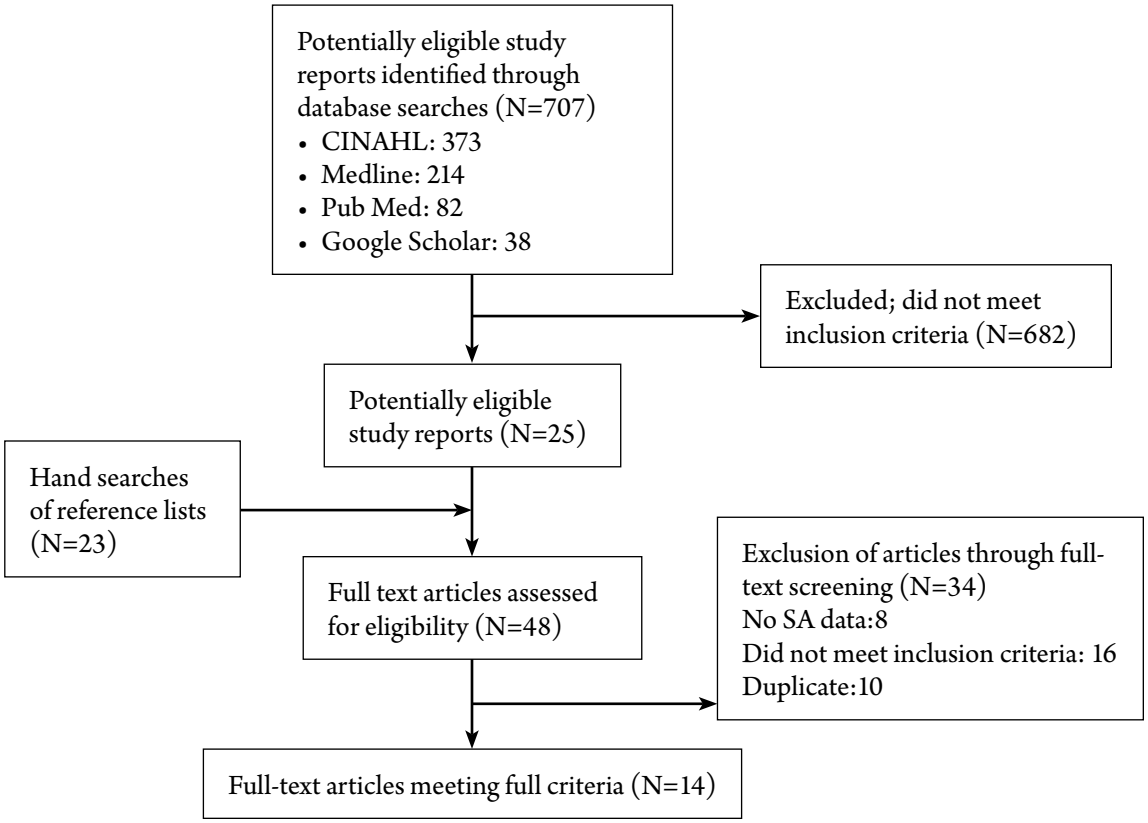

Table 1: Relevant Articles for Literature Review

Author, Article Title, Journal	Year	Study Purpose	Study Design	Sample Size and Sample Characteristics	Key Findings
Farquharson et al., Appraisal and illness delay with symptoms of ACS: A questionnaire study of illness representations, British Journal of Cardiac Nursing	2012	To explore whether illness representations are associated with patient delay in those symptoms with ACS	A Common-sense Model of Self-Regulation (CS-SRM) questionnaire study	• Random sample of 182 patients • Patients who contacted NHS 24 with symptoms of ACS	• Median Appraisal Delay was 2 hours • Median Illness Delay was 75 minutes • Women were more likely than men to have long appraisal delays (57% vs. 43%)
Kandula et al., Knowledge gaps and misconceptions about coronary heart disease among U.S. South Asians, American Journal of Preventive Medicine	2010	Examined South Asians' knowledge and beliefs about CHD as a first step in developing prevention messages	Analysis of a cross-sectional study	• 270 South Asian adults • Age 20-75, self-identified as Asian Indian/Pakistani • Spoke English, Hindi, or Urdu	• Most participants (89%) said they knew little or nothing about CHD. • Stress-most frequently mentioned risk factor (44%) • Few mentioned controlling blood pressure (11%); cholesterol (10%); and diabetes (5%) for prevention • Fifty-three percent said that heart attacks are not preventable
King et al., Ethnic variation in acute myocardial infarction presentation and access to care. The American Journal of Cardiology	2009	Ethnic variation in acute myocardial infarction presentation and access to care.	Explanatory study	• A random sample of 406 health records of Caucasian, Chinese, South Asian, Southeast Asian, and First Nations patients discharged from hospitals in the Calgary Health Region (Alberta, Canada) was audited	• Chinese, South Asian, and Southeast Asian patients were 64% to 69% less likely than Caucasian patients to have a classic symptom profile reported • 39% of patients who had a reported distinct time of symptom onset waited >12 hours to present to the ED • In patients who presented with a classic symptom profile, South Asians were 70% less likely than Caucasians to report to the ED within 3 hours of symptom onset
Darr et al., Causal attributions, lifestyle change, and coronary heart disease: illness beliefs of patients of South Asian and European origin living in the United Kingdom, Heart & Lung: The Journal of Critical Care	2008	Examined and compared the illness beliefs of South Asian and European patients with coronary heart disease (CHD) about causal attributions and lifestyle change.	Qualitative study that used framework analysis to examine in-depth interviews	• 65 subjects • Previously admitted with unstable angina, myocardial infarction or to undergo CABG.	• Stress and lifestyle factors were the most frequently cited causes for CHD irrespective of ethnic grouping
Greenslade et al., Examining the Signs and Symptoms Experienced by Individuals with Suspected Acute Coronary Syndrome in the Asia-Pacific Region: A Prospective Observational Study. Annals of Emergency Medicine	2012	To examine whether symptoms reported by patients varied across ethnic backgrounds	Prospective data collection on ethnicity, type of pain, and associated symptoms using a customized case report form, from 12 urban EDs in 8 countries	• 1,868 individuals from 4 ethnic groups: Chinese (730), Indian (100), Korean (181), and white (857).	• Type of pain did not predict ACS except in Indian patients where typical pain was associated with an increased prevalence of ACS • Diaphoresis was associated with marked increase of ACS in the Chinese and white samples
Teoh et al., Acute coronary syndromes and their presentation in Asian and Caucasian patients in Britain, Heart (British Cardiac Society)	2007	To describe and compare demographics and symptom presentation in Asian and Caucasian patients with acute coronary syndromes	Long-term prospective survey of symptom presentations	• 604 'Asian' (not defined) patients • 2,301 Caucasian patients • Required hospital admission for ACS	• Asian patients were younger than Caucasian patients (61 vs. 69 years, $p<0.001$) and more had diabetes (43% vs. 17%, $p<0.001$) • Asian patients more frequently reported discomfort over the rear of their upper bodies compared to Caucasian patients (46% vs. 25%, $p<0.001$) and radiation of discomfort to their arms and necks • Asian patients demonstrated a "classical" location of symptoms more than Caucasian patients (90% vs. 82%, $p<0.001$) • Patients with diabetes were more likely to feel no discomfort

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Perkins-Porras et al., Pre-hospital delay in patients with acute coronary syndrome: Factors associated with patient decision time and home-to-hospital delay. European Journal of Cardiovascular Nursing	2009	To examine factors associated with total pre-hospital delay	Chart reviews and Semi-structured interviews	• 228 patients admitted with ACS to one of four London hospitals	• Shorter total pre-hospital delays and decision times were associated with ST segment myocardial infarction (STEMI), recognizing symptoms as cardiac in origin, being married, symptom onset outside the home and the presence of a bystander • Shorter home-to-hospital delays were more likely among younger patients, those experiencing an STEMI, and patients reporting a greater number of symptoms
Zaman et al., Presentation of stable angina pectoris among women. Canadian Medical Association Journal	2008	To examine whether atypical symptoms of angina in women and South Asians impacted clinically important outcomes and management	Prospective study	• 2,189 South Asian people and 5,605 white people with recent onset chest pain at 6 chest pain clinics in the UK.	• Atypical chest pain was reported by more women (56.5%) than men (54.5%) and by more South Asian patients (59.9%) than white patients (52.5%)
Rana et al., Cardiovascular risk among South Asians living in Canada: a systematic review and meta-analysis. CMAJ Open	2014	To compare cardiovascular risk factors and disease management practices among South Asian and white Canadians	Systematic Review and Meta-analysis	• 50 articles (5,805,313 individuals)	• The median time from symptom onset to presentation to a hospital in a southern Ontario sample was about 1 hour longer for South Asian people than white people
Ben-Shlomo et al., Ethnic differences in healthcare-seeking behaviour and management for acute chest pain: Secondary analysis of the MINAP dataset 2002-2003. Heart (British Cardiac Society)	2008	To test the hypothesis that South Asian patients with chest pain would be less likely to attend by ambulance and examine delay factors	Prospective study	• 118,323 subjects were classified as Caucasian, 5,486 Asian and 26,521 subjects were unclassified (16.3% of the total dataset)	• Query if South Asians present with more atypical histories • Delay factors • 'Asian' not defined
Noureddine, S., Patterns of responses to cardiac events over time. Journal of Cardiovascular Nursing	2009	To examine 1) the influence of past experience with similar symptoms on delay in seeking health care, 2) whether the correlates of delay time differ on the basis of past experience with similar symptoms, and 3) determine the pattern of responses to symptoms of ACS overtime in a sample of Lebanese patients	Secondary analysis of a descriptive study	• 210 patients from a CCU in Beirut	• Reasons for delay in seeking treatment for patients with ACS • Those with past experience were more likely to recognize their symptoms as cardiac
McKee et al., Multivariate analysis of predictors of pre-hospital delay in acute coronary syndrome. International Journal of Cardiology	2013	To identify sociodemographic, clinical, patients' knowledge, attitudes and beliefs, appraisal of symptoms, situational and behavioral factors predictive of pre-hospital delay in patients with ACS	Secondary objective of a large RCT of an educational intervention to reduce delay time in response to ACS symptoms	• 1,894 patients with ACS from 5 large urban hospitals in Dublin, Ireland	• Factors leading to delay in presentation to hospital with ACS
Comeau et al., Can symptom presentation predict unstable angina/non-ST-segment elevation myocardial infarction in a moderate-risk cohort? European Journal of Cardiovascular Nursing	2006	To examine the symptoms of individuals presenting to the ED suggestive of ACS	Prospective cohort design	• 100 patients enrolled in the Chest Pain Program	• Good comparison of typical and atypical symptoms in patients with NSTEMI and unstable angina • Chest Pain Protocol algorithm
Canto et al., Prevalence, clinical characteristics, and mortality among patients with myocardial infarction presenting without chest pain. JAMA: Journal of the American Medical Association	2000	To determine the frequency with which patients with MI present without chest pain and to examine their subsequent management and outcome	Prospective Observational Study	• 434,877 patients with confirmed MI from 1,674 hospitals in the United States.	• Patients with MI who present without chest pain are at increased risk for delays in seeking medical attention, less aggressive treatments and in-hospital mortality • Patient characteristics in those who presented without chest pain (ex. those who are non-Caucasian or an ethnic minority)

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factors contributing to delay in treatment seeking, and their significance to the South Asian population. Articles that met full inclusion criteria have formed a quorum for this review and have been further analyzed to identify distinct themes.

