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Editorial

You learn to write better by reading. You learn to read better by writing. Reading and writing work together to improve the way you think!
—Author Unknown

We all learned the importance of reading and writing at a very young age! Most of us would not be where we are today if it were not for our ability to read and write. The *Canadian Journal of Cardiovascular Nursing* (CJCN) provides an opportunity for you to do both! As the official journal of the Canadian Council of Cardiovascular Nurses (CCCN), our goal is to provide a forum for disseminating timely, original research and discourse on advances and issues in clinical practice, as well as other novel topics related to cardiovascular health and illness that are relevant to cardiovascular nurses.

As the new, incoming editor of the CJCN, I am committed to improving the way you *think*—by publishing papers that you will want to *read*, and providing you with the opportunity to *write*! While writing for publication can seem like a daunting task, especially if you are a novice, most of us have the necessary foundational writing skills and, by methodically taking the steps to achieve the goal, you, too, can succeed!

And so, to light your writing fire, particularly for those of you who attended the recent CCCN Conference, and may have presented a paper or a poster, we have included a brief article in this issue—with you in mind. *Writing for Publication: Tips for Getting Started* was created to help you over the initial hump and on your way to submitting a clinical or research manuscript, or a short report to the CJCN. We have also recently updated our Author Guidelines on our website with you in mind. I welcome your queries about potential topics, especially for clinical papers. You are all doing great work out there—why not share it with your cardiovascular nursing colleagues from across Canada and beyond? I challenge you to give it a try…

> *And will you succeed? Yes, you will indeed! 98 and ¾ percent guaranteed!*
> —Dr. Seuss

Jo-Ann V. Sawatzky, RN, PhD
Editor, Canadian Journal of Cardiovascular Nursing

Search for Associate Editors for the CJCN

We are currently seeking two additional Associate Editors for the Canadian Journal of Cardiovascular Nursing. Associate Editors must have:

- At least five years of cardiovascular nursing experience
- A current CCCN membership
- A minimum of master's preparation
- Publishing experience in peer-reviewed journals.

For further information on this opportunity to participate in the CJCN publication process, please contact CJCN Editor, Dr. Jo-Ann Sawatzky at **joanne.sawatzky@umanitoba.ca**

Writing for Publication in CJCN: Tips for Success

Jo-Ann V. Sawatzky RN, PhD

Why publish?

Nurses, clinicians, researchers, administrators, clinician-scientists, and graduate students are motivated to publish by factors such as:

- the opportunity to share innovative solutions to clinical practice issues or unique case studies, communicate and disseminate research findings, and contribute to evidence-informed practice.
- an impetus to advance along the educational and professional journey.
- to increase knowledge, skills, and expertise as nursing scholars.

While the publication process can be a daunting endeavour, the following tips, strategies, and resources are designed to facilitate this process.

Getting Started

- **What to write?** Identify the main focus of a potential paper and verify that the topic is unique and/or has not been recently published elsewhere. Do your homework; review recent articles in your area of interest.
- **What do you already have in your back pocket?** Graduate course papers, conference presentations or posters, quality improvement initiatives, program innovations, educational strategies, etc., all have the potential to be re-worked into publishable papers.
- **Where else can you get inspiration?** Check the CCCN website for calls for special issues; read scholarly journals for emerging issues or trends.
- **Who are you writing to?** Consider the aim and scope of CJCN and its readership.
- **What type of paper?** Get familiar with the various formats of professional and academic articles in CJCN, including research papers, short reports, review papers, commentaries and responses to commentaries, case reports, arts informed scholarship, and other discourse relevant to cardiovascular nursing.

Authorship

- **Who are you writing with?** Writing for publication can be less daunting if you are writing the paper with colleagues. However, it is important to choose your co-authors wisely! What is the value added for each co-author? Do they have expertise in manuscript development? Can they make a substantial intellectual contribution to the manuscript? Do they have the time to devote to writing and reviewing the manuscript? Can they work within your timeline for completion?
- **Establish authorship** roles, responsibilities, and order of authors at the start of project. Authorship indicates a significant contribution to the work.
- **Understand role of first author**: Generally, the first author is responsible for the majority of the writing, as well as pulling the pieces together from multiple authors to ensure organization and flow of ideas. The first author generally assumes overall responsibility for the manuscript, including submission to the journal, and taking the lead in making revisions and resubmitting.

Writing the Manuscript

- **Write for the journal:** follow the CJCN Author Guidelines in every detail, including word count, formatting, and general APA guidelines for references, citations, etc. Consider use of study reporting guidelines (e.g., CONSORT) for reports of particular research types.
- **Write to the reader:** Consider that the readership of CJCN is primarily nurses with an interest in cardiovascular health and illness.
- **Write well!** Follow general principles for good writing including grammar and sentence structure, paper organization, flow of ideas, and paragraph construction; avoid slang/jargon and use of passive voice.
- **Revise and revise some more!** Find your own 'peer' – someone who is not familiar with the topic – to read over the manuscript and offer honest, constructive feedback.

Avoiding Rejection

Reduce the chance of rejection by avoiding the following pitfalls:

- Submission is poorly written/not well organized;
- Information is inaccurate/outdated and/or lacks current and appropriate references;
- Topic has low importance/relevance to CJCN readership; implications for cardiovascular nurses not addressed;
- Similar topic has been recently published elsewhere; the topic is too broad, too elementary, or too complex;
- Author/APA guidelines have not been followed.

Submitting the Manuscript

- **Titles matter!** While cute or catchy titles are interesting, they do not always convey the focus of the paper. Keep titles relevant, clear, and concise. Consider what terms might be used to search on your topic and incorporate those into the title, abstract, and keywords.

- **Abstract writing:** Follow the CJCN requirements for abstracts; consider the essentials of problem, purpose, solution, conclusions, and implications for practice.
- **Cover letter:** A cover letter to the editor should accompany your submission. Include the purpose of the paper, the main findings/conclusions, and its contribution to cardiovascular nursing.
- **Follow the instructions for the submission process:** Ensure that journal directions for blinding (e.g., removing all identifying information from the body of the manuscript) are followed exactly for peer review.

Resources

American Psychological Association (2010). Publication Manual of the American Psychological Association, Sixth Edition. Washington, DC: American Psychological Association. http://expertjournals.com/how-to-write-great-introduction-4-tips-academic-article/

Green Riters. (n.d.). How to Choose a Co-author: 4 Things to Consider. Retrieved from https://greenriters.com/how-to-choose-a-co-author/

Inquiries Journal. (n.d.). 5 Tips for Publishing Your First Academic Article. Retrieved from http://www.inquiriesjournal.com/blog/posts/51/5-tips-for-publishing-your-first-academic-article/

International Committee of Medical Journal Editors. *Defining the Role of Authors and Contributors.* Retrieved from http://www.icmje.org/recommendations/browse/roles-and-responsibilities/defining-the-role-of-authors-and-contributors.html

Nurse Author & Editor: http://naepub.com

Oermann, M., & Hays, J.C. (2016). *Writing for Publication in Nursing* (3rd edition). New York, NY, USA: Springer Publishing Company.

Peironcely, J. (2012). *5 Tips To Improve Your Academic Writing + [Infographic]*. Next Scientist. Retrieved from https://www.nextscientist.com/tips-improve-your-academic-writing/

> *Women are under-researched,*
> *under-diagnosed, and over-dying.*
>
> —*Heart & Stroke Foundation, 2019*

The Canadian Journal of Cardiovascular Nursing announces a Call for Papers for a theme issue: Women's Heart Health Across the Lifespan

The Canadian Journal of Cardiovascular Nursing (CJCN) is pleased to announce the call for papers for a special theme issue on women and heart health for the 2020 spring issue. We invite researchers, clinicians, and educators to submit short reports* of novel research projects or initiatives related to women's heart health across the lifespan. The publication of this special issue will align with the 3rd Canadian Women's Heart Health Summit in Ottawa in April 2020. Please direct queries to Dr. Jo-Ann Sawatzky, CJCN Editor at **joanne.sawatzky@umanitoba.ca**. Deadline for submissions:

*criteria: max 12 double-spaced pages [excluding title page]. Please follow general CJCN Author Guidelines for research/non-research submissions: **https://www.cccn.ca/media.php?mid=1278**.

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Patient Experiences of Undertaking a Virtual Cardiac Rehabilitation Program

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Abstract

Cardiovascular disease (CVD) is a major global health concern and patients typically require ongoing management and targeted education. Cardiac rehabilitation programs (CRP) provide secondary prevention to modify risk factors and improve outcomes. Despite known benefits, the uptake of CRPs is poor, with geographical location being a key barrier. We undertook a 16-month multi-method study of a virtual CRP (vCRP) with patients living in small urban and rural communities. To examine patient perspectives, 22 vCRP participants were recruited, of which 19 individuals completed a semi-structured interview. Data were analyzed using a qualitative descriptive approach. The vCRP was described as being accessible, appropriate, convenient and effective. Participants experienced both clinical improvements and a high level of satisfaction. Participants liked having access to healthcare providers without the need for travel and felt more motivated to adopt healthy lifestyles practices. Poor computer literacy and lack of time were key factors associated with low usage.

Banner, D., Kandola, D., Bates, J., Horvat, D., Ignaszewski, A., Singer, J., & Lear, S.A. (2019). Patient Experiences of Undertaking a Virtual Cardiac Rehabilitation Program. *Canadian Journal of Cardiovascular Nursing*, *29*(2), 6–14.

Clinical Highlights

- Cardiac rehabilitation programs are evidence-based programs that provide secondary prevention to modify risk factors and improve outcomes. Despite the known benefits, attendance and completion of programs is poor.
- Geographical location is a key barrier to CRP attendance. Virtually delivered CRPs provide an accessible and cost-effective way to enhance access to services.
- The vCRP was demonstrated to be an accessible, convenient, and effective way to deliver cardiac rehabilitation services, particularly for those located in rural and remote settings who may otherwise lack ready access to traditional services.
- vCRPs can improve patient outcomes, but patients require support to gain comfort with the use of technology and still benefit from contact with their healthcare providers, including nurses.
- The participants identified that the program improved access to healthcare providers, facilitated self-management, and promoted confidence through ongoing surveillance. Key barriers to participation included perceived poor competence and confidence when using technology. Further research is needed to examine the long-term outcomes of telehealth CRPs, in addition to exploring their use in a broader range of populations.

Despite known benefits, the uptake of CRPs is poor, with geographical location being a key barrier. We undertook a 16-month multi-method study of a virtual CRP (vCRP) with patients living in small urban and rural communities. To examine patient perspectives, 22 vCRP participants were recruited, of which 19 individuals completed a semi-structured interview. Data were analyzed using a qualitative descriptive approach. The vCRP was described as being accessible, appropriate, convenient and effective. Participants experienced both clinical improvements and a high level of satisfaction. Participants liked having access to healthcare providers without the need for travel and felt more motivated to adopt healthy lifestyles practices. Poor computer literacy and lack of time were key factors associated with low usage.

Cardiovascular disease (CVD) continues to be a global health concern and the biggest cause of morbidity and mortality among men and women, accounting for more than 17.8 million deaths worldwide (World Health Organization [WHO], 2016). With the exception of low-income countries, rates of CVD deaths have been declining steadily, largely due to improvements in disease prevention and management. However, the rising incidence of risk factors, in addition to burgeoning rates of chronic diseases, are contributing to increasing public health concerns about CVD (Deaton et al., 2011; Fuster et al., 2011; Lee et al., 2009; Santulli, 2013).

The management of CVD is complex and patients typically require ongoing clinical management, multiple medications, and recurrent hospitalizations (Berra et al., 2013; Deaton et al., 2011). Cardiac rehabilitation programs (CRPs) are medically-supervised, multidisciplinary, structured programs that provide secondary prevention aimed at addressing risk factors and improving lifestyle behaviours (Martin et al., 2012; Piepoli et al., 2010). CRPs are considered integral to the effective and evidence-based management of CVD and are recommended for all patients following acute cardiac events (Smith et al., 2011; Thomas et al., 2010). These programs are commonly offered in the hospital and community setting and comprise patient education, supervised exercise, monitoring, and support. CRPs have been demonstrated as a cost-effective mechanism to improve health system and patient outcomes, including a reduction in mortality and hospital readmission, and improved confidence, self-management, and quality of life (Clark et al., 2005; Cottrell et al., 2015; Hammill et al., 2010; Kwan & Balady, 2012; Polinski et al., 2016).

Despite the known benefits of these programs, the uptake of CRPs remains poor, with only 10–35% of eligible patients attending (Dafoe et al., 2006; Dalal et al., 2012; Kotseva et al., 2012; Suaya et al., 2007). Poor attendance has been linked to a number of factors, including geographical location and transport availability since many CRPs are limited to hospitals in larger metropolitan areas (Clark et al., 2012, 2013; Conway et al., 2015; French et al., 2006; Grace et al., 2016; Neubeck et al., 2012; Worcester et al., 2004). In response to this, home-based CRPs have been developed to improve accessibility and to capture those who may be excluded due to their geographical location. This is particularly important given that those in rural communities are typically older, have a greater prevalence of chronic diseases, and more limited access to healthcare services, such as CRPs (Dollard et al., 2004; Halseth et al., 2015; Hanlon & Halseth, 2005; Sangster et al., 2013).

Traditionally, home-based CRPs have still relied upon some contact with healthcare professionals, typically in the form of clinic/home visits and supervised exercise sessions. Studies have provided comparative data, with home-based programs being shown to provide effective care with few differences being seen with respect to improvements in CVD risk (Dalal et al., 2010; Taylor et al., 2010). However, many of these studies have been short in duration and have not assessed long-term outcomes.