Results

After a thorough review of the articles retained for review, information specific to symptom presentation and time-to-seek-treatment was organized into the following themes: typical symptoms, atypical symptoms, location of symptoms, characteristics of symptoms, and intensity of symptoms, as well as factors of delay to seeking treatment.

Symptoms in ACS

Symptoms related to cardiovascular disease are essential warning signs indicative of an impending heart attack and if not recognized by the patient or a health professional can lead to a delay in treatment and poor outcomes.

Typical symptoms. Typical or classic symptoms of ACS include mid-sternal or retrosternal chest pain or pressure on the left side of the chest and may or may not include arm or jaw pain that is provoked by physical exercise or emotional stress (Caldwell & Miaskowski, 2000; Comeau, Jensen, & Burton, 2006; Greenslade et al., 2012; King, Khan, & Quan, 2009; Zaman et al., 2008). Some literature suggests back, neck, and shoulder pain are also typical ACS symptoms (Farquharson, Johnston, & Bugge, 2012; Perkins-Porras, Whitehead, Strike, & Steptoe, 2009).

Atypical symptoms. Atypical symptoms of ACS are those symptoms not as clearly determined to be cardiac in nature including nausea, fatigue, headache, confusion, weakness, abdominal or epigastric discomfort, shortness of breath, feeling faint or dizzy, flu-like, and diaphoresis (Comeau et al., 2006; Farquharson et al., 2012; Greenslade et al., 2012; King et al., 2009; Perkins-Porras et al., 2009). These atypical symptoms are also referred to as "ancillary symptoms" suggesting that atypical symptoms are those symptoms that are related to ACS, but occur in the absence of mid-chest pain (Caldwell & Miaskowski, 2000; Comeau et al., 2006). This array of atypical symptoms can make it difficult to recognize potential ACS symptoms.

In studies that compared persons of South Asian descent with Caucasians, the former were more likely to present with atypical symptoms (King et al., 2009; Teoh et al., 2007; Zaman et al., 2008). In contrast, one study found typical pain in Indians to be associated with increased prevalence in ACS (Greenslade et al., 2012). However, the study was limited, as the non-specific Indian group was underpowered and inadequate to examine patients with atypical and typical symptoms. Furthermore, patients included in this same study (Greenslade et al., 2012) were to have "at least five minutes of chest pain suggestive of ACS", which would exclude patients experiencing atypical or prodromal symptoms.

Patients who report typical symptoms of chest pain were more likely to be diabetic compared to those with atypical symptoms (Zaman et al., 2008). However, this largely contradicted other studies that reported those who have diabetes tend to present with atypical ACS symptoms (Canto et al., 2000; King et al., 2009; Teoh et al., 2007). South Asians are known to have a high incidence of diabetes (Bainey & Jugdutt, 2009; Ben-Shlomo, Naqvi, & Baker, 2008; Nair & Prabhakaran, 2012; Teoh et al., 2007), thus the relationship between diabetes and atypical or typical symptoms is worth investigating. Female gender, advanced age, and non-Caucasian/ethnic minorities are other factors commonly associated with atypical presentation (Canto et al., 2000; Comeau et al., 2006; Zaman et al., 2008). Atypical symptom presentation is of grave concern, as patients who presented without chest pain in ACS were more likely to die in hospital (23.3%) in comparison to those who presented with chest pain (9.3%) (Canto et al., 2000).

Location of symptoms. Because the location of discomfort experienced in ACS can vary significantly, it has limited value as an indicator of a cardiovascular event (Caldwell & Miaskowski, 2000). However, a British study (Teoh et al., 2007) reported that 46% of South Asians reported pain on the back of their upper body in comparison to 25% of Caucasian patients—a difference that proved to be statistically significant. In another study that compared persons of South Asian and Caucasian descent, the former were more likely to report left-sided pain (Zaman et al., 2008). Significant differences in location of symptoms would be important to include in primary prevention messaging to the South Asian community. Well-designed research utilizing schematic, pictorial diagrams, where patients indicate location of symptoms would be useful in determining variances in ACS presentation (Teoh et al., 2007). This may enable patients to recognize ACS symptoms early and present to hospital in a timely manner.

Characteristics of symptoms. The terminology that individuals used to identify the characteristics of ACS symptoms varied depending on education levels, socioeconomic status, gender, and ethnicity. Words used to describe discomfort included: tight, pressure, weight, heaviness, dull, crushing, squeezing, aching, constricting, pulling, pushing, stabbing, shooting, and, burning (Comeau et al., 2006; Teoh et al., 2007; Zaman et al., 2008). One study found that men often used the word 'grinding,' whereas women used the word 'tearing' (Caldwell & Miaskowski, 2000). A study to establish translational and conceptual equivalence of language on survey questionnaires found differences among ethnic groups concerning an illustration depicting 'squeezing' pain (King, Khan, LeBlanc, & Quan, 2011). European and South Asian reviewers agreed that a picture of a hand grasping a balloon captured the conceptual meaning of squeezing, while Chinese reviewers endorsed a picture of a towel being wrung

out (King et al., 2011). This demonstrates how the same word may be understood or expressed differently based on an individual's ethnicity. Caucasian patients described their symptoms with broader terminology than Asian patients, including use of words such as cramp-like, belt-like, rawness, gnawing, throbbing, searing, bruised, and punched (Comeau et al., 2006; Teoh et al., 2007). One study, in particular, categorized quality of symptoms into atypical and typical where sharp, burning, stabbing, cramping, throbbing, pinching, and raw meat were words used by patients with atypical symptom presentation in the setting of NSTEMI or unstable angina (Comeau et al., 2006). Clearly, the words used to describe symptoms vary with ethnicity and may not reflect textbook descriptions, adding to the complexity of recognizing ACS in a timely manner.

Intensity of symptoms. Patients who experience low levels of discomfort may not seek treatment as quickly as someone who is feeling unbearable pain. Patients who had higher intensity of pain were more likely to contact emergency personnel (Perkins-Porras et al., 2009). On the other hand, patients with diabetes were 19% more likely to report low levels of pain (Teoh et al., 2007) and potentially could have longer delays in seeking care. Diabetic neuropathies can result in weakened pain perception and sensation, ultimately impeding a person to seek treatment in the event of ACS (Caldwell & Miaskowski, 2000). Since persons of South Asian descent have a higher incidence of diabetes and present with atypical symptoms, they may be particularly at risk for late presentation. Intensity of symptoms is not well described in the literature, but may be worth investigating further, especially in patients with diabetes.

Factors Related to Delays in Treatment Seeking

Understanding the variability of symptoms in ACS presentation is essential in order for patients to seek timely treatment and for health professionals to evaluate and manage care. Delay in seeking treatment is consistently defined as prolonged time from symptom onset until arrival to hospital (Canto et al., 2000; McKee et al., 2013; Noureddine, 2009). Explanations associated with delay in seeking care include not realizing the seriousness of symptoms, not attributing symptoms to an acute cardiac event, waiting to see if symptoms would go away, concern about troubling others, perceived control over illness, lack of support to seek care, lower levels of education, health literacy and socioeconomic status, older age, female gender, and being non-Caucasian (Ben-Shlomo et al., 2008; Darr, Astin, & Atkin, 2008; Gallagher, Marshall, & Fisher, 2010; Grewal, Stewart, & Grace, 2010; King et al., 2009; McKee et al., 2013; McKinley et al., 2004; Noureddine, 2009). As a result, denial, prayer, distraction, relaxing, and fatalism are some of the responses to the situation. Teoh et al. (2007) found ['Asian'] individuals in London showed that any delays in obtaining cardiac services were unrelated to difficulties in interpretation of symptoms or willingness to seek care. However, these results conflicted with another study where findings have revealed that decision time accounted for nearly two-thirds of the delay in presenting to hospital (Perkins-Porras et al., 2009). A Canadian study recently reported that South Asians with ACS presented to hospital about one hour longer than Caucasians with ACS (Rana, De Souza, Kandasamy, Lear, & Anand, 2014). Evidently, symptom recognition is essential to receiving prompt, life-saving treatment. A deeper look at factors in seeking care within the South Asian ethnic group would be helpful in determining any differences compared to the general population.

Discussion

This literature review provides clear evidence of differences in ACS symptom presentation among ethnic groups. The literature suggests that persons of South Asian descent are more likely to present with atypical symptoms, whereas Caucasian males typically present with classical symptoms. Much of the literature attributes atypical symptom presentation to diabetes, which is highly prevalent among South Asians. While treatment targets for diabetes do not differ between ethnic groups, guidelines should consider cultural differences (e.g., traditional diets).

With respect to the location of symptoms, South Asians more frequently reported symptoms in the upper back radiating to the arms and neck, while Caucasians tended to report a typical location of symptoms. This is a significant ethno cultural difference, which may be further explored through use of schematic diagrams in future research.

The characteristics of symptoms were described differently depending on a patient's ethnicity, education level, and sex (King et al., 2009; Schifferdecker & Reed, 2009; Zaman et al., 2008). Clear communication of symptoms is key to a prompt diagnosis. A qualitative study would provide an in-depth understanding of the terminology used by South Asians and would perhaps create an awareness among health practitioners when considering differentials in symptom presentation.

Intensity of symptoms has not been studied as a variant of symptom presentation across ethnic and gender groups, but may be of importance in the diabetic population, including South Asians.

Implications for Practice

Symptom presentation in ACS can be confusing and difficult to recognize, ultimately contributing to delay in seeking lifesaving care. In the South Asian population where cardiovascular disease is of serious concern, it is imperative that health professionals and patients understand factors that may delay treatment.

To establish evidence and generalize findings specific to the South Asian population, a consistent definition of ethnicity is needed. Many studies referred to the population as

"Indian", "Asian" and "South Asian" with substandard definitions of ethnic origin (Darr et al., 2008; Greenslade et al., 2012; Kandula et al., 2010; Teoh et al., 2007; Zaman et al., 2008). For example, one study (Teoh et al., 2007) comparing demographics and symptom presentation is applicable and could be replicated in Canada and likely yield generalizable results to the South Asian population. However, the term Asian is not appropriately defined. As more research is implemented with regards to this ethnic group, a global definition is essential for consistency.

Likewise, it has been acknowledged that the terminology used to identify characteristics of ACS symptoms varies depending on education levels, socioeconomic status, gender, and ethnicity. For health practitioners to accurately treat ACS, recognizing the language used to communicate symptoms is essential. It is possible that certain words are more commonly used among South Asians when describing symptoms in ACS. This may warrant additional qualitative studies to examine and increase awareness regarding the contextual and ethno cultural differences in the vocabulary of symptom presentation.

Furthermore, South Asians are a broadly defined population, thus further analysis of this group may benefit by sub classifying the ethnic subgroups to gain a better understanding of potential variations under the umbrella term of 'South Asian'.

Lastly, cardiovascular risk-reduction programs aimed at health promotion in South Asians with cardiovascular risk must be culturally sensitive, taking into account differences in diet, culture and lifestyle (Gupta, Singh, & Verma, 2006). An interdisciplinary approach, involving dietitians, physiotherapists, pharmacists, nurse practitioners and physicians, targeting care specific to the South Asian with ACS may be the most effective for overall risk reduction. Health practitioners should be mindful to disseminate educational information in local temples, mosques, ethnic grocery stores, and other venues which are easily accessible to many South Asians.

Limitations of the Study

There was a dearth of literature on the topic of ACS symptom presentation in persons of South Asian descent, which was a limitation to the study. However, this highlights the need for more research on symptom presentation in ACS, specifically in the South Asian ethnic group within Canada. As well, due to the nature of the literature on this topic, no systematic assessment of the quality of the data was possible.

Conclusion

While the typical symptoms of ACS are clear, it is uncertain whether South Asians in Canada present with the same or a subset of the symptoms seen in the general population. It is critical that healthcare practitioners understand the ACS symptom presentation in South Asians in order to ensure that treatment is provided as quickly as possible. If presentation is atypical, it is important for nurses and health care professionals alike to recognize and educate about these symptom differences in order to ensure the timely care of ACS is initiated. This integrative literature review addresses the proposed research and further defines the research questions: 1) Do South Asians' symptoms of acute coronary syndromes differ from Caucasians residing in Canada? 2) If so, is symptom presentation of ACS in South Asians associated with the length of time it takes to seek treatment? Cardiovascular disease is a chronic disease that is one of the most common, expensive and preventable of all health problems (Centers for Disease Control and Prevention, 2016). As health practitioners, it is our responsibility to further recognize, understand and educate each other in effort to reduce the overall burden of cardiovascular disease in Canada. ♥

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A Nursing Intervention to Enhance Acceptance of Implantable Cardioverter Defibrillators: A Randomized Pilot Study

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Abstract

***Background**: Patients may experience anxiety and reduced quality of life after implantable cardioverter defibrillator (ICD) device implantation.*

***Objective**: To assess the feasibility, acceptability, and preliminary efficacy of the Approach Caring and Cognitive Behavioural (PRO-CARE) intervention, aimed at improving ICD device acceptance and psycho-functional outcomes one month after implantation.*

***Methods**: The pilot study involved 30 patients randomized to the intervention (IG) or control (CG) groups. The three encounters of the PRO-CARE intervention addressed patient-specific ICD concerns by focusing on beliefs leading to lower device acceptance and psycho-functional outcomes.*

***Results**: Thirteen (87%) of the 15 IG patients received all three encounters. The intervention was both feasible and acceptable. Although not statistically significant, mean scores on ICD device acceptance, shock, and general anxiety favoured the IG.*

***Conclusions**: Further research is needed to replicate results from this pilot study, but our observations suggest that nurses need to assess ICD patient anxiety and to tailor their interventions accordingly.*

Trial registration: www.controlled-trials.com; ISRCTN95996799

Key words: implantable cardioverter defibrillator, pilot study, nursing intervention, device acceptance, anxiety

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Media Advisory Highlights

- The purpose of this pilot study was to assess the feasibility and acceptability of an individualized nursing intervention aimed at improving device acceptance in first-time recipients of implantable cardioverter defibrillators (ICD).
- The intervention was both feasible and acceptable as a means of potentially reducing ICD-related anxiety.

Implantable cardioverter defibrillators (ICD) can be used as primary prevention for those at risk of sudden cardiac arrest (SCA) or as secondary prevention in SCA survivors (Priori et al., 2015). Previous studies have proposed specific domains of concerns in SCA survivors including preventive care, activities of daily living (ADL), physical changes, emotional challenges, and possible ICD shocks (Dougherty, Benoliel, & Bellin, 2000; Wong, Sit, & Wong, 2012). These concerns may result in lower psycho-functional recovery including avoidance of ADL (Habibovic, Burg, & Pedersen, 2013). Therefore, improving patients' psychological health may improve their acceptance and adaptation to the ICD device.

Device acceptance is defined as "the psychological accommodation and understanding of the advantages and disadvantages of the ICD device, the recommendation of the device to others, and the derivation of benefit in terms of biomedical, psychological and social functioning," (Burns, Serber, Keim, & Sears, 2005, p. 385). Device acceptance has been associated with increased quality of life in ICD patients; therefore, developing strategies to increase device acceptance is important.

A review of interventions aiming to improve outcomes such as device acceptance in ICD patients, revealed some gaps limiting the transfer of research results to clinical practice (Dunbar et al., 2012; Habibovic et al., 2013). The majority of studies tested cognitive behavioural therapy (CBT) interventions provided by psychologists or mental health specialists, and many were part of comprehensive rehabilitation programs. Among the studies evaluating educational and CBT-based interventions provided by general practice nurses, Dougherty, Lewis, Thompson, Baer, and Kim (2004a) assessed an eight-week intervention with weekly 15- to 20-minute telephone calls. They found no effect of the intervention on anxiety, depressive symptoms, or quality of life at three months after ICD implantation, whereas a trend toward a decrease in anxiety, and improvement in knowledge and self-efficacy was observed at 12 months (Dougherty, Pyper, & Frasz, 2004b; Dougherty, Thompson, & Lewis, 2005).

Dunbar et al. (2009) compared two different interventions with usual care. Each intervention began with a face-to-face encounter at the day of hospital discharge and a brief phone call at one week, followed either by four group meetings or four telephone follow-ups initiated one or two months after the ICD implantation. Dunbar et al. observed a decrease in anxiety and depressive symptoms at three months, a result that was not maintained at one year. While the studies assessed a wide range of interventions, in order to facilitate their use in clinical practice, we sought to test an intervention that could be administered within a short timeframe by regular staff nurses.

Aim and Methods

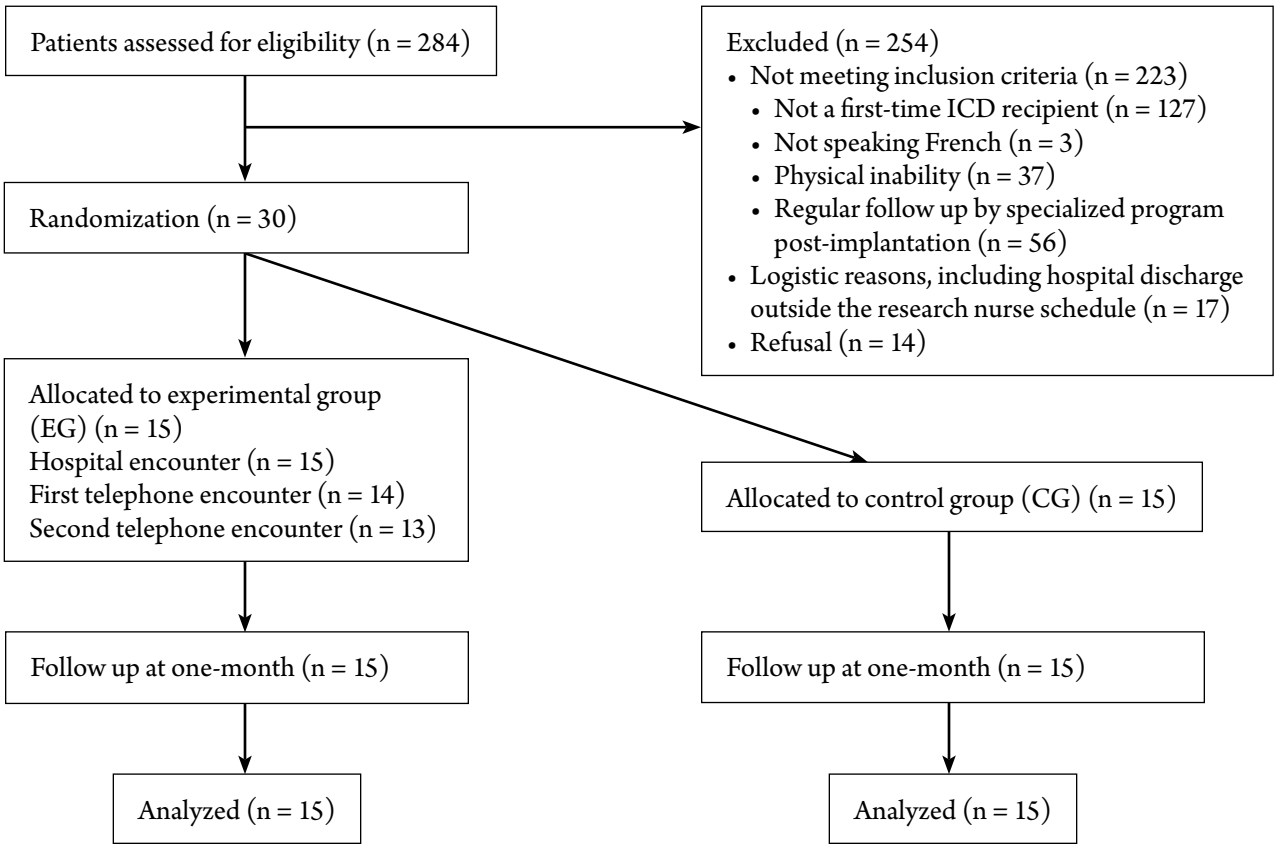
The purpose of this randomized pilot study was to evaluate the feasibility, acceptability, and preliminary efficacy of the Nursing Approach Caring and Cognitive Behavioural (PRO-CARE) intervention, a caring and cognitive behavioural nursing approach aimed at improving psycho-functional outcomes one month after first ICD implantation. We hypothesized that compared to the control group, the intervention group would demonstrate greater device acceptance (Hypothesis; H1); lower shock anxiety (H2); lower general anxiety (H3); and higher ADL functioning (H4) one month post-ICD implantation.