The proliferation of low-cost communication and internet technology has given rise to an array of opportunities in healthcare, this includes the provision of remote or virtual health services to populations that may otherwise be hard to access or underserved, for example those located in rural and remote communities (Dalal & Taylor, 2016; Jaglal et al., 2013; Lear et al., 2009). Telehealth interventions have expanded rapidly and have been utilized in a diverse range of patient populations, including those with heart failure, hypertension, and those without a primary care provider (Clarke et al., 2011; Cottrell et al., 2015; Polinski et al., 2016). While there has been growth in remotely-delivered healthcare services, the evidence to support them is varied and largely limited to feasibility studies (Clark et al., 2015; Munro, Angus, & Leslie, 2013). Furthermore, few studies have explored the effectiveness and uptake of such interventions in the rural setting. Further research is needed to determine the acceptability, effectiveness and uptake of telehealth interventions in varied settings, both in Canada and globally.

To address these gaps, we undertook a multi-method study, including a randomized controlled trial and qualitative inquiry, to explore the use of a virtual CRP (vCRP). As part of this study, qualitative interviews with vCRP participants were undertaken to explore patient experiences and describe factors relating to uptake. This provided an opportunity to expand the scope of the study, capture the insights of the patients, and to uncover contextual factors impacting upon the use of telehealth. These data can be used to inform the development, implementation, and evaluation of telehealth initiatives more broadly, as well as 'bridging gaps' across the data sets to enhance our understanding of the study findings and garner insights that might otherwise have been overlooked (Oakley et al., 2006; Rapport et al., 2013). Furthermore, incorporating the patient experiences alongside quantitatively-derived clinical data provides the opportunity to explore the frontline insights of the healthcare experience; this in turn may inform the development of services that are patient-centred and influence patient outcomes and uptake (Thomas et al., 2004). In this paper, we provide a succinct overview of the vCRP and present the qualitative findings of the patient experiences.

Virtual Cardiac Rehabilitation Program: An Overview

The vCRP is a four-month program that was designed to imitate a standard hospital-based CRP for patients following an acute cardiac event. The program included on-line intake forms (medical, risk factor, and lifestyle assessment), scheduled one-on-one chat sessions with a nurse case manager, exercise specialist, and dietician (three times each over the course of the program), weekly education sessions in the form of slide presentations with multiple choice questions, data capture for the exercise stress test and blood test results, progress notes (for health professionals), and monthly ask-an-expert group chat sessions. As part of the program, participants were asked to complete weekly tasks, including monitoring their blood pressure, heart rate, and weight at defined intervals. During the individual chat sessions, which lasted an hour on average, participants were engaged in discussions about progress, symptom management, and adherence to recommended diet and exercise regime. These interventions were developed to incorporate best practices and were pilot tested (Zutz et al., 2007). Technological support was available through the study coordinator.

In the vCRP trial, prospective participants were identified by screening consecutive adult in-patients with acute coronary syndrome or recent revascularization procedure in two British Columbia hospitals, St. Paul's Hospital, Vancouver and the University Hospital of Northern British Columbia (formally Prince George Regional Hospital). Rural dwelling participants were recruited if they resided in communities in the Northern Health Authority and Coast Garibaldi regions. Both regions comprise communities that are considered geographically isolated from the major metropolitan areas and have limited access to speciality cardiology services. To be eligible for inclusion, participants also had to be considered at low to moderate risk based on the American Association of Cardiovascular and Pulmonary Rehabilitation guidelines at the time without any major limitations to physical activity, be fluent in English and have regular access to the Internet in the home, at work or other environment. Patients who had previously attended a CRP, were pregnant, suffering with depression, uncontrolled diabetes or other significant co-morbidities that may interfere with effective cardiovascular management, or were considered unsuitable candidates for the program by their responsible physician, were excluded. Recruitment took place between February 2009 and April 2011 and participants were randomized to the intervention group or usual care.

Participants randomized to the intervention group participated in the vCRP program as described above. After completion of the vCRP at 16 weeks, all participants were asked to return for a follow-up assessment. A sample of these participants was asked to participate in a semi-structured interview.

A total of 38 participants (mean age 61.7 years) were randomized to the 16-week vCRP with a mean number of website logins per person of 27 (range 0-140) and 122 individual chat sessions between the vCRP participants and either the nurse, dietician or exercise specialist (mean 3.6 per participant). The majority of the participants were male (n=34). Participants in the vCRP group had significant improvements in exercise capacity, saturated fat intake, and total cholesterol and LDL-C levels. This paper will present the outcomes of the qualitative interviews.

Method

A qualitative descriptive approach was selected as it allowed the researchers to preserve the richness of the data. Qualitative description differs from other common qualitative approaches in that it does not advocate for a specific theoretical 'posture' (Sandelowski, 2000). Instead, researchers are encouraged to remain 'close' to the data and the descriptive accounts of the participants.

Sample. A purposive sample of 22 vCRP participants was recruited, of which 19 participants completed a semi-structured interview. Sampling was undertaken to capture experiences of undertaking the vCRP, as well as exploring variation in vCRP usage, including high and low engagement.

Data Collection and Analysis. Semi-structured interviews were undertaken by a trained research coordinator, either in-person or via telephone. Interview questions were developed in consultation with key stakeholders, such as healthcare providers and telehealth researchers, and an interview schedule comprising open-ended questions was developed. Interviews were digitally recorded and transcribed verbatim. Data were analyzed using qualitative description and in-depth descriptive summaries of experiences were developed (Neergaard et al., 2009; Sandelowski, 2000). Data were then organized thematically. Data analysis was facilitated through the use of NVivo8, a computer-aided data analysis software program (NVivo, 2008). Peer checking of the ongoing analysis with members of the research along with reflexivity were undertaken to promote the authenticity, credibility and trustworthiness of the analysis (Giorgi, 1992; Guba and Lincoln, 1989; Milne and Oberle, 2005).

Ethical Considerations. Ethical approval from the Simon Fraser University, Providence Health Care, and Northern Health Authority Ethics Boards was obtained and the study was registered at ClinicalTrials.gov (trial registration number: NCT00683813). All participants provided informed consent and the participants' family physicians were notified of their patient's enrolment.

Results

The descriptive analysis was organized into five major themes: accessibility, making healthy choices, surveillance, barriers to participation, and perceptions of the vCRP.

Accessibility. For the majority of participants, the vCRP was seen as an accessible, convenient, and effective way to deliver cardiac rehabilitation services. Many of the participants described the value of being able to access a diverse range of professionals, including a cardiac nurse, exercise specialist, and dietician, from the convenience of their home. For those participants that utilized the program frequently, having access to these supports was reassuring and helped them work confidently towards their health goals. Some of the participants commented:

> *"Convenience of fitting into your lifestyle is big. Access to numerous experts in one location is also handy. You can ask questions any time they pop into your head through email"*
>
> *"On the computer, with this program, you could access the nurse, dietician, exercise specialist right at home, and you would not have to travel anywhere"*

In addition to accessing healthcare professionals, having ready access to educational materials was also seen as important. For some, the program filled gaps in services that occurred as a result of living in a rural and remote community with fewer healthcare resources. One participant commented:

> *"I think it would be excellent to spread this right through the province and especially for some remote areas. I think it would be very useful. I wouldn't even limit it to the province, it should be Canada-wide"*

Making Healthy Choices. Participants reported greater awareness and motivation to manage their health condition and adopt healthier lifestyles as a result of their participation in the vCRP. Greater awareness of their health condition and lifestyle choices was described by all of the participants, even by those who reported lower levels of engagement with the program. This included a greater recognition of the need to maintain a healthy diet, undertake regular exercise with suitable intensity, and to monitor their health condition appropriately. As well as having more awareness, participants also reported greater motivation to engage in healthier activities as a result of their participation in the program. Two of the participants explained:

> *"For me, it [vCRP] was really important because it was the first real illness that I have ever had, and it was a wake-up call for me to become more aware about this illness that I had … and the causes of it, my lifestyle, my smoking, my fast food, and my exercise, and all of those things … I knew that by becoming involved with this program that I was going to learn a lot more than if I just had the operation and was left on my own"*

> *"You just pay more attention, and it's more upfront and not in the back of your mind … you are more aware of what's happening and what you can do about it"*

While the participants described the benefits of participation in the program for themselves, many reported that the information about lifestyle choices was also extended to their family members and friends who in turn were motivated to engage in similar healthy activities. For the most part, those who were most engaged in the program became great advocates and were keen to share their experiences with others:

> *"… when I was out for my walks I would bump into people and they would ask what I am doing and how come I was doing this, I had an opportunity to share the information … everybody thought it was a great program and lots of potential"*

Overall, the vCRP provided opportunities for participants to identify and address risk factors and to support health lifestyle behaviours.

Surveillance. During the interviews, the participants highlighted that the program provided much needed surveillance. This was perceived as being both surveillance of their own progress, through ongoing self-monitoring, as well as surveillance by others as part of the vCRP. As a result, many of the participants explained that they felt accountable to both themselves and the healthcare teams supporting them. For example, as part of the program, participants entered their blood pressure, heart rate and weight at regular intervals, as well as information pertaining to diet and exercise. Both the participant and the program team were able to review the data to assess and monitor progress. Feedback on progress was provided directly from the program in the form of charts that were accessible to the participants, or through Internet-based interactions with healthcare professionals. More general feedback was also provided through chat rooms where participants could interact and chat with fellow program participants. For the higher use participants, it was this surveillance that encouraged them to keep on track with their health goals and healthier lifestyle choices. For example:

> *"You know I had stents four years ago, and you start off with the best of intentions, but nobody looks over your shoulder and you peter out. At this time, I felt this is a nifty program … somebody's watching it and I better do it. Keeps you honest, keeps you focused"*

> *"I am becoming more educated on preventative health, so it's not about dealing with things after the fact … I looked at it as a gift … I was worried about what it was going to be like after, who I was going to see. This gave me a place to sort of have a central body of information"*

Through this ongoing surveillance, many of the participants expressed feeling confident and reassured. This arose from the feeling that they had some control over their health and that the program helped them 'know what was going on'. For many, this reduced stress and provided them with reassurance by knowing that they had extra resources, supports and monitoring tools to help them keep track of their progress. Two of the participants highlighted:

> *"So it [vCRP] gave me … a little more assuredness than I would have if I did not have some feedback. I guess it is just knowing there is a resource there"*

> *"It just helps. You are not out there by yourself"*

Progress charts were embedded in the vCRP to display trends in the data, including heart rate, weight and blood pressure. One limitation noted by many of the participants was that the charting function was difficult to find, but for those who did locate it, it was considered a very useful tool. Improving the navigation of this function would be of benefit as the program becomes developed further. A participant commented:

> *"I liked the charts, that you could put your charts up to see how you're coming along and progressing"*

Interlinked with the experience of surveillance was the perceived support for the participants to engage in self-care activities. This was considered to be an important aspect of the program, for example:

> *"I think you have an excellent program, outstanding … it is really progressive thinking in my mind, self-help is as good as a medical strategy as putting hospitals in and doing all the other things you have to do, if you can motivate people to do it themselves, it takes a lot of stress off the system. One thing you can count on is I am not going to be back here as a patient, the fact is I am not going to have another heart attack"*

Through regular surveillance and monitoring, participants had become increasingly aware of their healthcare conditions and more attuned to self-care activities.

Barriers to participation. During the interviews, participants were asked to comment on their level of involvement with the vCRP on a scale of 1-10, with one being low to ten being high. Participant responses ranged from 1-10 with an average reported score of 6.3. While high levels of engagement were common, some participants reported low to moderate levels of involvement. A number of explanations were provided for this, including lack of time (n=3), infrequent access to the Internet or computer (n=4) and lack of motivation (n=1). One participant commented:

> *"I actually didn't really have any involvement. That is not your fault, that is my fault. I have not done my share in participating, especially on the Internet"*

Challenges with computer literacy and low levels of confidence with technology were commonly cited barriers to participation. However, for the most part, these challenges were largely isolated to the initial set-up of the program and were resolved with greater familiarity or direct support from the research team or family members. A proportion (n=6) reported more substantial computer literacy barriers. These participants attributed such barriers to being older and less familiar with 'modern' technologies. For example:

> *"It does require the participants to have a fairly significant technical ability to pull it off, which I imagine is a challenge to some, especially if they are as old or older than I am"*

> *"The thing is, you know, our age group, all of this is new technology and we haven't done anything, and not the newer generation, they are going to be on it like a dirty shirt"*

For some, these early technological challenges seemed to deter them from more consistent or sustained engagement with the program. For example, one participant commented:

> *"There were some technical glitches at the beginning, kind of frustrated me, but … so I don't think I did it consistently enough or as much as I should have"*

Upon experiencing any technical issues, participants frequently sought support from the research team or family members. A small number (n=2) did not seek help and subsequently had minimal engagement in the program as a result. One participant suggested that having undertaken a computer course would be helpful:

> *"I'm not very good in the virtual field I guess … I would take a computer course first – it would have made a difference"*

Effects of participation. During the interviews, participants were asked to explain if their participation in the vCRP had affected their health and their use of other healthcare services. In relation to their own perceptions of their health, the majority of participants reported that they felt their health had improved. Commonly cited reasons included improved exercise capacity, weight loss, healthier diet, as well as other measures determined by their healthcare professionals, including improvements evidenced by subsequent stress tests or biophysiological measures (including blood test and blood pressure measurements). For example, one participant stated:

> *"Blood pressure has improved, and blood glucose. Those things have improved, but I am also in better physical condition, which was obvious by the stress test"*

When asked about their utilization of healthcare services, the majority of the participants reported that they had not changed the frequency within which they saw their family doctor or other healthcare providers. However, in some cases, participants identified that they were more confident when asking questions and seeking clarification about their progress or management regime. Some of the participants explained:

> *"I had some questions on the medication and some of the symptoms that were described by someone online … I went back to my doctor and said 'look, these symptoms keep happening, what can we do? Can we change something? Can we go to a different drug?"*

> *"It helped with knowing which questions to ask … it probably helped [GP name] because I wasn't asking random questions"*

Perceptions of the vCRP. When reflecting on their experiences of undertaking the vCRP, some of the participants expressed a desire for the program to be longer, in some cases upwards of a year was suggested. The participants recognized the value of regular monitoring and surveillance and could see how this could contribute to long-term disease management and wellbeing. One participant commented:

> *"For people who have health problems with the support you get on the program … I would like to see it go on. I would love to be part of this for a couple of years. It's your health and you're watching to make sure you don't let it deteriorate"*

For many of the participants, the self-monitoring was considered a major benefit of the program. This was largely related to the use of the heart rate monitors when assessing exercise intensity, blood pressure monitoring equipment, as well having access to feedback about ongoing progress through interactions with program experts. One participant explained:

> *"I really liked talking to the experts, I really liked the monitors. I admit, I might even buy one of those Polar heart rate monitors – it is quite an asset"*

In addition to seeking support from experts, the chat rooms provided an important mechanism for peer support. While only a minority of the participants used the chat rooms on a regular basis (n=4), these participants identified that the opportunity to interact with others going through the same experiences and to hear the questions that others had was very enjoyable, supportive and useful. One participant explains:

> *"I tried to attend all the chat sessions, but it all seemed to be just a couple of people who were on there … I found that [chat sessions] very helpful … I enjoyed it, it was fun"*

As described, many participants identified that they did not use the chat room function regularly; key explanations offered for this include technical issues (related to computer literacy or technical glitches), limited engagement by others, and a preference for more personal forms of communication (such as preferred telephone or in-person meetings). For example:

> *"I didn't feel the need to seek out somebody who I didn't know or couldn't see, which is weird, probably more so for people of my generation versus people who grew up with chats … I like to pick up the phone"*

> *"I am a lot older, and chatting is not really, I would rather speak to someone … I had trouble communicating what I wanted to say, as I am a bit of a rambler. I had a hard time typing, it took so long, I don't know if I got my point across"*

Exploring a wider range of 'chat' options, including some telephone support, was considered to be one way to increase engagement in these activities.