The pilot study was registered at Controlled Trials (#ISRCTN95996799) and approved by the Scientific and Ethics Committee of the Montréal Heart Institute Research Centre (Reference number: 2011-1294). The investigation conforms with the principles outlined in the Declaration of Helsinki (Rickham, 1964). Each participant signed a written consent form after receiving explanations on study procedures in an individual encounter with the project nurse. Participants were informed they could withdraw from the study at any time without consequences. An identification number was assigned to each participant to ensure confidentiality. Reporting of the study sequence was guided by the SPIRIT guidelines as suggested by the CONSORT group (Chan et al., 2013; Zwarenstein et al., 2008) (see Figure 1).

Study Setting and Sample

The study was conducted with adult patients who were hospitalized for a first ICD implantation at a tertiary cardiac hospital in Montreal, Canada. This pilot study involved two randomized parallel groups (1:1 ratio), counting in total 30 patients. To be included, patients had to be aged 18 years or older; a first-time ICD recipient; able to speak, read, and understand French; hospitalized for a maximum of two weeks after ICD implantation; and discharged home. In order to avoid multiple interveners, patients were excluded if they had specialized follow-up in an outpatient clinic.

Figure 1. CONSORT Flow Diagram for the PRO-CARE Pilot Randomized Study



When patients were stabilized after ICD implantation, the project nurse approached them to explain the study and obtain informed consent. A self-report questionnaire was then administered to collect baseline data, and clinical data were obtained from the hospital files. The project nurse also enquired if a family member would be interested in participating, because of their possible supportive role in ICD acceptance; however, their presence was not mandatory.

Study Procedures

Usual care. All participants in the IG and the CG received usual care during their hospital stay and after discharge. This included educational and discharge planning interventions and usual follow-up, including device testing and adjustment, as needed, by a cardiac electrophysiology technician.

The PRO-CARE intervention. The aim of the PRO-CARE intervention was to facilitate ICD device acceptance by addressing specific concerns expressed by patients. It combined an adaptation of both caring-based (Watson, 2009) and Cognitive Behavioural Therapy (CBT)-based (Bandura, 1977; Dougherty et al., 2000) interventions and was designed to be transferable into regular practice with post-ICD patients. The caring-based interventions aimed to foster a trusting and helping relationship with patients in order to create an optimal environment for ICD device acceptance. The nursing intervention included identifying patient-specific ICD concerns, with a focus on their interpretation of the events.

CBT-based interventions are based on the principle that a person's emotions are more the result of his/her beliefs rather than of only the events. For example, an ICD recipient receiving a shock while walking might develop a belief that this physical activity generates shocks, which could result in anxiety and avoidance of walking. CBT-based techniques would then focus on reinterpretation of the event with the aim to reduce anxiety and avoidance. Studies have also shown that CBT has a beneficial impact on anxiety (Dunbar et al., 2012). CBT-based nursing interventions have been previously adapted for nursing practice in several studies (Dougherty et al., 2004a; Dunbar et al., 2009).

Intervention content and structure. The nurse who provided the intervention received two days of training in CBT-based nursing interventions through a continuing education program by the provincial order of nurses. This training was provided by a clinical nurse specialist in mental health and the interventions are within the scope of practice of registered nurses. PRO-CARE included three encounters: one in-hospital after consent and randomization but before discharge, and two by telephone at 7 ± 2 and 14 ± 2 days after discharge (see Table 1). The telephone encounters targeted a time when patients usually resume their ADL, which can trigger anxiety and concerns for them and their families.

The PRO-CARE nurse began by asking "What concerns you the most about your ICD?" This aimed to assess patients' concerns based on Dougherty et al.'s (2000) seven domains of post-ICD implantation concerns. These include 1) physical changes and symptoms, 2) activities, 3) emotional reactions, 4) shocks from the ICD, 5) partner relationships, 6) safety and prevention, and 7) health care providers. In response to each concern expressed by patients, the nurses used caring-based interventions based on previous work by the team (Cossette, Cote, Pepin, Ricard, & D'Aoust, 2006) and CBT-based nursing interventions based on the literature (e.g., Dougherty et al., 2004a).

The nurse used a checklist to ensure *per protocol* delivery of the experimental interventions, but tailored the interventions to address each patient's particular concerns. This checklist included 25 possible interventions divided into eight categories: 1) explore the concerns towards the ICD; 2) offer tailored counselling regarding ICD concerns; 3) assess ICD-specific consequences; 4) acknowledge and support patient's belief system and hope; 5) assess strategies

Table 1: Study Sequence

	In-hospital			***After hospitalization***		
	$-t_1$	t_0	t_1	t_2	t_3	t_4
Participants timeline	Enrolment and baseline measures	Randomization	Pre-hospital discharge	7th day	14th day	One-month measures
Control group	√	√	Usual care			√
Intervention group	**√**	**√**	**PRO-CARE**	**PRO-CARE**	**PRO-CARE**	**√**
Preliminary efficacy measures	Time of data collection					
H1 – device acceptance with the FPAS	√					√
H2 – shock anxiety with the FSAS	√					√
H3 – general anxiety with the HAD	√					√
H4- functioning with the FPI-SF	√					√

Note. Template adapted from the SPIRIT guideline (Chan et al., 2013); FPAS: Florida Patient Acceptance Survey; FSAS: Florida Shock Anxiety Survey; HAD: Hospital Anxiety and Depression scale; FPI-SF: Functional Performance Inventory Short Form.

regarding ICD concerns; 6) encourage new behaviours and autonomy; 7) go over the progress made; and 8) set a precise, realistic goal for the next encounter. The checklist was validated before the study by 16 new ICD recipients, four spouses, seven nurses, and one volunteer responsible for an ICD recipient support group (Charchalis & Cossette, 2010; Charchalis et al., 2011).

Measures

Feasibility and acceptability. While feasibility refers to the possibility of providing the intervention as planned, acceptability refers to the appropriateness of the intervention for participants and intervention providers (Feeley & Cossette, 2015; Feeley et al., 2009).

Feasibility of the experimental intervention was assessed using predetermined indicators for intervention structure and content as suggested by Feeley and Cossette (2015). Structure was documented using a research log including information on intervention sequence and duration. Content was documented using the nursing intervention checklist and the domains of patient ICD concerns list completed by the nurse after each encounter.

Acceptability of the experimental intervention was assessed with the Treatment Acceptability and Preference (TAP) measure (Sidani, Epstein, Bootzin, Moritz, & Miranda, 2009). The TAP includes four items assessing whether the intervention was perceived as appropriate, acceptable, and effective in supporting ICD device acceptance, and whether patients would be willing to participate if a similar study would be offered to them. Answers on a 5-point Likert scale ranged from "not at all" (0) to "extremely" (4). An overall question about satisfaction was added. The TAP and other scales were translated into French using the back-translation method and verified by the research team. The alpha coefficients reported by Sidani et al. (2009) ranged from 0.80 to 0.87.

Preliminary efficacy. The preliminary efficacy of the intervention was assessed by collecting outcome data at one month after discharge using a telephone questionnaire administered by a research assistant who was blinded to the study group assignment.

Hypothesis testing. Hypothesis 1 on device acceptance was assessed by the Florida Patient Acceptance Scale (FPAS) (Burns et al., 2005), which is a specific scale for this population (Dunbar et al., 2012). The FPAS includes 15 items that make the four sub-scores including return to functioning, positive appraisal, device-related distress, and body image concerns. Respondents answer on a 5-point agreement scale ranging from "strongly disagree" (1) to "strongly agree" (5). A higher score indicates higher patient acceptance of the device. Burns et al. (2005) reported an alpha coefficient of 0.83.

Hypothesis 2 on shock anxiety was assessed using the Florida Shock and Anxiety Scale (FSAS) (Kuhl, Dixit, Walker, Conti, & Sears, 2006). The FSAS includes 10 items providing a total score of shock-specific anxiety. Respondents' feelings in relation to possible ICD shocks were assessed on a 5-point Likert scale ranging from "not at all" (1) to "all the time" (5), with higher scores indicating higher anxiety. The alpha coefficient reported by Kuhl et al. (2006) was 0.91.

Hypothesis 3 on general anxiety was assessed by the seven-item anxiety sub-scale of the Hospital Anxiety and Depression (HAD) scale (Zigmond & Snaith, 1983). Response scores vary from 1 to 4 with qualifiers depending on the statement. A higher score reflects higher general anxiety. The alpha coefficient reported by Savard, Laberge, Gauthier, Ivers, and Bergeron (1998) for the anxiety subscale was 0.89.

Hypothesis 4 on functioning in ADL was assessed with the Functional Performance Inventory Short Form (FPI-SF) (Leidy, 1999; Leidy & Knebel, 2010). This questionnaire includes 32 items assessing six domains of functioning: body care, maintaining the household, physical exercise, recreation, spiritual activities, and social interactions. Respondents indicated the difficulty level of each activity: "not performed because of health difficulties (0)," "no difficulty (1)," "some difficulty (2)," "much difficulty (3)," or not applicable (NA). A score was calculated if at least 80 percent of the items in a subscale were rated on the difficulty levels. A higher score reflects higher difficulty in functioning. The alpha coefficient reported by Leidy and Knebel (2010) was 0.93.

Baseline data obtained from medical charts included gender, age, days in hospital, diagnosis, NYHA heart failure class, antecedents, comorbidities, ICD indications, type of ICD, and ejection fraction. Self-reported baseline data included marital and employment status, and education.

Sample Size and Randomization

A sample size of 15 per group (N = 30) was planned. No specific cut-off was predetermined to decide on feasibility, but we hoped to deliver all three encounters to at least 50% of the intervention group sample (Charchalis, 2012). For the hypotheses, the pilot study was not designed to attain an adequate statistical power, but to observe the direction and amplitude of the differences between the two groups in order to assess the preliminary efficacy of the intervention. Randomization occurred after informed consent, and assignment was then revealed. The randomization scheme was automatically generated by an independent statistician and was carried out using sealed opaque envelopes.