Discussion

An analysis of the qualitative data revealed that the vCRP is an accessible, convenient and effective way to deliver cardiac rehabilitation services, with patients perceiving both clinical improvements and a high level of satisfaction. Furthermore, the clinical outcomes, identified in this multi-method study, further support the vCRP as a viable alternative to community, hospital or home-based programs for patients who have experienced a cardiac event (Lear et al., 2014).

Through our analysis, the vCRP participants identified that the program assisted them in gaining timely access to healthcare providers, facilitated self-monitoring and management, and provided comfort through ongoing surveillance. Unexpectedly, participants also reported that they became role models for others and gained more confidence when interacting with their healthcare providers. These findings contribute to a growing body of knowledge on cardiac rehabilitation and highlight the importance of establishing new and varied modes of practice to promote access to evidence-based healthcare for patients with CVD.

In this study, the participants identified that the virtual format was particularly important for those patients located in rural and remote areas, who may not otherwise have the opportunity to attend a program or have ongoing support to manage their condition and risk factors. Similar to other studies exploring telehealth, such approaches to healthcare services can address disparities in access and reduce the need for extensive travel for those who require ongoing specialty care (Banbury et al., 2014; Marcin et al., 2015; Neubeck et al., 2009). For example, accessibility and convenience has been highlighted in other studies, including those exploring patients with diabetes, mental health and substance use and terminal illness (Benavides-Vaello et al., 2013; Marcin et al., 2015; Sabesan et al., 2012; Watanabe et al., 2013). Thus, more widespread integration of virtual health programs could provide a solution to the growing health disparities between urban and rural populations, where there are the highest levels of chronic disease, worst patient outcomes and more limited access to healthcare services (DesMeules et al., 2006; Marcin et al., 2015; Pong et al., 2010).

In addition to accessibility, some participants in this study highlighted the importance of peer support as part of these programs. Peer supports through virtual networks have been studied widely (Embuldeniya et al., 2013). However, their use in concert with telehealth programs, along with their impact upon clinical outcomes and patient satisfaction, is not fully understood. Undertaking a more focused examination of the experiences of peer support for those engaged in virtual healthcare could provide further insights into the delivery of virtual programs and their impact upon health and patient outcomes.

As previously highlighted, the participants in this study were quick to identify that the vCRP enhanced their knowledge and promoted self-care activities. The use of virtual programs, independently or in combination with traditional approaches, may provide the means to improve secondary prevention and ultimately patient and health system outcomes. Similar outcomes have already been identified in studies exploring heart failure (Riley et al., 2013; Shao et al., 2013). As such, further studies aimed at specifically exploring self-care activities would be beneficial. Similarly, further research is warranted to explore longer-term outcomes, particularly in relation to lifestyle modification and adverse clinical events.

Further research to support the broader application of virtual programs across wider populations is likewise warranted. This should include studies to explore the more widespread integration of the program in populations and settings across Canada, including Indigenous communities, and internationally. In addition to diverse populations, exploring mechanisms to improve the uptake of health technologies in key populations also requires exploration. In our study, low-level users identified that poor computer literacy, along with low confidence in using technology, was a key barrier that impacted upon their participation. The participants identified that age and perceptions around technology use were factors in this. In a commentary addressing telehealth-based cardiac rehabilitation, Neubeck (2015) highlighted that further studies are needed to enhance the engagement and support of older adults, who may experience challenges in technology use.

Limitations

We employed purposive sampling to garner insights from vCRP participants, including those with high and low levels of engagement. While we captured a broad range of perspectives, it is possible that other participants may have contributed different experiences and insights. Second, common to most qualitative studies, the findings are contextualized and lack generalizability in the traditional sense. Despite this, we anticipate that our findings are transferrable to other similar populations engaged in telehealth interventions. Finally, the interviews captured only the experiences of participants who undertook the vCRP. Undertaking interviews with both the vCRP participants and those receiving usual care, at baseline and at completion, may have yielded further insights, including exploring issues such as readiness for lifestyle modification and attitudes towards technology.

Conclusion

Semi-structured interviews were undertaken with 19 participants to explore the experiences of using the vCRP, as well as assessing attitudes and satisfaction. Data analysis revealed five themes: accessibility, making healthy choices, surveillance, barriers to participation, and perceptions of the vCRP. In this study, the vCRP was demonstrated to be an accessible, convenient, and effective way to deliver cardiac rehabilitation services, particularly for those located in rural and remote settings who may otherwise lack ready access to traditional services. The participants identified that the program improved access to healthcare providers, facilitated self-management, and promoted confidence through ongoing surveillance. Key barriers to participation included perceived poor competence and confidence when using technology. Further research is needed to examine the long-term outcomes of telehealth CRPs, in addition to exploring their use in a broader range of populations. ♥

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REFERENCES

Banbury, A., Roots, A., & Nancarrow, S. (2014). Rapid review of applications of e-health and remote monitoring for rural residents. *Australian Journal of Rural Health, 22*(5), 211–222. doi:10.1111/ajr.12127

Benavides-Vaello, S., Strode, A., & Sheeran, B.C. (2013). Using technology in the delivery of mental health and substance abuse treatment in rural communities: A review. *Journal of Behavioral Health Services & Research, 40*(1), 111–-20. doi:10.1007/s11414-012-9299-6

Berra, K., Fletcher, B., Hayman, L.L., & Miller, N.H. (2013). Global cardiovascular disease prevention: A call to action for nursing executive summary. *Journal of Cardiovascular Nursing, 28*(6), 505–513. doi:10.1097/JCN.0b013e31826b6822

Clark, A.M., Hartling, L., Vandermeer, B., & McAlister, F.A. (2005). Meta-analysis: Secondary prevention programs for patients with coronary artery disease. *Annals of Internal Medicine, 143*(9), 659–672. doi:10.7326/0003-4819-143-9-200511010-00010

Clark, A.M., King-Shier, K.M., Thompson, D.R., Spaling, M.A., Duncan, A.S., Stone, J.A., & Angus, J.E. (2012). A qualitative systematic review of influences on attendance at cardiac rehabilitation programs after referral. *American Heart Journal, 164*(6), 835–845. doi:org/10.1016/j.ahj.2012.08.020

Clark, A.M., King-Shier, K.M., Duncan, A.S., Spaling, M.A., Stone, J.A., Jaglal, S., & Angus, J.E. (2013). Factors influencing referral to cardiac rehabilitation and secondary prevention programs: A systematic review. *European Journal of Preventive Cardiology, 20*(4), 692–700. doi:10.1177/2047487312447846

Clark, R.A., Conway, A., Poulsen, V., Keech, W., Tirimacco, R., & Tideman, P. (2015). Alternative models of cardiac rehabilitation: A systematic review. *European Journal of Preventive Cardiology*, *22*(1), 35–74. doi:10.1177/2047487313501093

Clarke, M., Shah, A., & Sharma, U. (2011). Systematic review of studies on telemonitoring of patients with congestive heart failure: A meta-analysis. *Journal of Telemedicine and Telecare, 17*(1), 7–14. doi:10.1258/jtt.2010.100113

Conway, B. (2015). Understanding illness perception as a barrier to cardiac rehabilitation uptake. *British Journal of Cardiac Nursing, 10*(1), 21–25. doi:10.12968/bjca.2015.10.1.21

Cottrell, E., Cox, T., O'Connell, P., & Chambers, R. (2015). Patient and professional user experiences of simple telehealth for hypertension, medication reminders and smoking cessation: A service evaluation. *British Medical Journal Open*, *5*(3), e007270. doi:http://dx.doi.org/10.1136/bmjopen-2014-007270

Dafoe, W., Arthur, H., Stokes, H., Morrin, L., Beaton, L., & Canadian Cardiovascular Society Access to Care Working Group on Cardiac Rehabilitation. (2006). Universal access: But when? Treating the right patient at the right time: Access to cardiac rehabilitation. *Canadian Journal of Cardiology, 22*(11), 905–911. doi:https://doi.org/10.1016/S0828-282X(06)70309-9

Dalal, H.M., Zawada, A., Jolly, K., Moxham, T., & Taylor, R.S. (2010). Home based versus centre based cardiac rehabilitation: Cochrane systematic review and meta-analysis. *British Medical Journal*, *340,* b5631. doi:https://doi.org/10.1136/bmj.b5631

Dalal, H.M., Wingham, J., Palmer, J., Taylor, R., Petre, C., & Lewin, R. (2012). Why do so few patients with heart failure participate in cardiac rehabilitation? A cross-sectional survey from England, Wales and Northern Ireland. *British Medical Journal Open*, *2*(2), e000787. doi:10.1136/bmjopen-2011-000787

Dalal, H.M., & Taylor, R.S. (2016). Telehealth technologies could improve suboptimal rates of participation in cardiac rehabilitation. *Heart*, *102*(15), 1151–1152. doi:10.1136/heartjnl-2016-309429

Deaton, C., Froelicher, E.S., Wu, L.H., Ho, C., Shishani, K., & Jaarsma, T. (2011). The global burden of cardiovascular disease. *European Journal of Cardiovascular Nursing*, *10*(2), S5–S13. doi:10.1016/S1474-5151(11)00111-3

DesMeules, M., Pong, R., Lagacé, C., Heng, D., Manuel, D., Pitblado, R., & Koren, I. (2006). *How healthy are rural Canadians? An assessment of their health status and health determinants.* Ottawa, ON: Canadian Institute for Health Information. doi:http://secure.cihi.ca/cihiweb/products/summary_rural_canadians_2006_e.pdf

Dollard, J., Smith, J., Thompson, D.R., & Stewart, S. (2004). Broadening the reach of cardiac rehabilitation to rural and remote Australia. *European Journal of Cardiovascular Nursing*, *3*(1), 27–42. doi:10.1016/j.ejcnurse.2003.10.002

Embuldeniya, G., Veinot, P., Bell, E., Bell, M., Nyhof-Young, J., Sale, J.E., & Britten, N. (2013). The experience and impact of chronic disease peer support interventions: A qualitative synthesis. *Patient Education and Counseling*, *92*(1), 3–12. doi:10.1016/j.pec.2013.02.002

French, D.P., Cooper, A., & Weinman, J. (2006). Illness perceptions predict attendance at cardiac rehabilitation following acute myocardial infarction: A systematic review with meta-analysis. *Journal of Psychosomatic Research*, *61*(6), 757–767. doi:10.1016/j.jpsychores.2006.07.029

Fuster, V., Kelly, B.B., & Vedanthan, R. (2011). Promoting global cardiovascular health moving forward. *Circulation, 123*(15), 1671–1678. doi:10.1161/CIRCULATIONAHA.110.009522

Giorgi, A. (1992). Description versus interpretation: Competing alternative strategies for qualitative research. *Journal of Phenomenological Psychology, 23*(2), 119–135. doi:10.1163/156916292X00090

Grace, S.L., Turk-Adawi, K., Pio, C.S.D.A., & Alter, D.A. (2016). Ensuring cardiac rehabilitation access for the majority of those in need: A call to action for Canada. *Canadian Journal of Cardiology, 32*(10), S358–364. doi:10.1016/j.cjca.2016.07.001

Guba, E.G., & Lincoln, Y.S. (1989). *Fourth Generation Evaluation.* Newbury Pak, CA: Sage.

Jaglal, S.B, Haroun, V.A., Salbach, N.M., Hawker, G., Voth, J., Lou, W., & Bereket, T. (2013). Increasing access to chronic disease self-management programs in rural and remote communities using telehealth. *Telemedicine and E-Health, 19*(6), 467–473. doi:https://doi.org/10.1089/tmj.2012.0197

Halseth, G., Ryser, L., & Markey, S. (2015). British Columbia. In B. Markey, G. Lauzon & M. Ryser. (Eds.). (2015). State of Rural Canada Report (pp. 9–16). doi:http://sorc.crrf.ca/bc/

Hammill, B.G., Curtis, L.H., Schulman, K.A., & Whellan, D.J. (2010). Relationship between cardiac rehabilitation and long-term risks of death and myocardial infarction among elderly Medicare beneficiaries. *Circulation, 121*(1), 63–70. doi:10.1161/CIRCULATIONAHA.109.876383

Hanlon, N., & Halseth, G. (2005). The greying of resource communities in northern British Columbia: Implications for health care delivery in already-underserviced communities. *The Canadian Geographer/Le Geographe canadien, 49*(1), 1–24. doi:10.1111/j.0008-3658.2005.00077.x

Kotseva, K., Wood, D., De Backe, G.D., & De Bacquer, D.D. (2012). Use and effects of cardiac rehabilitation in patients with coronary heart disease: Results from the EUROASPIRE III survey. *European Journal of Preventive Cardiology, 20*(5), 817–826. doi:10.1177/2047487312449591

Kwan, G., & Balady, G.J. (2012). Cardiac rehabilitation 2012: Advancing the field through emerging science. *Circulation, 125*(7), e369–e373. doi:10.1161/CIRCULATIONAHA.112.093310

Lear, S.A., Araki, Y., Maric, B., Kaan, A., & Horvat, D. (2009). Prevalence and characteristics of home Internet access in patients with cardiovascular disease from diverse geographical locations. *Canadian Journal of Cardiology,* 25(10), 589–593.

Lear, S.A., Singer, J., Banner-Lukaris, D., Horvat, D., Park, J.E., Bates, J., & Ignaszewski, A. (2014). Randomized trial of a virtual cardiac rehabilitation program delivered at a distance via the Internet. *Circulation: Cardiovascular Quality and Outcomes,* 7(6), 952–959.

Lee, D.S., Chiu, M., Manuel, D.G., Tu, K., Wang, X., Austin, P.C., & Flanagan, W.M. (2009). Trends in risk factors for cardiovascular disease in Canada: Temporal, socio-demographic and geographic factors. *Canadian Medical Association Journal, 181*(3-4), E55–E66. doi:10.1503/cmaj.081629

Marcin, J.P., Shaikh, U., & Steinhorn, R.H. (2015). Addressing health disparities in rural communities using telehealth. *Pediatric Research, 79,* 169–176. doi:10.1038/pr.2015.192

Martin, B.J., Hauer, T., Arena, R., Austford, L.D., Galbraith, P.D., Lewin, A.M., & Aggarwal, S. (2012). Cardiac rehabilitation attendance and outcomes in coronary artery disease patients. *Circulation, 126*(6), 677–87. doi:10.1161/CIRCULATIONAHA.111.066738

Milne, J., & Oberle, K. (2005). Enhancing rigor in qualitative description. *Journal of Wound Ostomy & Continence Nursing 32*(6), 413–420.

Munro, J., Angus, N., & Leslie, S.J. (2013). Patient focused Internet-based approaches to cardiovascular rehabilitation-A systematic review. *Journal of Telemedicine and Telecare 19*(6), 347–353. doi:10.1177/1357633X13501763

Neergaard, M.A., Olesen, F., Andersen, R.S., & Sondergaard, J. (2009). Qualitative description–the poor cousin of health research? *BMC Medical Research Methodology, 9*(1), 52. doi:10.1186/1471-2288-9-52

Neubeck, L. (2015). Telehealth-based cardiac rehabilitation: A solution to the problem of access? *European Journal of Preventive Cardiology, 22*(8), 957–958. doi:10.1177/2047487315574282

Neubeck, L., Freedman, S.B., Clark, A.M., Briffa, T., Bauman, A., & Redfern, J. (2012). Participating in cardiac rehabilitation: A systematic review and meta-synthesis of qualitative data. *European Journal of Preventive Cardiology, 19*(3), 494–503. doi:10.1177/1741826711409326

Neubeck, L., Redfern, J., Fernandez, R., Briffa, T., Bauman, A., & Freedman, S.B. (2009). Telehealth interventions for the secondary prevention of coronary heart disease: A systematic review. *European Journal of Cardiovascular Prevention & Rehabilitation, 16*(3), 281–289. doi:10.1097/HJR.0b013e32832a4e7a

NVivo Qualitative Data Analysis Software; QSR International Pty Ltd. Version 8, 2008.

Oakley, A., Strange, V., Bonell, C., Allen, E., & Stephenson, J. (2006). Process evaluation in randomised controlled trials of complex interventions. *British Medical Journal, 332*(7538), 413–416. doi:10.1136/bmj.332.7538.413

Piepoli, M.F., Corra, U., Benzer, W., Bjarnason-Wehrens, B., Dendale, P., Gaita, D., McGee, H., Mendes, M., Niebauer, J., Zwisler, A.D.O., & Schmid, J.P. (2010). Secondary prevention through cardiac rehabilitation: From knowledge to implementation. A position paper from the cardiac rehabilitation section of the European Association of Cardiovascular Prevention and Rehabilitation. *European Journal of Cardiovascular Prevention and Rehabilitation*, *17*(1), 1–17. doi:10.1097/HJR.0b013e3283313592

Polinski, J.M., Barker, T., Gagliano, N., Sussman, A., Brennan, T.A., & Shrank, W.H. (2016). Patients' satisfaction with and preference for telehealth visits. *Journal of General Internal Medicine, 31*(3), 269–275. doi:10.1007/s11606-015-3489-x

Pong, R.W., DesMeules, M., Heng, D., Lagacé, C., Guernsey, J.R., Kazanjian, A., & Dressler, M.P. (2010). Patterns of health services utilization in rural Canada. *Chronic Diseases and Injuries in Canada, 31*(S1), 1–36. doi:http://europepmc.org/abstract/med/22047772

Rapport, F., Storey, M., Porter, A., Snooks, H., Jones, K., Peconi, J., & Russell, I. (2013). Qualitative research within trials: Developing a standard operating procedure for a clinical trials unit. *Trials, 14*(1), 54. doi:10.1186/1745-6215-14-54

Riley, J.P., Gabe, J.P., & Cowie, M.R. (2013). Does telemonitoring in heart failure empower patients for self-care? A qualitative study. *Journal of Clinical Nursing, 22*(17–18), 2444–2455. doi:10.1111/j.1365-2702.2012.04294.x

Sabesan, S., Simcox, K., & Marr, I. (2012). Medical oncology clinics through videoconferencing: An acceptable telehealth model for rural patients and health workers. *Internal Medicine Journal, 42*(7), 780–785. doi:10.1111/j.1445-5994.2011.02537.x

Sandelowski, M. (2000). Focus on research methods-whatever happened to qualitative description? *Research in Nursing and Health, 23*(4), 334–340. doi:10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G

Sangster, J., Furber, S., Phongsavan, P., Allman-Farinelli, M., Redfern, J., & Bauman, A. (2013). Where you live matters: Challenges and opportunities to address the urban–rural divide through innovative secondary cardiac rehabilitation programs. *Australian Journal of Rural Health, 21*(3), 170–177. doi:10.1111/ajr.12031

Santulli, G. (2013). Epidemiology of cardiovascular disease in the 21st century: Updated numbers and updated facts. *Journal of Cardiovascular Disease, 1*(1), 1–2. doi:10.3390/jcdd1010001

Shao, J.H., Chang, A.M., Edwards, H., Shyu, Y.I.L., & Chen, S.H. (2013). A randomized controlled trial of self-management programme improves health-related outcomes of older people with heart failure. *Journal of Advanced Nursing, 69*(11), 2458–2469. doi:10.1111/jan.12121

Smith, S.C., Benjamin, E.J., Bonow, R.O., Braun, L.T., Creager, M.A., Franklin, B.A. & Lloyd-Jones, D.M. (2011). AHA/ACCF secondary prevention and risk reduction therapy for patients with coronary and other atherosclerotic vascular disease: 2011 update: A guideline from the American Heart Association and American College of Cardiology Foundation endorsed by the World Heart Federation and the Preventive Cardiovascular Nurses Association. *Journal of the American College of Cardiology, 58*(23), 2432–2446. doi:10.1161/CIR.0b013e318235eb4d

Suaya, J.A., Shepard, D.S., Normand, S.L.T., Ades, P.A., Prottas, J., & Stason, W.B. (2007). Use of cardiac rehabilitation by Medicare beneficiaries after myocardial infarction or coronary bypass surgery. *Circulation, 116*(15), 1653–1662. doi:10.1161/CIRCULATIONAHA.107.701466

Taylor, R.S., Dalal, H., Jolly, K., Moxham, T., & Zawada, A. (2010). Home-based versus centre-based cardiac rehabilitation. *Cochrane Database Systematic Review, 1*(8). doi:10.1002/14651858.CD007130.pub2

Thomas, J., Harden, A., Oakley, A., Oliver, S., Sutcliffe, K., Rees, R., & Kavanagh, J. (2004). Integrating qualitative research with trials in systematic reviews. *British Medical Journal, 328*(7446), 1010–1012. doi:10.1136/bmj.328.7446.1010

Thomas, R.J., King, M., Lui, K., Oldridge, N., Piña, I.L., & Spertus, J. (2010). AACVPR/ACCF/AHA 2010 Update: Performance measures on cardiac rehabilitation for referral to cardiac rehabilitation/secondary prevention services: Endorsed by the American College of Chest Physicians, the American College of Sports Medicine, the American Physical Therapy Association, the Canadian Association of Cardiac Rehabilitation, the Clinical Exercise Physiology Association, the European Association for Cardiovascular Prevention and Rehabilitation, the Inter-American Heart Foundation, the National .... *Journal of the American College of Cardiology, 56*(14), 1159–1167. doi:10.1016/j.jacc.2010.06.006

Watanabe, S.M., Fairchild, A., Pituskin, E., Borgersen, P., Hanson, J., & Fassbender, K. (2013). Improving access to specialist multidisciplinary palliative care consultation for rural cancer patients by videoconferencing: report of a pilot project. *Supportive Care in Cancer, 21*(4), 1201–1207. doi:10.1007/s00520-012-1649-7

Worcester, M.U., Murphy, B.M., Mee, V.K., Roberts, S.B., & Goble, A.J. (2004). Cardiac rehabilitation programmes: Predictors of non-attendance and drop-out. *European Journal of Cardiovascular Prevention & Rehabilitation, 11*(4), 328–335.

World Health Organization. (2016). Cardiovascular Diseases Fact Sheet. doi:http://www.who.int/mediacentre/factsheets/fs317/en/

Zutz, A., Ignaszewski, A., Bates, J., & Lear, S.A. (2007) Utilization of the internet to deliver cardiac rehabilitation at a distance: A pilot study. *Telemedicine and E-Health, 13*(3), 323–330.

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Revision of the Cardiac Prodromal Symptoms-Screening Scale [PS-SS]: A Qualitative Exploration

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Abstract

Purpose: *To explore further prodromal symptoms (PS) needed to comprehensively describe cardiac-specific warning signs experienced by individuals with coronary artery disease (CAD).*

Sample: *A purposive sample of adult men and women was recruited from a community teaching hospital and from associated cardiac rehabilitation programs in southeastern Ontario, Canada.*

Methods: *A qualitative descriptive design was employed using content analysis to code, categorize and generate themes until data saturation occurred. NVivo 10 was used to store and organize data.*

Results: *Twenty-three participants described an array of cardiac-related prodromal warning signs that occurred years, months, weeks and days prior to their initial or second myocardial infarction. Of the eight PS included in the original tool, participants reported unusual fatigue (n=17; 74%), shortness of breath (n=14; 61%); chest pain (n=13; 57%), unusually located aches and pains (n= 11; 48%), anxiety (n=9; 39%), sleep disturbance (n=8; 35%), dizziness (n= 7; 30%), and headaches (n=3; 13%). Additional prodromal symptoms identified were: gastro-intestinal symptoms (nausea, vomiting, retching, heartburn, excessive gas [belching]), heart palpitations (racing or skipped heart beats, hearing pulse or fluttering in the ears); diaphoresis (excessive sporadic sweating); tingling (pins and needles. numbness in the jaw, hands, arms, legs, feet); and cold/warm sensations (a cold area on skin, cold-clammy, or hot flushed). Suggestions offered by participants for further clarity in wording to better understand and describe the intensity and frequency of PS were incorporated into the revision.*

Conclusion: *The PS-SS is now revised to include 13 comprehensive descriptive prodromal symptoms reflective of the PS experienced prior to a cardiac event. Screening and tracking of PS annually to identify those at risk of CVD is needed. Further research is required to validate the PS-SS in a diverse sample of acute coronary syndrome patients and to establish predictive value that the PS-SS may have on major adverse cardiac events.*

Key words: cardiac prodromal symptoms; acute coronary syndrome, qualitative description, pain, fatigue, tool development

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Introduction

More than 16,000 Canadians die each year from unrecognized heart attacks (World Health Organization, 2014). People do not have the requisite knowledge to recognize cardinal warning signs—prodromal symptoms—of encroaching heart disease. Prodromal symptoms (PS) indicate development of blocked heart arteries (coronary artery disease [CAD]) leading to myocardial ischemia, injury and/or infarction (Bahr, Christenson, Farin, Hand, & Long, 2001; McSweeney et al., 2003; O'Keefe-McCarthy, 2008). PS are specific and non-specific sensations (symptoms) individuals may experience days, weeks or months prior to a cardiac event, with varying degree of intensity and frequency (Bahr et al., 2001; McSweeney et al., 2003; O'Keefe-McCarthy, 2008; O'Keefe-McCarthy & Ready, 2016). Incidence ranges from 49-92% in men and women (O'Keefe-McCarthy & Ready, 2016). Some preliminary evidence identifies that PS may relate to acute symptoms, major adverse cardiac events and sudden death (McSweeney et al., 2014; O'Keefe-McCarthy, McGillion, Victor, Jones, & McFetridge-Durdle, 2016; O'Keefe-McCarthy & Ready, 2016). Men and women have reported variations of PS that include unusual pain, such as chest and arm pain, shortness of breath, fatigue, sleep disturbances, dizziness, and escalating anxiety (Canto, Canto, & Goldberg, 2014; Hofgren, Karlson, & Herlitz, 1995). Early recognition of the warning signs is critical to prevent myocardial death, provide immediate reperfusion therapies for obstructive CAD, and screen individuals at risk, in order to decrease CAD-related morbidity and mortality.