Data Analysis

Sociodemographic and clinical variables were summarized as mean and standard deviation (SD) for continuous variables and as count and percentage for categorical variables. Alpha coefficients were calculated at baseline and at one-month for the scales and the subscales. The hypotheses were tested using analysis-of-covariance (ANCOVA) models including the baseline score as a covariate. We examined the direction and amplitude of the differences between groups, as well as *p* values. *P* values ≤.05 were considered statistically significant.

Results

Reliability of the Measures

For the FPAS subscores, alphas at baseline and at one month were respectively 0.48 and 0.70 for return to functioning, 0.78 and 0.54 for device-related distress, 0.82 and 0.84 for positive appraisal, 0.88 and 0.82 for body image concerns, and 0.81 and 0.84 for the total score. At baseline and one month, alphas were respectively 0.85 and 0.86 for the total score of the FSAS, and 0.72 and 0.65 for the HAD. For the FPI-SF alphas were 0.69 and 0.46 for body care, 0.83 and 0.80 for household maintenance, 0.76 and 0.59 for physical exercise, 0.72 and 0.55 for recreation, 0.76 and 0.59 for spiritual activities, and 0.89 and 0.84 for social interactions.

Participant Flow

Recruitment started in June 2011 and ended in April 2012, including a one-month follow-up (Figure 1). Among the 284 potential participants, 223 did not meet inclusion criteria, most because they were not first-time ICD recipients (e.g., ICD box change), 17 were excluded because of logistical issues (e.g., discharge hours), and 14 refused to participate, resulting in 30 patients randomized in the experimental and control groups.

Characteristics of the Sample

As shown in Table 2, some differences were found for the sociodemographic and clinical variables. The control group included four women, while the intervention group did not include any women. The control group also had a longer length of hospital stay, a higher rate of NYHA class III (vs II), less type 2 diabetes, less previous myocardial infarction, more ICDs implanted as secondary prophylaxis, and higher ejection fraction.

Table 2: Socio-Demographic and Clinical Characteristics

	IG (N = 15) n (%) or mean (SD)	**CG** (N = 15) n (%) or mean (SD)
Sex, male	15 (100)	11 (73)
Age (yr)	60.17 (11.88)	60.42 (15.36)
Married	8 (53)	10 (67)
Not working	7 (47)	9 (60)
Education > high school	10 (67)	11 (73)
Number of days of hospitalization	2.45 (2.60)	5.26 (7.10)
Number of days of hospital stay between ICD implantation and hospital discharge	1.74 (1.10)	2.18 (1.94)
Diagnosis		
Congestive heart failure	13 (87)	12 (80)
Arrhythmia and/or sudden cardiac arrest	2 (13)	3 (20)
NYHA functional classification		
I	1 (7)	5 (33)
II	10 (67)	5 (33)
III	3 (20)	8 (50)
Not available	1 (7)	2 (13)
Antecedents-comorbidities		
Diabetes (type 2)	5 (33)	2 (13)
Previous myocardial infarction	8 (53)	4 (27)
Hypertension	7 (47)	8 (53)
Valve (stenosis, insufficiency)	8 (53)	6 (40)
Chronic renal insufficiency	2 (13)	2 (13)
ICD indications		
Primary prophylaxis	13 (87)	11 (73)
Secondary prophylaxis	2 (13)	4 (27)
Types of ICD		
Single chamber	6 (40)	6 (40)
Double chamber	2 (13)	4 (27)
Biventricular	7 (47)	5 (33)
Percent left ventricular ejection fraction	24.33 (7.57)	34.21 (14.83) [a]

Note. IG: intervention group; CG: control group; ICD: implantable cardioverter defibrillator; NYHA: New York Heart Association.
[a] n = 14.

Feasibility Results

Intervention structure. The first aspect of feasibility was assessed through the success of delivering the intervention structure as planned. The first encounter during hospitalization (mean duration of 20 minutes) was completed with all 15 experimental patients. For the post-discharge telephone calls, 14 patients were reached for the first telephone call (mean duration 22 minutes) and 13 patients were reached for the second (mean duration 19 minutes). A spouse or family member was present in eight of the 15 in-hospital encounters.

Intervention content. The second aspect of feasibility was the intervention content documented with the nursing intervention checklist and the domains of patient concerns list. Two patients told the nurse they had "no" concerns about the ICD during the first encounter, and another one had no concerns at the second telephone call. The duration of the encounters was very short for patients without any concerns (e.g., less than 10 minutes). The most prevalent concern at the in-hospital encounter was regarding ADL, such as the types of ADL to perform or to avoid, issues during the first days after returning home, and how to adapt to changes. Concerns related to physical issues (care for the scar, discomfort at the ICD site, sleeping difficulties), ICD shock, and ICD functioning were also reported by almost half of the IG patients in at least one of the three encounters. Relationships with health professionals (scheduling visits, who to call if needed) were also reported in the second and third encounters while patients were home.

Nursing interventions included exploration about the significance of and difficulties dealing with the ICD, provision of information, encouragement to discuss their feelings, reinforcement of strengths, and pointing out positive experiences.

Acceptability Results

The acceptability of the intervention, according to the TAP measure, was very strong with 12 of 15 patients in the IG indicating it was "extremely" appropriate and acceptable. The perceived efficacy of the intervention in helping patients accept the device was low for three patients who responded "not at all" and "a little". Thirteen of the 15 patients responded that they would agree to receive the intervention again. The 15 IG patients were extremely satisfied (n = 13) or very satisfied (n = 2) with the intervention.

Preliminary Efficacy of the Intervention

As presented in Table 3, although differences were minimal, most favoured the IG. In the IG, the total ICD device acceptance mean score (H1) was higher, and the shock anxiety (H2), as well as the general anxiety (H3) mean scores were lower. The general functioning in ADL mean score was lower in the IG, and this reflects lower difficulties in ADL. Not surprisingly in a pilot study, none of the differences analyzed with the ANCOVAs were statistically significant.

Discussion

This pilot study aimed to assess the feasibility and acceptability of a nursing intervention to improve ICD device acceptance, shock anxiety, general anxiety, and ADL functioning among post-ICD implantation patients. The PRO-CARE intervention was considered feasible, as more than 50% of participants received the three encounters. All 15 IG patients received the in-hospital encounter, and 14 and 13 received the first and second telephone follow-ups. The content was relevant given that 12 of the 15 IG patients reported at least one primary concern before hospital discharge; only three patients had no concerns before hospital discharge. Responses to the TAP measure indicated acceptability of the intervention.

In the ICD population, intervention duration ranged from two weeks to six months (Dunbar et al., 2012), making it challenging to choose an appropriate duration for our study intervention. To facilitate the possible use of the PRO-CARE intervention in clinical practice, we selected a dosage and duration of three interviews lasting a mean of 20 minutes each. Since providing educational and discharge planning interventions require time in usual practice, delivering these interventions in a different manner without adding time may be an interesting avenue to explore in practice. Adjusting educational and discharge intervention content to focus on patient-specific ICD concerns, similar to PRO-CARE, could result in more tailored intervention, rather than standardized discharge planning package. However, it is possible that some of the content of the PRO-CARE intervention was initiated too early for some patients, especially regarding possible ICD shock. The topic of ICD shock could be generally introduced to patients and their families during hospitalization; for instance, providing general information about what to expect and what to do in case of ICD shock. In a future study, patient-specific discussion about this topic could be offered after their return home or after a registered ICD shock in order to be tailored to the patient's concerns.

Table 3: Hypothesis Testing Results at One-Month (results of the ANCOVA analyses)

	IG (n = 15)	CG (n = 15)	*p*	95% CI
	Mean (SD)			
H1: ICD device acceptance [a]	64.77 (6.31)	61.99 (10.70)	0.715	-6.65 ; 4.63
H1a: Return to functioning	17.0 (3.16)	15.64 (4.03)	0.615	-3.48 ; 2.10
H1b: Positive appraisal	18.0 (2.72)	16.6 (3.79)	0.478	-1.23 ; 2.55
H1c: Device-related distress	21.21 (2.86)	20.64 (4.03)	0.840	-2.99 ; 2.45
H1d: Body image concerns	8.50 (2.41)	9.07 (2.02)	0.718	-1.36 ; 1.94
H2: Shock anxiety [b]	14.89 (6.31)	15.46 (7.52)	0.389	-2.87 ; 7.06
H3: General anxiety	1.87 (1.64)	3.53 (3.02)	0.103	-3.39 ; 0.33
H4: Functioning in ADL	61.80 (19.26)	62.86 (11.04)	0.803	-10.29; 13.18
H4a: Body care	13.80 (1.74)	13.47 (1.88)	0.703	-1.17 ; 1.63
H4b: Home maintenance	15.27 (7.28)	14.67 (4.85)	0.841	-3.88 ; 4.73
H4c: Physical exercise	8.80 (3.70)	9.60 (2.89)	0.462	-3.23 ; 1.51
H4d: Entertainment	9.73 (4.22)	11.33 (3.04)	0.196	-4.50 ; 0.97
H4e: Spiritual activities	3.87 (5.04)	5.33 (4.65)	0.317	-4.40 ; 1.48
H4f: Social activities	5.13 (1.51)	4.27 (2.15)	0.237	-0.59 ; 2.26

Note: IG: intervention group; CG: control group; Ns lower than 30 are due to non-response to some items precluding calculation of a total score for a particular scale.
[a] n = 28; [b] n = 27

Regarding hypothesis testing, the ANCOVAs showed no statistically significant between-group differences at the end of the study. The small sample size might explain this, but future studies should consider screening anxious patients who express concerns about the ICD to determine study eligibility in order to address more specific concerns raised in that population.

The choice of outcome measures is crucial in clinical trials. Basing our choice on the literature, we selected specific measures for ICD patients: device acceptance and shock anxiety (Burns et al., 2005, Kuhl et al., 2006). However, device acceptance levels, which were already high at baseline, may have resulted in a ceiling effect, leaving little room for improvement. Regarding shock anxiety, previous studies included patients who had already experienced an ICD shock and, therefore, may have benefited more from the intervention than in our sample patients who did not experience any shocks during the study duration.