Global Burden

Globally, cardiovascular disease (CVD) remains the number one killer of men and women and accounts for approximately 29% of all deaths in Canada each year (Statistics Canada, 2018; The Conference Board of Canada, 2010). The financial burden of CVD is well documented and costs the Canadian economy over $21 billion annually in hospital costs, physician services and lost personal productivity and wages (The Conference Board of Canada, 2010). Currently, there are approximately 500,000 people living with heart disease in Canada (Statistics Canada, 2018). Despite therapeutic advances in the treatment of CAD, and targeted health policy messaging about the signs of heart disease, a considerable number of individuals do not recognize warning PS of an approaching myocardial infarction or declining heart health. An evidence-based, patient-informed screening tool used in clinical practice, to identify people at risk for the development of CAD to mitigate cardiovascular–related morbidity and mortality is essential.

Preliminary Development and Psychometric Evaluation of the Original PS-SS

In response to this clinical measurement gap, O'Keefe-McCarthy et al. (2014) developed and evaluated the original PS-SS through four related studies. A systematic review (O'Keefe-McCarthy & Ready, 2016) and qualitative focus group study of patients with ACS and cardiac nurses (O'Keefe-McCarthy et al., 2014) generated a detailed list of PS based on scientific evidence, clinical practice and patients' individual lived experiences of prodromal symptomology. A third study established the content validity index (CVI) of the original PS-SS (O'Keefe-McCarthy et al., 2015), and the fourth provided preliminary validation of the PS-SS in a sample of 120 individuals with documented CAD (O'Keefe-McCarthy & Guo, 2016). The systematic review (O'Keefe-McCarthy & Ready, 2016) identified typical PS experienced pre-infarct as variable and included unusual fatigue, sleep disturbance, chest pain, anxiety and shortness of breath, dizziness, headaches and unusually located aches and pains.

The CVI for the original PS-SS was established at 0.85 indicating strong construct/content validity (O'Keefe-McCarthy et al., 2015). The PS-SS presented a two-factor structure, with accepted eigenvalues greater than 1 (factor 1 and 2 had eigenvalues of 2.23 and 1.41) and explained 24.7 % and 15.6% of variance, respectively. The Kaiser-Meyer-Olkin measure of sampling adequacy was 0.64 ($p<0.001$). Factor 1 (*Specific PS Sub-scale*) included: unusual aches or pains, dizziness, chest pain and other prodromal symptoms, with an acceptable factor loading range of 0.46 to 0.77. Factor 2 (*Non-Specific PS Sub-scale*) included: unusual fatigue, sleep disturbance, headaches, shortness of breath, and anxiety, with a factor loading from 0.40 to 0.75. Pearson's correlation confidence was 0.44 ($p=0.001$) between factor 1 and factor 2. Internal consistency reliability was satisfactory at 0.61 for the PS-SS (O'Keefe-McCarthy & Guo, 2016). The purpose of this current study was to ensure that the PS-SS was comprehensive and able to capture the constellation of unique and individual PS of both men and women. Further item generation of category-item number 9 of the PS-SS was required to establish further item clarity and to include all of the PS described by patients with CAD.

Overall Objective

The overall objective of this study was to, in Phase I, generate new PS items to be included in the existing PS-SS and in Phase II, conduct further psychometric testing and validation within a group of individuals with recognized cardiovascular disease. Results of Phase I will be provided herein.

Conceptual Framework

Mechanisms involved in Ischemic Cardiac Prodromal Symptoms Perception. Underpinning this research project were pain theory and the neuromatrix of cardiac ischemic pain perception (Melzack, 2001; Melzack & Wall, 1965). The pathophysiology of cardiac pain related to development of CAD is complex. CAD is a chronic condition that results from an active atherosclerotic process of plaque formation that progresses over a lifetime (Kumar & Cannon, 2009; Melzack, 2001). Formation of atherosclerotic plaque within an epicardial artery impedes perfusion of blood to the myocardium and restricts vital oxygen reaching the heart muscle. Over time, plaque becomes unstable, obstructive and potentially leads to warning (prodromal symptoms) signs and symptoms of acute coronary ischemic syndromes (Rosen, 2012; Tousoulis, Charakida, & Stefanadis, 2006). Patients experience cardiac pain as a result of myocardial ischemia due to: a) obstructive atherosclerotic plaque in the coronary arteries, or b) dynamic coronary obstruction due to a cascade of endothelial dysfunction and inflammatory changes, or c) a combination of both mechanisms.

Important to our understanding of PS is that ischemic cardiac–specific prodromal signs are not unlike acute pain symptoms and are equivocal and variable in nature. Melzack and Wall's (1965) influential Gate Control Pain Theory indicates that tissue damage (caused by myocardial ischemia) produces neural signals that enter an active nervous system (Melzack, n.d.; Melzack, 2001; Melzack & Wall, 1965). This complex neuromatrix in the brain reflects the cumulative and combined effects of a person's past experience, cultural background, context, and emotion (Basbaum, Bushnell, Devor, 2005; Julius & Basbaum, 2001; Melzack, 1982). Pain processes arising in the periphery are modulated in the central nervous system by mechanisms that participate in the selection, perception, and combination of information from total peripheral sensory input. The way in which an individual perceives pain (the amount, quality, and nature and meaning) is a dynamic and multi-factorial product of sensory-discriminative, cognitive-evaluative, and affective-motivational components (Melzack, n.d.; Melzack, 2001; Melzack & Wall, 1965); different and unique for each person.

Methods

Design/Sample/Setting

A descriptive qualitative, patient-informed design was used to conduct individual and focus group interviews employing semi-structured interview guides. After research ethics board approval was obtained, patient participants were recruited from a cardiology program and associated cardiac rehabilitation programs within a community teaching hospital in southeastern Ontario, Canada.

Data Analysis

Participant demographics were obtained and included: age, ethnicity, employment status, marital status, level of education, level of family income, and previous history of confirmed CAD (obtained from participant health record) and/or co-morbidities and risk factors. All demographic and clinical data were analyzed using SPSS with descriptive statistics; measures of central tendency and dispersion computed for continuous variables. For categorical variables, frequency tables were constructed.

Qualitative data were analyzed using descriptive content analysis as outlined by Sandelowski (2000); recordings were transcribed verbatim with line-by-line coding analysis used. All transcripts were cross referenced and verified with the audio-recorded tapes and imported into NVivo 10. Data collection and analysis occurred concurrently using constant comparison analysis until saturation occurred**.** Participant data were coded and organized into respective categories and emerging themes (Kvale, 1996; Miles, Huberman, 1994; Morse & Field, 2005). All corresponding field notes from the focus groups were included in the analysis. Analysis was conducted by members of the research team and disagreements (e.g., of wording, coding, or themes) were handled via consensus by all analysts.

Results

Sample Demographics and Clinical Characteristics

Four focus groups (n=11) were conducted with a purposive sample of adult ACS patients (female: n= 9, 39.1% and male n=14, 60.9%), along with 12 individual participant interviews. Baseline demographic and clinical characteristics of the ACS sample are provided in appendices A and B. Of the sample, 39.1% were women, with a mean age of 65.8 ± 8.1. Most of the participants were Caucasian (n= 21, 91.3 %), retired (n= 16, 69.6 %) and married (n= 16, 69.6%) or living with a partner (n=16, 69.6%). The overall household income level ranged between $30,000 to $69,000. The majority of participants had grade 1 class

Table 1: Demographics of ACS Participants

ACS Demographic		
	Mean (SD)	**Range**
Age (Years)	65.8 (8.1)	43–78
Level	**Frequency (n)**	**Proportion (%)**
Sex		
Male	14	60.9
Female	9	39.1
Ethnicity		
White/Caucasian	21	91.3
Japanese	1	4.3
South and Southeast Asian	1	4.3
Highest Education		
Community College/Junior College	9	39.1
Less than High School/ Secondary School	3	13
High School/Secondary School	5	21.7
University/ 4 Year College	1	4.3
Postgraduate Education/ Graduate School or Higher	5	21.7
Marital Status		
Married/Common-Law/ Cohabitating	16	69.6
Single	3	13
Divorce/Separated	2	8.7
Widowed	2	8.7
Current Employment Status		
Retired	16	69.6
Unemployed	5	21.7
Disability	1	4.3
Employed Full Time	1	4.3
Overall Household Income		
.00	1	4.3
10,000–29,000	3	13.0
30,000–49,000	5	21.7
50,000–69,000	5	21.7
70,000–89,000	2	8.7
90,000–109,000	2	8.7
>110,000	5	21.7
Class of Angina Pectoris		
Grade 1	10	43.5
Grade 2	5	21.7
Grade 3	1	4.3
No Angina/ Not Applicable	7	30.4

angina, hypercholesterolemia (n=19, 83%), family history of CAD (n=19, 83%), hypertension (n= 16, 70%) diabetes (n=7, 30 %), stress/anxiety (n=10, 43%) and heart failure, (n=1, 4 %). Nine percent were past or current smokers.

Prodromal Symptoms

Most of the participants experienced at least two or more PS prior to their cardiac event and often at the same time. The average mean total PS-SS scale score for males and females were 22.84 and 22.44, respectively. There were no significant differences in prevalence of PS between women and men. The primary PS reported by 74% (n= 17) of participants was unusual or unexpected fatigue, followed by shortness of breath (n=14, 61 %), chest pains (n= 13, 57%) and unusual aches and pains (n=11, 48 %) in different or unexpected locations in the body. Thirty nine percent of the sample (n= 9) reported prodromal anxiety prior to their cardiac event. Other PS reported were sleep disturbance (n=8, 35%), dizziness (n=7, 39%) and headaches (n=3, 13%). The timing or frequency with which participants experienced PS occurred months, weeks, days, or daily prior to their hospitalization for ACS. The intensity in terms of severity ranged from mild to severe but symptoms were predominantly reported in the moderate intensity range.

Table 2: Risk Factor Profile

Risk Factor	Frequency (n)	Proportion (%)
Hypercholesterolemia	19	83
Family History of CAD	19	83
Hypertension	16	70
Stress	10	43
Diabetes	7	30
Smoking	2	9
Heart Failure	1	4

CAD=Coronary Artery Disease

Table 3: Prodromal Symptoms (Items) Experienced Among the ACS Patient Participants

Prodromal Symptom (Item)	Overall	Male	Female	P-Value (differences among sex)
	n (%)	n (%)	n (%)	
Fatigue	17 (74)	10 (71)	7 (78)	0.735
Shortness of Breath	14 (61)	9 (64)	5 (56)	0.675
Chest Pain	13 (57)	7 (50)	6 (67)	0.431
Unusually Located Aches and Pains	11 (48)	6 (43)	5 (56)	0.552
Anxiety	9 (39)	6 (43)	3 (33)	0.648
Sleep Disturbance	8 (35)	6 (43)	2 (22)	0.311
Dizziness	7 (30)	5 (36)	2 (22)	0.493
Headaches	3 (13)	1 (7)	2 (22)	0.295

* Chi-squared test for association

Added Prodromal Symptoms that emerged as themes

Participants articulated additional symptoms that were present before their cardiac events. Included in this new list were, gastrointestinal symptoms (nausea, indigestion, vomiting, retching, flatulence, belching); heart palpitations (noticeable heart rate changes, fluttering, rapid/slow rate, skipped beats); cold and hot sensations; excessive diaphoresis and tingling and numbness in various parts of the body (hands, arms, legs, feet, jaw).

Gastrointestinal Symptoms. Participants described gastrointestinal symptoms as predominantly burning indigestion. One woman described her gastric symptoms as, *"It was like a continual indigestion pain, sort of a lot of gastric burning"* [Participant 11]. Men and women described variations of gastric complaints as *"Lots of heartburn"* [Participant 1], and *"Heartburn that felt kind of like pressure and discomfort"* [Participant 16]. Some experienced sudden episodes of nausea and vomiting that were unprovoked. One male participant commented, *"About once or twice a year, I'd get deadly sick for no reason"* [Participant 1].

Palpitations. The symptoms described that concerned heart palpitations were unique and varied among the participants. Palpitations were categorized into disturbances in heart rate (slow, fast, skipped or fluttering), heart beats or sensations. What was disturbing to a few participants was the feeling of hearing the heart rate in their ears. One woman described: *"I did have, the fluttering… My ear was fluttering. I had those butterflies again. I went to bed at night, it would drive me crazy because you can hear it through your ears, you turn on one side and turn on the other… it would flutter- just these little fluttering wings. Sometimes 'boom, boom', and then a big BOOM"* [Participant 7].

Another participant offered this description: *"It felt like my heart was almost skipping a beat. When you're lying down, you can hear your (heartbeat). You can feel your heart beating, so you can hear the noise. Oh geez, you know… and it's skipping a beat or something"* [Participant 8].

Chest Sensations. Various prodromal cold and/or hot sensations were described, as well. One gentleman described an unusual sense of coldness in the centre of his chest that occurred with activity.

> *"Well the first time I had any sense of it, I was on the ski hill and it felt like my jacket was open and my chest was extremely cold – the centre of my chest. So, I stopped and slowly went down the hill. The next time was two weeks later. I had some coldness and tightness in the chest. It happened about three more times, uh… I'd say about every two weeks or so" [Participant 17].*

Chest sensations in the form of either *"waves of hot or cold sensations"* [Participant 19] often were described as occurring at random.

Diaphoresis. The women and men in this study described unusual periods of profuse sweating where they were totally drenched with little explanation or identifiable reason for the sweating. One man described:

> *"I woke up and you know, I went out and I took the garbage out. I came back in and because I was overweight the way I was, that's what I attributed my sweating to—because I was sweating when I came back in, and this was February, so you know, it's not like it was 100 degrees outside. My wife asked me if I was alright and I said 'yeah.' I said, 'I'm just… '. She said 'Well you're sweating'. And I said 'Well yeah.... that's 'cause I took the garbage out' and she says 'well you know what that means' so I said, 'yes, I'm overweight.' (Laughing)… the pressure stayed with me and stayed with me.... I thought that maybe it was uh… you know, I took some -Tums- to relieve that and it didn't seem to help… I was sitting at the kitchen table having a cup of coffee, and the sweat was just running off my forehead … At the table… that's when I realized that something wasn't right" [Participant 12].*

Tingling/Numbness. Approximately a third of the participants identified tingling and numbness sensations, which were experienced as pins and needles in various locations such as the jaw, hands, arms, legs or feet. One male participant attributed the repetitive *"tingling down my left arm"* [Participant 10] as one of the main indicators to him that something was wrong. One person described "*numbness in her foot"* [Participant 7], while another said" *"I get this numbness in my leg and I have to sit down for a bit"* [Participant 9]. These sensations were noticed to increase with severity and frequency in the lead-up to their initial myocardial infarction or hospitalization for unstable angina.

Further Understanding of Unrecognizable Prodromal Fatigue

Fatigue, as an ongoing symptom, was not often recognized as relevant to declining heart health and was ubiquitous across all interviews. Disturbing to participants once they realized that the unexpected fatigue was not related to over-working or extreme exertion, as one would expect, was the comprehension that this encroaching fatigue was occurring during restful periods. One male participant described: *"It's not fatigue from exertion, it's fatigue from… from total relaxation. You know, because that's significantly different than what I ever expected. But I couldn't figure that. It didn't make sense to me because all I'm doing is sitting talking on my phone. Why should I be getting so tired?"* [Participant 5].

Another participant described increasing levels of ongoing fatigue and discussed being interrupted doing just normal activities of daily living. It was as if the fatigue was taking over. She explains: *"Fatigue - Yes… God… I had no energy… I need to sit. I can't… I just need to sit - so I sat."* [Participant 1]. Again, this participant described remembering times where she would feel totally exhausted. "*Just low in terms of energy. Fatigue didn't' hit me until I was at rest*" [Participant 1].

Teasing out the problematic aspect of the fatigue was not realized for some until after the cardiac event occurred, one man explained: *"If I look back to say, well it was in August that I had the stent, and I left the job site in June because I was getting tired. But for about a year before that I was starting to feel fatigued and actually had my hours cut back a bit a one point."* [Participant 5].

Clarifications of the items were sought in terms of accurately understanding the descriptors used for severity of the symptoms. Participants urged our team to consider increasing the choice in options of the severity categories and to add 'slight, mild-moderate and moderate-severe' to the existing tool. Similarly, participants suggested adding more descriptive options of the timing when the PS occurred. Added to the frequency selections were timeframes broken down into: yearly, monthly, weekly, and daily timeframes.

PS-SS Revision

In its revised form, the cardiac prodromal symptoms screening scale (PS-SS) is a 13-item tool of possible prodromal symptomology. The thirteen symptoms are evaluated for occurrence (yes/no), severity (intensity) and frequency (timing). Added to the PS-SS, to provide a comprehensive risk factor overview, our team incorporated a risk factor profile (diabetes, hypertension, obesity, lifestyle factors, etc.). Further survey questions have been added based on current science of sex-specific risk factor differences (i.e. gestational diabetes and gestational hypertension, pre-eclampsia, eclampsia) for targeted screening. This screening scale can be used annually and may: a) help individuals measure their heart health, b) start conversations with healthcare providers about concerning cardiac-related symptoms and risk factor burden, and c) act as an adjuvant assessment tool for clinical practice to guide, assess patient's level of risk, and/or target those individuals who exhibit early warning signs of developing CAD and to plan for further baseline diagnostic evaluations.

Discussion

The cardiac PS-SS was specifically developed to evaluate diverse experiences of pre-clinical, early cardiac warning signs of developing obstructive heart disease. This revision of the scale encompasses prodromal symptoms, as experienced by women and men living with CAD. Unique to this sample, PS most reported were unusual fatigue, shortness of breath, chest pain and unusually located aches and pains followed by a feeling of foreboding anxiety in the months and days leading to a cardiac event. Of those who had repeated cardiac events, some indicated that their initial prodromal symptoms were very different than the symptoms leading up to a second or third infarct. This finding is novel in the literature related to cardiac warning signs. It advances the current knowledge base and warrants further in-depth exploration. Most participants indicated that PS were experienced in patterns of two or three at a time and with increasing degrees of intensity and frequency closer to an acute cardiac event.

Other researchers have corroborated our results and reported that women (n=1,097) prior to an adverse cardiac event experienced unusual fatigue, discomfort in the arms, general chest discomfort and shortness of breath (McSweeney et al., 2014). Our previous systematic review that examined prodromal symptomology across seven studies of 6,716 men and women identified similar results, as well, and included PS of dizziness, headaches, gastrointestinal complaints, jaw, back and shoulder pain, and sleep disturbances (O'Keefe-McCarthy & Ready, 2016). Findings from this study demonstrate that the PSs experienced by men and women did not differ statistically, though previous studies found that PS occurred more frequently in women than men (Haasenritter et al., 2012; Hofgren et al., 1995). This difference might be explained by the small sample size in the current study.

The most distressing PS that the majority of men and women experienced was unusual fatigue. Seventy-four percent of participants in this sample described unexpected levels of prodromal fatigue. This symptom was perplexing, as it was unrecognizable to them as related to an unhealthy heart. This fatigue was unpredictable, as it occurred at rest without exertion. In our study, most participants anticipated that with activity or strenuous exercise they would be fatigued. This has been supported by McSweeney, Cody, and Crane (2001) who reported prodromal fatigue as being unprovoked and impairing normal activities of daily living. Therefore, it was necessary to seek further clarity of the quality descriptors used in the PS-SS to aptly flush out and describe the "unusualness" of the fatigue.

Cardiac-related fatigue was first documented in the 1970s by colleagues Nixon and Bethell (1974). They examined abnormal fatigue in 40 women and men post myocardial infarction and found it to be a precursor of obstructive heart disease. Of the sample, 77% reported increasing and abnormal fatigue six weeks to three years before the cardiac event.

Mounting evidence supports the level of concern of unrecognized prodromal fatigue prior to a cardiac event (Bahr et al., 2001; Blakeman & Booker, 2016; Bruno, 2013; Canto et al., 2014, 2007, 2012; Cole et al., 2012; Graham, Westerhout, Kaul, Norris, & Armstrong, 2008; Herlitz, Hartford, Aune, Karlsson, & Hjalmarson, 1993; Hofgren et al., 1995; Hwang, Ahn, & Jeong, 2012; Lovlien, 2006; McSweeney, 1998; McSweeney et al., 2001, 2003, 2010; McSweeney & Crane, 2000; McSweeney et al., 2014; O'Keefe-McCarthy, 2008; O'Keefe-McCarthy & Guo, 2016; O'Keefe-McCarthy et al., 2016; O'Keefe-McCarthy et al., 2015; O'Keefe-McCarthy et al., 2014). Blakeman and Booker (2016), in their recent systematic review of 8,283 ACS individuals reporting PS, further identified that prodromal fatigue is not a benign warning sign among men and women. This supports our findings that fatigue is a PS that requires immediate attention as a significant precursor to increased cardiovascular morbidity and mortality (Bruno, 2013; Canto et al., 2007; Lovlien, Shei, & Gjendgedal, 2006; McSweeney, 1998; McSweeney et al., 2001, 2003; McSweeney & Crane, 2001.)

Table 4: Prodromal Symptoms Screening Scale: Males versus Females

PS-SS Total Score

Sex	Frequency (n)	Mean	Minimum	Maximum	St. Deviation
Male	14	22.86	3	43	12.673
Female	9	22.44	6	34	8.734

In our current study, PS varied substantially in duration and nature, and were further described as occurring as a dyad or triad pattern. For example, participants described unusual fatigue as accompanied by shortness of breath and heartburn, or excessive sweating with tingling occurring in the arms and a fluttering sensation in the heart/ears. For some participants, these clustered PS were experienced months, weeks and days before their event. Subtle symptoms were reported such as 'something was not right, or off balance' yet were not regarded as symptoms related to an unhealthy heart. According to our results (Table 4), the mean total PS-SS score in males and females was 22.9 and 22.4, respectively. This demonstrates that women and men may experience PS in dyads and triads, or as cluster symptoms equally. McSweeney et al. (2010) and Hwang et al. (2012) further support this finding that symptoms can occur in clusters, though those studies focused on 'acute symptom' clusters. Nevertheless, many of the symptoms that have occurred in acute myocardial infarction have been shown to be experienced during the early prodromal phase (McSweeney, Cleves, Zhao, Lefler, & Yang, 2010; O'Keefe-McCarthy et al., 2015). Clustering PS may include anxiety, shortness of breath, racing heart and indigestion for instance (McSweeney, Cleves, et al., 2010).

Results of this study also demonstrate that PS are transient in occurrence, as they tend to come and go. PS were described as intermittent, appearing and receding, and then reappearing with increasing intensity, frequency and leading to the acute cardiac event. This phenomenon has been well documented previously (McSweeney, 1998; McSweeney & Crane, 2000; O'Keefe-McCarthy et al., 2016), and is one of the reasons contributing to lack of appropriate PS recognition. The inability to consider heart disease as a viable reason for the occurrence of PS is problematic and requires targeted knowledge dissemination and exchange. The disconnect or misattribution of PS may be related to the fact that such symptoms are unexpected and "do not fit" within the context of one's life and, therefore, PS are rationalized as relating to something else such as being overweight or being too busy (Hwang et al., 2012; O'Keefe-McCarthy, 2008). Moreover, PS are often experienced alongside other concerning chronic health conditions that prevent the consideration of the likelihood of heart disease (Graham et al., 2008; O'Keefe-McCarthy, Ready, & Francis, 2017).

Implications

To the best of our knowledge, this is the first study to identify that separate cardiac events may encounter different and unique, individual prodromal symptoms each time and requires future longitudinal examination and comparison. Also, our data reflect that in equal proportions, both women and men experience PS days, weeks and months prior to a cardiac event. Unusual or unrecognizable prodromal fatigue seems to be a cardinal early warning symptom to pay particular attention to and it is not well understood or assessed in current practice. Pre-emptive screening for individuals at risk or exhibiting prodromal symptomology is urgently needed.

The revised Prodromal Symptoms-Screening Scale [PS-SS] in its 13-item scale format is designed for use by individuals and healthcare providers to evaluate prodromal symptomology. Each item is assessed for occurrence, intensity, and frequency. Total scale scores can range from 0 to 234, with higher scores indicative of increased symptomology. Individual item scores of 0–7; 8–12 and 13–18 reflect mild, moderate and severe levels of symptom severity. Coupled with the included risk factor profile and the overall scale level, the scale offers recommendations based on evidence to contact a healthcare provider for cardiovascular health risk assessment and follow up. The PS-SS online tool can be found at: catchheartdiseaseearly.ca

Conclusion

Gaining knowledge and insight, through qualitative exploration, from individuals who experienced perplexing, hard-to-recognize early warning signs of obstructive heart disease was essential. This work builds upon current scientific prodromal literature and creates a clinical adjuvant tool to assist clinicians to screen for early prodromal symptoms of CAD. The Prodromal Symptoms-Screening Scale (PS-SS) is a tool that guides both patients and clinicians to identify encroaching heart disease, explore problematic symptoms, and assess individuals at risk. Further research is required to validate the PS-SS in a more diverse sample of acute coronary syndrome patients and to establish the positive predictive value the PS-SS may have on major adverse cardiac events. ♥

REFERENCES

Bahr, R., Christenson, R., Farin, H., Hand, M., & Long, J.M. (2001). *Prodromal symptoms of acute myocardial infarction: Overview of evidence.* Maryland Medicine: MM: A Publication of MEDCHI, the Maryland State Medical Society, Suppl, 49–59.

Basbaum, A., Bushnell, A., & Devor, M. (2005). *Pain: Basic mechanisms.* Washington: IASP Press.

Blakeman, J.R., & Booker, K.J. (2016). Prodromal myocardial infarction symptoms experienced by women. *Heart & Lung: The Journal of Acute and Critical Care, 45*(4), 327–335. https://doi.org/10.1016/j.hrtlng.2016.04.005

Bruno, C.M. (2013). *Understanding symptom experiences of older individuals with acute coronary syndrome.* Retrieved from https://repository.arizona.edu/handle/10150/293479

Canto, J.G., Canto, E.A., & Goldberg, R.J. (2014). Time to standardize and broaden the criteria of acute coronary syndrome symptom presentations in women. *Canadian Journal of Cardiology, 30*(7), 721–728. https://doi.org/10.1016/j.cjca.2013.10.015

Canto, J.G., Goldberg, R.J., Hand, M.M., Bonow, R.O., Sopko, G., Pepine, C.J., & Long, T. (2007). Symptom presentation of women with acute coronary syndromes: Myth vs reality. *Archives of Internal Medicine, 167*(22), 2405–2413. https://doi.org/10.1001/archinte.167.22.2405

Canto, J.G., Rogers, W.J., Goldberg, R.J., Peterson, E.D., Wenger, N.K., Vaccarino, V., … NRMI Investigators. (2012). Association of age and sex with myocardial infarction symptom presentation and in-hospital mortality. *JAMA, 307*(8), 813–822. https://doi.org/10.1001/jama.2012.199

Cole, C.S., McSweeney, J.C., Cleves, M.A., Armbya, N., Bliwise, D.L., & Pettey, C.M. (2012). Sleep disturbance in women before myocardial infarction. *Heart & Lung: The Journal of Acute and Critical Care, 41*(5), 438–445. https://doi.org/10.1016/j.hrtlng.2012.05.007

Graham, M.M., Westerhout, C.M., Kaul, P., Norris, C.M., & Armstrong, P.W. (2008). Sex differences in patients seeking medical attention for prodromal symptoms before an acute coronary event. *American Heart Journal, 156*(6), 1210–1216.e1. https://doi.org/10.1016/j.ahj.2008.07.016

Haasenritter, J., Stanze, D., Widera, G., Wilimzig, C., Abu Hani, M., Sönnichsen, A., … Donner-Banzhoff, N. (2012). Supplementary table 3. Retrieved from https://www.researchgate.net/publication/294036896_Supplementary_Table_3/download

Herlitz, J., Hartford, M., Aune, S., Karlsson, T., & Hjalmarson, A. (1993). Delay time between onset of myocardial infarction and start of thrombolysis in relation to prognosis. *Cardiology, 82*(5), 347–353. https://doi.org/10.1159/000175885

Hofgren, C., Karlson, B.W., & Herlitz, J. (1995). Prodromal symptoms in subsets of patients hospitalized for suspected acute myocardial infarction. *Heart & Lung: The Journal of Acute and Critical Care, 24*(1), 3–10. https://doi.org/10.1016/S0147-9563(05)80089-5

Hwang, S.Y., Ahn, Y.G., & Jeong, M.H. (2012). Atypical symptom cluster predicts a higher mortality in patients with first-time acute myocardial infarction. *Korean Circulation Journal, 42*(1), 16–22. https://doi.org/10.4070/kcj.2012.42.1.16

Julius, D., & Basbaum, A.I. (2001). Molecular mechanisms of nociception. *Nature, 413*(6852), 203–210. https://doi.org/10.1038/35093019

Kumar, A., & Cannon, C.P. (2009). Acute coronary syndromes: Diagnosis and management, part I. *Mayo Clinic Proceedings, 84*(10), 917–938.