Implications for Practice

Although pilot studies only inform on the preliminary efficacy of interventions, observations from the present study are relevant to clinical nursing practice. First, nurses could readily assess the anxiety level and beliefs of ICD recipients in order to quickly identify patients who could benefit from an intervention aimed at ICD acceptance. Assessing anxiety as part of a therapeutic relationship could be performed using open-ended questions, taking into account each patient's particular concerns and family support system, as described in the guidelines published by the Registered Nurses Association of Ontario (2006). Furthermore, by assessing logistical needs after ICD implantation (e.g., resources at home, medical follow-up, etc.), we may better target patient-specific needs. Our results also suggest that a "one-size-fits-all approach" to interventions is far from being the ideal way to address patient-specific ICD concerns (Habibovic et al., 2013). Instead, nurses could address these concerns by using a PRO-CARE-based intervention in their clinical nursing practice. Finally, because we observed that some patients were anxious while others were not, assessing specific concerns and anxiety levels in ICD recipients could be helpful in tailoring nursing interventions.

Study Limitations and Strengths

Our study had several limitations. An important limitation was the small sample size. Although adequate for a pilot study, the small sample was not representative of the general ICD population and did not allow for sufficient power for statistical testing. The baseline differences between the two groups might also be attributed to small sample size. The study did, however, have methodological strengths, including design and documentation of the intervention as recommended by CONSORT (Zwarenstein et al., 2008). We measured specific ICD outcomes as recommended for this population (Dunbar et al., 2012). Moreover, since some ICD recipients reported avoidance behaviour in the literature, we decided to assess ADL functioning—something that, to our knowledge, has not previously been done. The time required to assess baseline measures and outcomes was realistic, and participants reacted positively to the questionnaire format.

Conclusion

The PRO-CARE nursing intervention was found to be both feasible and acceptable, as a possible means of improving device acceptance and reducing anxiety in ICD recipients. Based on our findings, ICD interventions should focus on anxious patients. In addition, the optimal timing for delivery should be explored. Delivery later after discharge could possibly help patients deal with the concerns they experience once they return home. Future study interventions should be more tailored, to better deal with the specific concerns of every patient. ♥

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Cardiovascular Disease Risk: A Focus on Women

Gurmeet Gujral, RN, BN, and Jo-Ann V. Sawatzky, RN, PhD

Abstract

Cardiovascular disease (CVD) is the leading cause of death in Canada. Once considered a man's disease, CVD has emerged as the leading cause of death in women. Hence, it is critically important for women to be aware of their personal risks for CVD and to actively engage in risk-reduction behaviours. Although general awareness of CVD risk among women has improved in recent years, accurate personal perceptions of risk remain poor. As clinicians, educators, and researchers, nurses are ideally positioned to facilitate accurate cardiovascular risk perception in women. Therefore, the purpose of this paper is to provide nurses with a comprehensive overview of cardiovascular risk as it relates to women. Insights gleaned from this review will establish an evidence-based foundation for CVD risk assessment and strategies for promoting risk reduction behaviours in women, as well as future research in this area.

Key words: cardiovascular disease, risk factors, gender, sex, risk perception, women

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Media Advisory Highlights

- Although cardiovascular disease is the leading cause of death among Canadian women, many still are unaware of their potential risk
- In an effort to reduce the burden of cardiovascular disease among women, examining sex/gender differences is the new focus in preventative care
- Cardiovascular nurses should use evidence based CVD risk assessment and strategies to promote risk reduction behaviours in women

Cardiovascular disease (CVD) is the leading cause of death in Canada. CVD is any disease of the heart or blood vessels including stroke, high blood pressure, and coronary artery disease (Mendis, Puska, & Norrving, 2011). Women often underestimate their personal risk for CVD, assuming it is a man's disease and that they have "protection" from it (Mosca, Hammond, Mochari-Greenberger, Towfighi, & Albert, 2013). Yet, current evidence verifies that CVD is now more prevalent among women than men worldwide. According to the American Heart Association (AHA), in 2010 the prevalence of CVD in women was 42.9 million versus 40.7 million in men (Go et al., 2013). Similarly, in 2009, CVD-related mortality rates were higher in women; 51.1% (401,495) versus 49% (386,436) in men (Go et al., 2013). Based on an analysis of 15-year trends, Mosca and associates (2013) concluded that the number of women who are aware that CVD is a threat to their health is steadily increasing. However, research also demonstrates that having awareness does not necessarily translate into accurate perception or understanding of personal CVD risk (Kling et al., 2013). Moreover, poor insight into perceived risk and knowledge of CVD among Canadian women is still being reported (McDonnell et al., 2014). Ensuring accurate perceptions of one's own risk facilitates intent to engage in preventative behaviours and healthy lifestyle and, ultimately, may reduce the burden of illness. Therefore, immediate efforts to improve cardiovascular risk perception among women are critically important.

Risk assessment is the cornerstone of the nursing role in CVD prevention. Nurses also play a fundamental role in educating patients and families about their cardiovascular risks. As well, advanced practice nurses can effectively manage cardiovascular risk in the primary care setting (Voodgt-Pruis, Gorgels, van Ree, van Hoef, & Beusmans, 2010). Therefore, nurses must be aware of the sex/gender specific implications (note: The World Health Organization [2015a] distinguishes "sex" as the biological and physiological characteristics of an individual and "gender" as characteristics and behaviours that are often socially developed) and the risk factors that are exclusive to women. In assessing CVD risk in women, nurses must also recognize that risk factors may have a different impact on women than men, which, in turn, may ultimately lead to worse outcomes (Appelman, van Rijn, ten Haaf, Boersma, & Peters, 2015). Insight into these specific risk factor differences will ensure accurate assessments and optimal educational strategies and management of CVD risk in women.

Based on the alarming statistics surrounding the number of deaths in women attributed to CVD, every aspect of nursing care is worthy of further examination. Therefore, the purpose of this paper is to provide nurses with a comprehensive overview of cardiovascular risk as it relates to women. Insights gleaned from this review will establish an evidence-based foundation for CVD risk assessment and strategies for promoting risk-reduction behaviours in women, as well as future research in this area.

Background

Worldwide, CVD is the leading cause of death, with more people dying from CVD each year than any other cause (Mozaffarian et al., 2015). It is estimated that by 2030 more

than 23 million people will die from CVD annually (World Health Organization, 2015b). In 2012, CVD accounted for more than 27% of all deaths in Canada (i.e., nearly 67,000 deaths) and 27% of all female deaths (i.e., 33,000 deaths) (Statistics Canada, 2015b). These devastating statistics reinforce the importance of increasing awareness and ensuring accurate risk perception of CVD among women. The following brief overview of sex/gender differences in CVD, as well the current literature on risk perception of CVD in women establishes the foundation for the subsequent review of sex/gender differences in CVD risk factors and the implications for nursing.

Sex/Gender Differences in CVD

Over the past several decades there has been emerging evidence to support the differences between men and women in the CVD trajectory. Sex/gender distinctions are found in the physiology, symptoms, diagnosis, treatments, and outcomes of CVD.

There are fundamental physiological sex/gender differences in the heart. A woman's heart is generally smaller, her average heart rate is higher, and cardiac rhythm differences have been noted (Franceski, 2009). These differences may alter the function of the heart. For example, a smaller heart results in a smaller stroke volume and, in turn, a lower cardiac output, which may affect the response to cardiac drugs (Huxley, 2007). Examples of cardiac rhythm differences include abnormalities such as fragmented QRS or atrial fibrillation, which have been associated with increased rates of mortality in postmenopausal women with heart disease (Schröder, Wegscheider, Wenger, Vettorazzi, & Schröder, 2014). Furthermore, evidence reveals that atrial fibrillation is a female specific risk factor for heart failure with preserved ejection fraction (HFpEF) (Meyer et al., 2015). Based on their study of the sex-specific incidence of new-onset heart failure, Meyer and associates (2015) concluded that while men developed heart failure earlier in life, a higher risk for women developing HFpEF later in life was attributed to atrial fibrillation.

Women tend to present with symptoms of CVD later in life (Bybee, Dew, Lawhorn, & Stevens, 2012). Therefore, they also tend to have more comorbid conditions (Low, Thurston, & Matthews, 2010). Women are less likely to seek medical attention for their symptoms and experience their first acute myocardial infarction 10 years later than men (Douglas & Poppas, 2012). In an effort to standardize the criteria of symptom presentation of acute coronary syndrome (ACS) in women, Canto, Canto, and Goldberg (2014) reviewed the literature and found that women are more likely than men to experience back pain, neck pain, jaw pain, arm pain, shortness of breath, paroxysmal nocturnal dyspnea, nausea or vomiting, indigestion, loss of appetite, weakness or fatigue, cough, dizziness, syncope, and palpitations, in addition to chest discomfort.

Because of the sometimes vague, intermittent, and/or more numerous nature of their cardiac symptoms, as well as a general lack of knowledge regarding symptoms, and lack of awareness of CVD, women tend to delay seeking treatment longer than do men (Gallagher, Marshall, & Fisher, 2010). In addition, failure of the primary care provider to recognize symptoms of CVD in women contributes to delays in appropriate referrals and medical treatment (Finks, 2010).

Anatomical and biological sex/gender differences in vascularity and responses to hormones can affect diagnostic testing (Jacobs, 2009). For example, a high rate of false positives in exercise tolerance testing suggests this diagnostic test may be less accurate in women (Finks, 2010). Similarly, while coronary angiography is used to diagnose coronary artery disease (CAD), Taqueti and associates (2015) examined why women with ischemic heart disease, are less likely to be diagnosed with CAD during angiography than men. They found that measuring coronary flow reserve of large and small vessels, which may identify diffuse versus obstructive CAD, allows for a more accurate and thorough way to examine cardiovascular disease in women. Finally, Sy and associates (2013) found that stress-induced cardiomyopathy (i.e., Takotsubo or 'Broken Heart' Syndrome) is more common in women than previously reported, due in part to its similar presentation to acute coronary syndrome.

Once diagnosed, women tend to be treated less aggressively for their CVD compared to men (Wenger, 2012). Women presenting with ST-segment elevation myocardial infarction (STEMI) are less likely to undergo reperfusion therapy than men with the same diagnosis (Pelletier et al., 2014). Pelletier and associates (2014) also found that women are less likely to receive non-primary percutaneous intervention in the presence of non-ST-segment elevation myocardial infarction (MI) or unstable angina (Pelletier et al., 2014). Scheuermeyer and associates (2015) examined patients treated for atrial fibrillation and flutter in emergency rooms. In comparison to the men, the female participants were older with more comorbidities; yet, they received similar treatments. Although short-term emergency room readmission and mortality rates are similar between men and women, this warrants further examination into the long-term consequences of providing similar treatment when women are typically in a noticeably worsened state of health (Scheuermeyer et al., 2015). In addition, women may not benefit from the same treatments to the same degree as men. For example, antiplatelet pharmacotherapy is indicated for treatment of many forms of CVD. However, women have been shown to have increased bleeding as a result of antiplatelet therapy, thus hindering their ability to benefit from this treatment (Alexander et al., 2006).