Kvale, S. (1996). *An Introduction to Qualitative Research Interviewing.* California: Sage Publications.

Lovlien, M., Schei, M., & Gjengedal, E. (2006). Are there gender differences related to symptoms of acute myocardial infarction? A Norwegian perspective. *Progress in Cardiovascular Nursing*. https://doi.org/10.1111/j.0197-3118.2006.04656.x

McSweeney, J.C. (1998). Women's narratives: Evolving symptoms of myocardial infarction. *Journal of Women & Aging, 10*(2), 67–83. https://doi.org/10.1300/J074v10n02_06

McSweeney, J.C., Cleves, M.A., Zhao, W., Lefler, L.L., & Yang, S. (2010). Cluster analysis of women's prodromal and acute myocardial infarction symptoms by race and other characteristics. *The Journal of Cardiovascular Nursing, 25*(4), 311–322. https://doi.org/10.1097/JCN.0b013e3181cfba15

McSweeney, J.C., Cody, M., & Crane, P.B. (2001). Do you know them when you see them? Women's prodromal and acute symptoms of myocardial infarction. *Journal of Cardiovascular Nursing, 15*(3), 26.

McSweeney, J.C., Cody, M., O'Sullivan, P., Elberson, K., Moser, D.K., & Garvin, B.J. (2003). Women's early warning symptoms of acute myocardial infarction. *Circulation, 108*(21), 2619–2623. https://doi.org/10.1161/01.CIR.0000097116.29625.7C

McSweeney, J.C., & Crane, P.B. (2000). Challenging the rules: Women's prodromal and acute symptoms of myocardial infarction. *Research in Nursing & Health, 23*(2), 135–146. https://doi.org/10.1002/(SICI)1098-240X(200004)23:2<135::AID-NUR6>3.0.CO;2-1

McSweeney, J.C., O'Sullivan, P., Cleves, M.A., Lefler, L.L., Cody, M., Moser, D.K., … Zhao, W. (2010). Racial differences in women's prodromal and acute symptoms of myocardial infarction. *American Journal of Critical Care: An Official Publication, American Association of Critical-Care Nurses, 19*(1), 63–73. https://doi.org/10.4037/ajcc2010372

McSweeney, J., Cleves, M.A., Fischer, E.P., Moser, D.K., Wei, J., Pettey, C., … Armbya, N. (2014). Predicting coronary heart disease events in women: A longitudinal cohort study. *The Journal of Cardiovascular Nursing, 29*(6), 482–492. https://doi.org/10.1097/JCN.0b013e3182a409cc

Melzack, R. (n.d.). Pain – An overview. *Acta Anaesthesiologica Scandinavica, 43*(9), 880–884. https://doi.org/10.1034/j.1399-6576.1999.430903.x

Melzack, R.W.P. (1982). *The Challenge of Pain* (2nd ed.). New York: Penguin Books.

Melzack, R.W.P. (n.d.). *The Puzzle of Pain*. London: Basic Books.

Melzack, Ronald. (2001). Pain and the neuromatrix in the brain. Journal of Dental Education, 65(12), 5.

Melzack, R., & Wall, P.D. (1965). Pain mechanisms: A new theory. *Science, 150*(3699), 971–979. https://doi.org/10.1126/science.150.3699.971

Miles, Huberman, M.M. (1994). *An expanded source book: Qualitative Data Analysis*. California: Sage Publications.

Morgan, D.L. (1997). *Focus Group as Qualitative Research* (2nd ed.). London: Sage Publications.

Morse, Field, J.P. (2005). *Qualitative Research Methods for Health Professionals*. California: Sage Publications.

Nixon, P. G., & Bethell, H. J. (1974). Preinfarction ill health. *The American Journal of Cardiology, 33*(3), 446–449.

O'Keefe-McCarthy, S. (2008). Women's experiences of cardiac pain: A review of the literature. *Canadian Journal of Cardiovascular Nursing = Journal Canadien En Soins Infirmiers Cardio-Vasculaires, 18*(3), 18–25.

O'Keefe-McCarthy, S., & Guo, S.L. (2016). Development of the Prodromal Symptoms-Screening Scale (PS-SS): Preliminary validity and reliability. *Canadian Journal of Cardiovascular Nursing, 26*(2), 10–18.

O'Keefe-McCarthy, S., McGillion, M.H., Victor, J.C., Jones, J., & McFetridge-Durdle, J. (2015). Prodromal symptoms associated with acute coronary syndrome acute symptom presentation. *European Journal of Cardiovascular Nursing, 15*(3), 52–59. https://doi.org/10.1177/1474515115580910

O'Keefe-McCarthy, S., McGillion, M., Nelson, S., Clarke, S.P., Jones, J., Rizza, S., & Mcfetridge-Durdle, J. (2014). Acute coronary syndrome pain and anxiety in a rural emergency department: Patient and nurse perspectives. *Canadian Journal of Nursing Research, 46*(2), 80–100. https://doi.org/10.1177/084456211404600207

O'Keefe-McCarthy, S., & Ready, L. (2016). Impact of Prodromal Symptoms on Future Adverse Cardiac-Related Events: A Systematic Review. *The Journal of Cardiovascular Nursing, 31*(1), E1–10. https://doi.org/10.1097/JCN.0000000000000207

O'Keefe-McCarthy, S., Ready, L., & Francis, S-L. (2017). Cardiac related prodromal symptoms—A complicated clinical challenge. *The Nurse Practitioner, 42*(1),1-3. doi:10.1097/01.NPR.0000511010.36961

Rosen, S.D. (2012). From heart to brain: The genesis and processing of cardiac pain. *Canadian Journal of Cardiology, 28*(2), S7–S19. https://doi.org/10.1016/j.cjca.2011.09.010

Sandelowski, M. (2000). Whatever happened to qualitative description? *Research in Nursing & Health,* 23(4), 334–340. https://doi.org/10.1002/1098-240X(200008)23:4<334::AID-NUR9>3.0.CO;2-G

Statistics Canada. (2018). *Mortality, summary list of causes*. Retrieved from https://www150.statcan.gc.ca/n1/pub/84f0209x/84f0209x2009000-eng.htm

The Conference Board of Canada. (2010). *Canadian heart health strategy: Risk factors and future cost implications.* Retrieved from http://www.conferenceboard.ca/e-library/abstract.aspx?did=3447

Tousoulis, D., Charakida, M., & Stefanadis, C. (2006). Endothelial function and inflammation in coronary artery disease. *Heart, 92*(4), 441–444. https://doi.org/10.1136/hrt.2005.066936

World Health Organization. (2014). *The 10 leading causes of death*. Retrieved from https://who.int/mediacentre/factsheets/fs310/en/index.html.

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Standardized Care Plans for Heart Failure and Chronic Obstructive Pulmonary Disease in Community Care

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Abstract

Background and purpose: *Inconsistent documentation impedes communication and quality of care. Our aim was to develop and implement evidence-based standardized nursing care plans (SNCPs) for cardio-respiratory conditions encountered in community care settings.*

Methods: *A Plan-Do-Study-Act (PDSA) model was employed to guide this quality improvement project. We developed and implemented SNCPs with nurses in Southwestern Ontario, Canada. Chart audits were used to evaluate documentation after implementation (77 charts). The user perspective was obtained through informal interviews throughout implementation.*

Findings: *Pre-intervention chart reviews (64 charts) revealed inconsistent language and absence of nursing process components thereby establishing the need for this project. The post-intervention chart audit demonstrated improved consistency linking objective data to nursing interventions. The SNCPs were easy to use and decreased perceived documentation time.*

Conclusions: *SNCPs are a feasible method of translating evidence-based guidelines into community care nursing practice. SNCPs comprising guideline content can be used as a clinical decision support tool, quality indicators for program evaluation, and to reduce documentation burden.*

Key words: heart failure, care plans, community health nursing, home care, chronic disease management

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Clinical Highlights

- SNCPs are a feasible method of translating evidence-based guidelines into home care nursing practice.
- Quality indicators embedded in standardized documentation can be used for program evaluation.
- SNCPs can be used as a clinical decision support tool to guide and enhance nursing interactions with specific populations.
- Documentation burden can be reduced by using SNCPs.

Background

Nursing documentation can be defined as records of information describing patient assessment data, care and services provided by qualified nurses (College of Nurses of Ontario, 2017; Jefferies, Johnson, & Griffiths, 2010; Urquhart, Currell, Grant, & Hardiker, 2009). High-quality nursing documentation is described as clear and concise, while accurately communicating observations, actions, and care outcomes (Blair & Smith, 2012). These qualities promote structured and effective communication among healthcare providers and facilitate continuity across care transitions and settings (Björvell, Wredling, & Thorell-Ekstrand, 2002; Voutilainen, Isola, & Muurinen, 2004). Overall, high-quality nursing documentation fosters efficient care delivery, health planning, patient safety, resource allocation, nursing development, research, and informed clinical practice (Björvell et al., 2002; Voutilainen et al., 2004).

Currently, nurses practising in community settings in Ontario, Canada use various types of assessment forms to complete nursing documentation. Although nursing documentation is recognized by the College of Nurses of Ontario as an 'integral' component for safe and effective nursing, there are, at present, no mandated guidelines across agencies and organizations that provide community nursing care documentation requirements and no mandated standardized assessment forms (College of Nurses of Ontario, 2017). Each local health agency in Ontario has access to standard initial and re-assessment forms but, in practice, many health agencies use assessment forms to their own discretion (Ontario Association of Community Care Access Centres, 2014). As a result, the quality of documentation varies between nurses and across jurisdictions, causing follow-up encounters among healthcare providers to be fragmented and impeding program evaluation and data analysis.

Studies show that the quality and coordination of patient care is dependent on communication among healthcare providers (Urquhart et al., 2009; Wang, Hailey, & Yu, 2011). The quality of communication varies by local or organizational documentation requirements, different documentation systems or forms, and/or inconsistent terminologies across settings (Wang et al., 2011). In addition, although rational and critical thinking behind clinical decisions and interventions is recognized as an important component of nursing documentation, this thought process is often absent in nursing documentation (Blair & Smith, 2012; Prideaux, 2011). Poor quality nursing documentation is problematic because it impedes seamless care transitions and causes difficulty accessing relevant information in patients' charts. This results in nurses asking patients repetitive questions because they lack documentation for reference, thereby impeding health education and introducing risks of physical and legal harms (Jefferies et al., 2010; Prideaux, 2011; Wang et al., 2011). Evidence suggests that time constraints for completing documentation, lack of timely entries following patient interactions, and absence of readily available evidence-based information may influence poor quality documentation (Blair & Smith, 2012; Cheevakasemsook, Chapman, Francis, & Davies, 2006).

When clear and concise communication of patient care goals, interventions, and progress occurs, studies show that it leads to improved assessment, quality and consistency of care, reduced time spent on researching appropriate interventions, and decreased documentation time (Andreae, Ekstedt, & Snellman, 2011; Dahm & Wadensten, 2008; Gjevjon & Hellesø, 2010; Jansson, Bahtsevani, Pilhammar-Andersson, & Forsberg, 2010; Jefferies et al., 2010; Pöder, Dahm, Karlsson, & Wadensten, 2015). In addition, standardized nursing documentation provides a common language among healthcare professionals, which promotes shared understandings, care continuity, and comparable nursing data for research and evaluation (Jefferies et al., 2010; Müller-Staub, Needham, Odenbreit, Lavin, & van Achterberg, 2007; Prideaux, 2011; Thoroddsen & Ehnfors, 2007).

The creation of Standardized Nursing Care Plans (SNCPs) can be developed by using evidence-based review articles or compendiums, as a foundation. For instance, practice guidelines developed by the Canadian Cardiovascular Society (CCS) (Ezekowitz et al., 2017; Howlett et al., 2016) and the Canadian Thoracic Society (CTS) (O'Donnell et al., 2007) can be used to create SNCPs for heart failure (HF) and chronic obstructive pulmonary disease (COPD), respectively, that align with practice guidelines. Patient-centred and evidence-based guidelines form the basis for high-quality patient care and underpin the development of best practices and assessment of the quality of care.