Finally, CVD outcomes are also generally worse among women. For example, women with ACS have higher short-term (28-day) (Bouisset et al., 2016) and long-term (20-year) (El-Menyar et al., 2013) mortality rates than their male counterparts. Women diagnosed with a STEMI who

undergo primary angioplasty also have higher short-term mortality rates than their male counterparts (Bavishi et al., 2015). Outcomes from cardiac surgery are also worse among women than men (Filardo et al., 2016). Differences in sex/gender CVD outcomes have been attributed to a variety of factors, including women's lack of knowledge, vague initial clinical presentation, and a higher cardiac risk profile, with increased disease severity and more comorbidities among women (Berger et al., 2009).

Thus, research evidence suggests that sex/gender differences in physiology, symptoms, diagnosis, and treatment contribute to a disadvantage for women's CVD outcomes. This evidence highlights the importance of increasing awareness of CVD and CVD risk among women and their healthcare providers.

Risk Perception of CVD Among Women

Ensuring that a woman has an accurate perception of risk is central to successfully influencing her behaviour or adherence to treatments (Cainzos-Achirica & Blaha, 2015). Women often respond to fear and not facts with regard to their biggest perceived health threat. Accordingly, women are generally most concerned with their risk for cancer (Rosenbaum, 2014). While research supports the contention that CVD risk awareness among women is improving, numerous misperceptions and barriers to disease prevention persist among women (Mosca et al., 2013; Rosenbaum, 2014). As well, general awareness of risk does not necessarily translate into an accurate understanding of one's actual personal risk (Kling et al., 2013). In a study that explored the psychosocial barriers preventing women from recognizing their cardiovascular risk factors and actively preventing heart disease, Galbraith and associates (2011) determined that worried and knowledgeable women over the age of 45 were motivated to modify their risk factors. They also concluded that greater personal risk factor awareness and knowledge of family history served as motivation to engage in risk-reducing behaviours.

For many decades, CVD was generally assumed to be a disease exclusive to men. Although awareness of CVD risk in women has improved over the last decade, there are still an insufficient number of women who are aware of their own personal risks for CVD and actively engage in risk-reducing behaviours (Kling et al., 2013). Moreover, there tends to be a general assumption by the general public, as well as some health professionals, that CVD risk factors are similar in men and women. A newer focus in cardiac health is the consideration of some important risk factor differences for CVD in women, including several factors that are exclusive to women. Healthcare professionals may also be unaware that the assessment and education of women at risk for CVD requires unique considerations based on their sex/gender. Thus, alleviating the burden of CVD among women begins with a comprehensive understanding of these unique sex and gender considerations.

Current literature suggests the best approach to evaluate CVD risk in women is routine testing for risk factors and risk score assessment (Gill, 2015). Although one of the strongest risk factors for CVD is age, young women at risk should not be overlooked (Rodriguez & Foody, 2013). The concern for young women is supported by a recent study of CHD mortality data in which Wilmot and associates (2015) found that although the older groups demonstrated a significant decline in death rates, young adults showed the smallest decline, and young women, in particular, saw no improvement in death rate over 32 years (Wilmot, O'Flaherty, Capewell, Ford & Vaccarino, 2015). According to the Heart and Stroke Foundation (2014), CVD risk assessments should begin at age 20. In evaluating trends of CVD awareness over a 15-year period, Mosca et al. (2013) found that although the large gap of CVD awareness between young and older women is decreasing, the younger population is less likely to take steps to reduce their CVD risks. On the other hand, young women who engage in a healthy lifestyle are reducing their CVD risk (Chomistek et al., 2015). This evidence highlights the importance of ensuring awareness, which, in turn, translates to a more accurate risk perception and, ultimately, in women engaging in healthy lifestyles and risk reduction.

Sex/Gender Differences in CVD Risk Factors

A comprehensive risk assessment is essential in CVD prevention because modifiable risk factors can be reduced through behaviour and lifestyle modification, which, in turn, reduces CVD burden. Periodically assessing a woman's risk for CVD not only identifies potential risk factors, but also provides an opportunity to manage any existing risk factors (Wilson, 2010). This is an ideal way to encourage risk-reducing behaviours and motivate healthy living. Although men and women have many of the same overall risk factors, certain risk factors exert greater risk for women. Therefore, the modifiable risk factors that have a greater impact on women than men, as well as risk factors that are unique to women, will be reviewed.

Modifiable Risk Factors

Several modifiable risk factors, including hypertension, diabetes, and obesity, exert a stronger cardiovascular risk in women than men. Each of these factors will be discussed in turn.

Hypertension. Population growth, an aging population, and behavioural risk factors are some of the factors that have contributed to an increase in the global prevalence of hypertension (World Health Organization, 2013). Contributing to the development of disease, disability, and premature mortality, hypertension is a major global public health issue (World Health Organization, 2013). High blood pressure is also one of the most common and preventable risk factors for CVD (World Health Organization, 2013). Although estrogen is thought to contribute to young women having lower blood

pressure than men of the same age, this complex physiological process remains unclear. However, hormones and other compounding factors that tend to occur during menopause, such as an increase in weight and decrease in activity, are believed to contribute to the increased incidence of hypertension in older women (August, 2013). Because older men also tend to gain weight and exercise less, changes in hormones may explain the sex/gender difference in hypertension rates. Interestingly, hypertension confers significantly higher CV risks on women than men. For example, hypertension in women is more strongly associated with stroke, left ventricular hypertrophy and diastolic heart failure (Maas et al., 2011). This association demonstrates the importance of prevention and management of hypertension.

Smoking. The overall prevalence of heavy smoking among Canadians has decreased in the last decade (Statistics Canada, 2015a). Yet, the health threat of tobacco remains a serious concern. In fact, smoking is the second leading risk factor for CVD, after hypertension (Mendis et al., 2011). Although the prevalence of smoking is higher among men than women (Statistic Canada, 2015a), the risk of developing CAD is 25% higher in female smokers than in male smokers (Huxley & Woodward, 2011). Interestingly, men smoke more tobacco cigarettes per day then women (Peters, Huxley, & Woodward, 2013). Nonetheless, women continue to have a higher relative risk for some types of CVD attributed to smoking, implying the hazards of smoking are greater to women than men (Peters et al., 2013). For example, smoking increases the risk of MI more in women than in men (World Health Organization, 2016). While it is unclear whether this difference is due to biology or to the potential differences in smoking behaviours of young women, such as increased popularity and pressure to smoke among their peers and starting to smoke at a younger age than men (Huxley & Woodward, 2011), clearly smoking cessation is essential to CVD prevention among women. Fortunately, those who are successful in smoking cessation can decrease their CVD risk back to that of a non-smoker (World Health Organization, 2016).

Diabetes. Diabetes has one of the most striking sex/gender differences in CVD risk factors. Women with diabetes have a 50% higher risk of mortality than men with diabetes (Maas et al., 2011). Following an MI, women with diabetes have a higher risk of reinfarction and heart failure than men (Finks, 2010; Maas et al., 2011). In a recent systematic review of 64 prospective, population-based cohort studies involving nearly 860,000 individuals, Peters and associates (2014) found that while the incidence of CVD doubled in men with diabetes compared to those without diabetes, the incidence nearly tripled in women with diabetes. This finding may be attributed to a number of factors. For example, in an investigation to determine how cardiovascular risk factors differ between older (ages 60–79 years) diabetic and non-diabetic men and women, with no previous history of an MI (N = 7,529), Wannamethee et al. (2012) found that the factors associated with increased relative risk in women included adiposity, insulin resistance, blood pressure, lipids, endothelial dysfunction, and systemic inflammation. These findings demonstrate that women with diabetes have a significant increase in CVD risk (Wannamethee et al., 2012).

Obesity. Considered to be a worldwide epidemic, obesity rates are rising globally among adults (Mitchell & Shaw, 2015) and children (Ng et al., 2014). Moreover, obesity is more prevalent worldwide among women than men (Mitchell & Shaw, 2015). In Canada, 25% of women are obese and 41% have a waist circumference larger than recommended. In comparison, only 29% of Canadian men have a waist circumstance exceeding recommendations to decrease health risks (Statistics Canada, 2013). Obesity has been found to precipitate and exacerbate other potential CVD risk factors in both men and women (Bybee et al., 2012). Based on a review of the effects of obesity on women's health, Kulie et al., (2011) concluded that it contributes to an increased relative risk for type 2 diabetes. As well, the higher abdominal obesity rate among women is a harmful risk factor of CAD and predictive factor for MI (Kulie et al., 2011). Although the CVD risks caused by abdominal obesity are similar among men and women, the change in fat distribution in a woman's body during menopause contributes to an increase in central obesity and an increase in visceral fat (Maas & Appelman, 2010). Evidence suggests that due to metabolic changes, visceral obesity directly contributes to alterations in cardiovascular structure and function, thereby increasing CVD risks factors during menopause (Bastien, Poirier, Lemieux, & Despres, 2014).

Excess adipose tissue in the obese individual causes an over-production of the mediators that control the inflammatory factors associated with CVD risk (Bybee et al., 2012). Fortunately, women who maintain their ideal weight lower their risk of CVD by 35–65% (Franceski, 2009). Although the risks associated with obesity may be different, men and women who reduce their weight benefit from a lower risk to their cardiovascular system. Weight reduction results in many benefits including decreased blood volume, decreased stroke volume and decreased cardiac output (Poirier et al., 2006), thereby reducing CVD risks.

Risk Factors Exclusive to Women

Although men and women are generally exposed to the same traditional risk factors, several additional risk factors are unique to women and, therefore, must be included in their CVD risk assessments. A woman's reproductive system and associated hormones contribute to the unique cardiovascular risk factors of pregnancy, polycystic ovary syndrome, and menopause.

Pregnancy. Complications during pregnancy, including hypertension and gestational diabetes, are recognized as risk factors for CVD. Hypertension during pregnancy, either

pregnancy-induced hypertension or preeclampsia, is associated with future CVD risk (Lykke et al., 2009; van Rijn et al., 2013). The risk for heart disease is twice as high in women who have experienced high blood pressure compared to women who maintained normal blood pressure during pregnancy (Maas & Appelman, 2010). Hypertension in pregnancy is also associated with increased body mass index and waist circumference and lower levels of HDL cholesterol later in life, which, in turn, affects cardiovascular risk (Stock & Redberg, 2012). Gestational diabetes, which occurs in 3–20% of pregnant women (Canadian Diabetes Association, 2016), increases the relative risk of developing diabetes later in life by seven to 12 times compared to women without gestational diabetes (Maas & Appelman, 2010). Therefore, complications during pregnancy require unique considerations for subsequent CVD risk in women.

Polycystic Ovary Syndrome. Considered a complex genetic condition, polycystic ovary syndrome (PCOS) is an endocrine disorder in women of reproductive age. Prevalence rates vary depending on region of diagnosis, as diagnostic criteria tend to vary. However, PCOS is diagnosed in 6–10% of women worldwide (Azziz, 2015). The etiology of PCOS is a combination of both environmental and genetic factors, and it is associated with a number of morbidities including CVD (Goodarzi, Dumesic, Chazenbalk, & Azziz, 2011). In a study exploring if women with PCOS are at greater risk for CVD later in life, Wang et al. (2011) found that these women had almost twice the incidence of diabetes and dyslipidemia compared to women without PCOS. While the exact relationship between CVD and PCOS is still unclear, a meta-analysis of 130 studies found that increased serum concentrations of CVD risk markers were more prevalent in women with PCOS than in those without PCOS (Toulis et al., 2011).

Menopause. Substantive research evidence supports the contention that as people age, their risk for both heart disease and stroke increases (Mosca et al., 2011; Rosano, Vitale, Marazzi, & Volterrani, 2007). However, as risk factors accumulate when women reach menopause, the prevalence of CVD may exceed that of men of the same age (Bybee et al., 2012). These risk factors include changes in body fat distribution, reduced glucose tolerance, abnormal plasma lipids, and increased blood pressure (Rosano et al., 2007). Over the 10 years from the onset of menopause, women's CVD risk increases four-fold (Abernethy, 2008). At normal serum levels, endogenous estrogen has a regulating effect on metabolic factors such as lipids, inflammatory markers, and the coagulation system (Maas et al., 2011). However, after menopause, reduced estrogen levels are associated with the development of atherosclerosis, clot formation in blood vessels, and an increase in cholesterol (Banks, 2008).

Although high cholesterol is a CVD risk factor for both men and women, lipid components or lipoproteins create a greater risk in aging women (Finks, 2010; Vaccarino et al., 2011). Due to adverse effects of estrogen deficiency on the cardiovascular system after menopause, low-density lipoproteins (LDL) rise and concentrations of high-density lipoprotein (HDL) decrease (Finks, 2010). Therefore, LDL cholesterol and total cholesterol peak between the ages of 55 and 65 years in women, which is approximately 10 years later than men (Banks, 2008). Thus, it is important for healthcare providers to recognize and acknowledge the significant impact of menopause on a woman's health and plan interventions for CVD prevention accordingly.

Although CVD is still often thought to be a man's disease, there are numerous factors that place women at increased risk. Additionally, risk factors can have different effects on women, which may lead to worse outcomes. On the forefront of the healthcare system, nurses in all areas of practice are in the ideal position to provide accurate CVD assessments and education that will assist in reducing the burden of this disease among women.

Implications for Cardiovascular Nurses

Nurses play an essential role in the cardiovascular risk assessment and education of their female patients. Ensuring accurate risk perception of CVD risk and encouraging risk-reduction behaviours is crucial to decreasing the likelihood of developing this disease. Although men and women often share the same risk factors, the significance, impact, and consequences to a woman's overall risk may differ (Maas & Appelman, 2010). The literature describes multiple strategies to reduce the burden of CVD. At the individual level, these strategies may include lifestyle changes, such as abstaining from cigarette smoking, maintaining ideal body weight, regular physical activity, maintaining an overall healthy dietary pattern, and following clinical practice guidelines for maintaining normal cholesterol, blood pressure, and blood glucose levels (Lloyd-Jones et al., 2010). More broadly, population level strategies, such as education in schools and workplaces are important. As well, public policy initiatives that are directed at behaviour, lifestyle, environmental factors, and use of evidence-based therapies for existing CVD are having a positive impact on the cardiovascular health of both men and women (Lloyd-Jones et al., 2010). Nurses make up the largest group of health professionals and they are at the forefront in conducting patient assessments, providing education, and influencing healthy public policy. In an effort to reduce the incidence of CVD, it is imperative for nurses working in areas of clinical practice, education, and research to be prepared to address the unique risk profiles of their female patients.

Clinical Practice

Clinical risk assessments provide a foundation to guide interventions and reduce long-term risk of CVD (Berger, Jordan, Lloyd-Jones, & Blumenthal, 2010). The Framingham

Risk Score (FRS) is a commonly used clinical risk assessment tool. Assessment of five different factors (i.e., age, cholesterol, lipid levels, smoking status, and blood pressure) enables the Framingham risk score calculator to effectively predict the 10-year risk for CHD by categorizing women into low, intermediate, or high risk (Banks, 2008). The FRS does, however, have limitations. For example, predicting only a 10-year risk in young women may provide an incomplete and/or inaccurate evaluation of their lifetime risk for CHD, which, in turn, may lead to incorrect risk perception and possibly affect their motivation and adherence to recommendations (Berger et al., 2010). Therefore, an alternative approach, particularly for younger women whose risk may change significantly over a lifetime, is required.

"Overall risk" assessment is an effective strategy to ensure that interventions focus on clusters of risk factors, as opposed to individual risk factors (Dahlöf, 2010). In addition to traditional risk factors, examining non-traditional risk factors (NTRFs) is a new approach to obtaining a comprehensive CVD risk assessment. Examining the risk profile differences between traditional risk factors and NTRFs, Choi and associates (2014) found that NTRFs are highly prevalent among premature ACS patients, specifically young women. NTRFs include lower levels of education, low household income, unemployment, poor stress management, anxiety, and depression (Choi et al., 2014). Research suggests policymakers and healthcare providers should target young women for primary prevention efforts in an attempt to decrease the development of CVD in women at younger ages (Rodriguez & Foody, 2013). By assessing CVD risk with an "overall risk" approach and including NTRFs, healthcare providers will be providing women with a complete risk assessment and the best opportunity to adopt healthy lifestyle and risk-reducing behaviours.

Education

Educating nurses on a focused approach to CVD risk assessment is central to ensuring optimal risk assessment in women. There is 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 (Kiamco-Millman & Pinto-Zipp, 2013). One of the requirements for achieving the goal of a well-informed patient is a nurse who is well-informed about research-based evidence related to CVD risk in women. Health care organizations play a key role in facilitating this goal.

Accurate risk perception is necessary to make an informed decision regarding behaviour change (Koelewijn-van Loon et al., 2010). Nurses should use risk assessment tools to provide individualized assessments to women and then discuss ways to make lifestyle changes to effectively decrease their CVD risk. This may include educating women about basic risk-reduction strategies such as smoking cessation, maintaining an optimal weight, engaging in regular physical activity, making dietary changes, and minimizing alcohol consumption (Stock & Redberg, 2012).

Nurses working in the area of women's health must be knowledgeable about the specific cardiovascular risks that may affect these women. For example, women with a history of complications of pregnancy, including pregnancy-induced hypertension, preeclampsia, and gestational diabetes, as well as women with PCOS and menopausal women warrant regular follow-up and education related to consequent risk for CVD (Bellamy, Casas, Hingorani, & Williams, 2009; van Rijn et al., 2013). Primary prevention of CVD in women with these risk factors is generally considered the same as broad CVD prevention recommendations (Goodarzi et al., 2011), with strategies that include education about lifestyle management, maintaining normal cholesterol, and blood pressure control. However, individualized education is also important and requires nurses to be aware of the most recent evidence. For example, nurses must be prepared to provide menopausal women with evidence-based information about the risks and benefits of hormone replacement therapy. Although hormone replacement therapy (HRT) has been indicated as treatment for menopause-related symptoms (Stuenkel et al., 2012), HRT is not currently recommended for CVD prevention alone (Hale & Shufelt, 2015). Thus, effective education of women at risk for CVD depends on nurses who have current knowledge in the specific areas of women's risk.

Research

Gaps in research evidence persist regarding sex/gender differences in CVD risk factors. Rather than generalizing the results of studies conducted on men, future research on specific risk factors for CVD in women is essential to the development of optimal prevention strategies in this population. As well, further research is needed to gain an understanding of why awareness of risk does not necessarily translate into accurate perception of personal CVD risk and/or taking action to reduce that risk. This may provide further insight on how to effectively inform women of their CVD risks. Research should also examine what motivational influences will encourage women to partake in and sustain long-term, healthy behaviours. These efforts may be hampered by the fact that women are consistently less likely to participate in clinical trials (Wenger, 2012). Therefore, researchers must continue to develop and refine recruitment strategies, as well as educate women on the importance of their participation in research. Finally, nurse researchers must seize the opportunity to explore the unique perspective of CVD risk and risk perception in women.

Summary

CVD is the number one health threat to women worldwide. Assessment of cardiovascular risk is the first-line strategy for prevention. Risk factors in women differ from those in men, which may contribute to women having an inaccurate perception of personal risk, delaying seeking treatment

and, therefore, experiencing delayed diagnoses and worse outcomes than their male counterparts. Most risk factors for CVD can be reduced through behavioural and lifestyle modifications. Nurses play a central role in CVD prevention through risk assessment and educating women and their families about their risks for CVD. This comprehensive overview of cardiovascular risk in women establishes an evidence-based foundation for CVD risk assessment of women in clinical practice. As well, educational strategies for promoting risk-reduction behaviours in women were highlighted. Finally, the identified gaps in the current research literature underscore the urgency for further nursing research in this area. ♥

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Author Guidelines

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The Canadian Journal of Cardiovascular Nursing (CJCN) publishes four issues annually, featuring articles in both French and English. CJCN welcomes original articles dealing with research findings or issues relating to cardiovascular health and illness.
The Journal provides a forum for:

- Research Papers
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- Commentaries and Responses to Commentaries
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- Case Studies
- Arts Informed Scholarship

Letters to the Editor in response to our articles or columns are encouraged.

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The manuscript should be sent by email to: Canadian Council of Cardiovascular Nurses, email: **david@cccn.ca**

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   i) Media Advisory Highlights
   j) References
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4. **Commentaries and Responses to Commentaries.** The text should be arranged as follows:
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5. **Discourses Relevant to Cardiovascular Nursing.** Discourses relevant to cardiovascular nursing, including position papers and critical reviews of particular bodies of work, which do not contain empirical data or use systematic review methods, are also welcome. The text should be arranged as follows:
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   g) Conclusions
   h) Relevance to Clinical Practice
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