HF and COPD are costly chronic diseases associated with frequent hospital admission and readmission rates and require management by nurses in community settings (Bui, Horwich, & Fonarow, 2011; Cardiac Care Network, 2014; Moser & Watkins, 2008; Wodchis, Austin, & Henry, 2016). HF and COPD patients often simultaneously manage other comorbidities, which makes their care planning and disease management complex, thus requiring more time and care during nursing visits (Hawkins et al., 2009; Zeng & Jiang, 2012). The burden of these diseases transcends across the healthcare system. In 2016, there were 600,000 Canadians living with HF (Heart & Stroke, 2016) and national COPD prevalence is estimated around 4% (Evans, Chen, Camp, Bowie, & McRae, 2014). The incidence of both chronic conditions is projected to increase, as the population ages and more people develop and live longer with cardiovascular disease (Cardiac Care Network, 2014; Evans et al., 2014).

Care of complex patients has shifted to the community sector (Goldhar et al., 2014), thereby requiring increased awareness and uptake of clinical guidelines currently used in more acute sectors to enhance the continuum of care. Patients with chronic diseases such as HF and COPD bear responsibilities related to self-management, which are often facilitated by community nurses (Van Spall et al., 2017; Yin, Yang, & Ye, 2018). Therefore, the community care population represents an opportunity for nurses to facilitate HF and COPD self-management by improving documentation quality among care providers and providing tools for guideline-based education and self-management support.

In this paper, we report findings of our development and implementation of patient-centred and evidence-based SNCPs targeting self-care management of HF and COPD patients in the community. Specifically, we discuss nursing documentation quality for community nursing in Southwestern Ontario. The goals of this quality improvement project are to improve consistency in documentation, demonstrate uptake of evidence-based guidelines, translate guidelines into practice, facilitate patient/program evaluation, and enhance communication about care plans across the care continuum.

Aim and Methods

The aim of this quality improvement project is to implement a documentation practice change. The proposed change is incorporation of HF and COPD evidence-based guideline recommendations in nursing documentation. SNCPs will be developed and implemented, and nursing documentation will be evaluated for inclusion of evidence-based components of HF and COPD care within the SNCPs. A formal ethics review was waived for this quality improvement project in consultation with the Hamilton Health Sciences Research Ethics Board, as per the Tri-Council Policy Statement 2, article 2.5 (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2014).

The Plan-Do-Study-Act (PDSA) model was employed to guide the development and implementation of this quality improvement initiative. The PDSA model includes the following stages: Plan (a change or test aimed at improvement), Do (carry out change or test the change on a small scale), Study (examine the results, what did we learn and what went wrong), and Act (adopt the change, abandon, or run through it again) (Langley et al., 1996). The PDSA model provides a practical guide for the development and evaluation of quality improvement initiatives in healthcare. The PDSA model was selected for this project, as it is a method that promotes collaboration, feedback, and engagement with clinical practice nurses.

Context/Setting

This project was implemented with one of the Local Health Integration Networks (LHIN) in Southwestern Ontario, which provides home and community care services for a population of 1.4 million people over a geographical area of approximately 7,000 sq. km. This LHIN has the Rapid Response Registered Nursing (RR RN) program that focuses on connecting the patient with primary care, reconciling medications, and providing education in the first 30 days post discharge from hospital. The RR RN team is now part of a trial (Trial registration number: NCT03012256) targeting home care patients with cardiorespiratory symptoms. The Detection of Indicators and Vulnerabilities for Emergency Room Trips (DIVERT) Scale (Costa et al., 2015) identifies home care patients with cardiorespiratory symptoms at risk for a future emergency department visit. This patient profile was used for the development and implementation of SCNPs for those with HF and COPD.

Stage 1: Plan

In stage one of the PDSA cycle, we conducted a pre-intervention chart review to identify documentation gaps and establish the need for this quality improvement initiative. A specific tool was not used for the pre-intervention chart review, as the purpose was to identify gaps and deficiencies. These documentation gaps informed the development of the SNCPs and chart audit tool selection for the post-implementation evaluation of the SNCPs. Pre-intervention chart reviews were completed by one author (A1), who is a trained registered nurse, on both initial and re-assessment forms.

Nursing Care Plan Development

SNCPs provide clear, concise communication of patient care goals, evidence-based nursing diagnoses, interventions, progress, and evaluation (Carpenito-Moyet, 2006). Clinical areas that care for specific patient groups benefit from using consolidated SNCPs (Lavin, Harper, & Barr, 2015). The authors used the North American Nursing Diagnosis Association (NANDA) taxonomy of nursing diagnosis, interventions, and outcomes as a guiding framework for the SNCPs (NANDA, 2012). The SNCPs incorporated the NANDA International (NANDA-I) nursing diagnosis, Nursing Interventions Classification (NIC), and the Nursing Outcomes Classification (NOC) format. NIC, NANDA-I diagnoses, and NOC are research-based and allow for individualization of the SNCP (Bubeníková & Procházka, 2015; Maas, Johnson, & Moorhead, 1996; Müller-Staub et al., 2007). NANDA diagnoses were selected that best reflect the role and work of the RR RN program with HF and COPD patients. Diagnoses included were geared towards self-management, teaching, and health promotion. Two members from the team (A1 and A4) compared the NANDA diagnosis, interventions, and outcomes to the CCS and CTS guidelines, focusing on objective outcome alignment with the guidelines. A review of the literature for current state of practice on HF and COPD self-management education and supports in the community sector was included to ensure up-to-date information and relevance to clinical area.

Stage 2: Do

In the second stage of the PDSA cycle, we implemented and tested the SNCPs developed in stage one on a small scale within one LHIN. To ensure smooth implementation, a series of education workshops were delivered from November 2017 to January 2018. Three separate workshop sessions were attended by LHIN nurses where the content included: 1) HF information according to the CCS guidelines, 2) COPD information according to CTS guidelines, and 3) information on the SNCPs to demonstrate how they should be used within existing electronic documentation and case scenarios. The half-day workshops were delivered by a leading nurse expert from CORE (2018) for HF and a certified respiratory educator nurse practitioner (NP) for COPD content. Six nurses and two NPs attended the education workshops. An additional nurse was trained at a later date. Each nurse was provided with a 2017 CCS HF pocket guide and the CTS COPD guide. A printed booklet of the SNCPs was distributed to each participating nurse. The SNCPs were also available and accessible on a shared electronic drive along with an expanded document related to the care plan along with rationale to each participating nurse.

The project was implemented in February 2018. All education and preparatory resources were to be in place prior to February 2018.

Stage 3: Study

Evaluation Plan—Chart Audit Tool Selection

Chart audits can provide valuable information on documentation of care processes and interventions provided by healthcare professionals. Chart audits serve two purposes: to determine if care is documented, and to appraise the clarity and quality of communication (Barisic, 2017). The nursing and midwifery chart audit tool (NMCAT) was selected to evaluate post-intervention quality of nursing documentation in relation to the SNCPs (Johnson, Jefferies, & Langdon, 2010). We included sections on the utilization of the nursing process, specifically a nursing diagnosis, assessment to support diagnosis, nursing actions, and patient response. The NMCAT includes several items related to timeliness and legibility; these were not applicable to the aims of this study and irrelevant for electronic documentation and, hence, were not included. Post-intervention chart audit items were modified to the context of the HF and COPD patient and practice recommendations according to the CCS and CTS guidelines

(Ezekowitz et al., 2017; Howlett et al., 2016; O'Donnell et al., 2007). The CCS quality indicator for HF education was incorporated into the post-intervention chart audit, specifically education on weight monitoring, what to do if symptoms change, and HF medications (McKelvie et al., 2016).

Quality indicators for COPD education were under development at the time of this project's implementation. Therefore, we included what to do if symptoms change, action plans, and medication education. These items correspond with Health Quality Ontario's statement 4 education and self-management, and statement 6 pharmacological management of stable COPD (Health Quality Ontario, 2019).

The third phase represents an evaluation of the SNCPs' implementation to determine if objectives were met and to identify lessons learned. Chart audits were performed post-intervention to identify whether use of the SNCPs improved documentation among community nurses. The NMCAT, and CCS and CTS guidelines were used for the chart audit items. Post-intervention chart audits were completed by two authors (A1 and A2).

To seek feedback on the SNCPs, informal feedback interviews were conducted by one author (A1) with available nurses who used the SNCPs. Feedback interviews were conducted in English and were completed in person over two sessions with available nurses as a group; those unable to attend were contacted over the phone. Participants included five nurses. Informal questions were prepared in advance to guide the conversation and ascertain feedback. Questions included asking how the SNCPs affect the nurses' chart time and influence on practice, if the SNCPs reflect best practice for the community, and suggested improvements. Feedback was grouped and categorized according to the topic asked.

Stage 4: Act

In the final stage of the PDSA cycle, the program can be repeated in another cycle dependent on findings or actions to sustain the implemented change. For this project, leadership from the organization was involved to discuss how the SNCPs met organizational needs and to plan next steps for wider spread across the RR RN program throughout the LHIN.

Results

Stage 1: Plan

The pre-intervention chart review assessed nursing documentation in a small group of community nurses. Sixty-four charts were reviewed (40 initial assessments and 24 re-assessments) from 15 nurses. The review found several documentation inconsistencies: absence of the patient's weight, absence of nursing actions, assessment data not linked to nursing actions, and specifics of educational topics discussed during the home visit not recorded. Overall, documentation lacked language and format consistency between nurses and flow of the nursing process, *assessment findings - nursing actions - patient's response,* was not evident.

Stage 2: Do

To address the needs identified in stage one, SNCPs were developed for HF and COPD. This was done by targeting the inconsistencies found in the pre-intervention chart review, incorporating existing CCS and CTS guidelines, and using information from a literature review. The SNCP was then implemented for use from February to July 2018.

Standardized nursing care plans focused on the nursing diagnosis:

- *Ineffective health management related to insufficient knowledge of therapeutic regimen HF* (Figure 1)
- *Ineffective health management related to insufficient knowledge of therapeutic regimen COPD*
- Planning a dignified life closure—Advance Care Plan.

NANDA nursing interventions and rationale were considered for each diagnosis. Potential interventions were discussed between project members for inclusion using additional criteria of relevance to practice setting and role of the RR RN. Interventions that were consistent with the CCS and CTS society guideline documents were included, as seen in Table 1**.** The care plan considers the uniqueness of each patient and their environment. It can be adapted to reflect learner readiness and health literacy. The SNCPs were adopted and used by all of the RR RNs involved in the study period.

Stage 3: Study

After implementation of the SNCPs, post-intervention chart audits were conducted on 77 charts (36 initial assessments and 41 re-assessments) from seven nurses to evaluate use of the SNCPs for documentation. Charts from one nurse were not obtained, as he/she left the organization during the course of this study. Both initial and re-assessment forms were included for evaluation. Two raters independently coded all charts and reached high levels of agreement at 90.9%. Table 2 presents the major findings associated with the post-intervention chart audit.

The effectiveness and utility of the SNCPs from the user perspective were obtained through informal interviews and group discussion. Five nurses provided feedback; four attended group interviews over two sessions and one was reached by phone. Recurring findings included reduced charting time, ease of use, ease to modify according to the patient's specific needs, and serving as a reminder of content to chart. The SNCPs were regarded as decision aids and good visual reminders. One nurse likened the SNCP to a best practice guideline that can be followed during the home visit. All feedback was not positive, with one nurse reporting a preference to document free text interventions and plans in the assessment data sections. Several suggestions for improvement were also elicited: include more checkboxes, add a section for weights on the reassessment forms, and list interventions with bullets instead of numbers to make editing easier.

Table 1. Nursing diagnosis: Ineffective health management (CHF) related to insufficient knowledge of therapeutic regimen

Nursing Interventions	Guideline Supporting Rationale (Ezekowitz et al., 2017; Howlett et al., 2016)
Assess Learner Learner readiness/health literacy/needs/and barriers assessed	*Teaching and learning overtime, reinforcing and allowing time to apply to daily life. Information alone is not sufficient, teach back is recommended.* (Howlett et al., 2016)
Review: Treatment Regimen • disease process • rationale for treatment regimen • prescribed medication • correct administration of medication • actions of medication • prescribed diet (sodium and fluid intake) • expected effects of treatment • prescribed/recommended activity (pacing activities)	*Medication review recommended* (Ezekowitz, et al., 2017) *Reinforce taking medications as prescribed.* (Howlett et al., 2016) *It is important to ensure the patient is adherent to an acceptable fluid restriction this is usually < 2000 mL per 24 hours.* (Howlett et al., 2016) *Clinicians should have early and frank discussion with patients and their families about the end-of-life preferences, and provide palliative care in appropriate patients* (Howlett et al., 2016) *Teach energy conserving strategies/exercise* (Ezekowitz et al., 2017)
Review Monitoring Activities • self-care responsibilities for monitoring/ daily care /emergency situations • HF Zones Reviewed • daily Weights Chart reviewed	*Routine daily monitoring/vigilance to HF symptoms (including daily weights and checking for edema)* (Howlett et al., 2016) *Evaluate a change in symptoms and determine what action is needed (e.g., do nothing, call a health care provider). Evaluate the effectiveness of the action* (Ezekowitz et al., 2017; Howlett et al., 2016)
Objective Outcomes 1. Medications taken as prescribed 2. Daily weight chart completed 3. Physician visit completed 4. Blood work completed 5. Tests/Procedures completed	*Routine assessment of electrolytes and creatinine, especially in those who are receiving triple therapy and diuretics.* (Howlett et al., 2016)

Table 2. Post-Intervention Chart Audit Results

Initial Assessments (n = 36)	Number of charts (% of charts)	Re-assessment (n = 41)	Number of charts (% of charts)
Presence of nursing diagnosis	26 (72.2%)	Presence of nursing diagnosis	32 (78.0%)
Presence of objective data to support a nursing diagnosis	35 (97.2%)	Presence of objective data to support a nursing diagnosis	35 (85.4%)
Patient goals are listed	30 (83.3%)	Patient goals are listed	25 (61.0%)
Nursing actions are listed	34 (94.4%)	Nursing actions are listed	32 (78.0%)
Resources for patient use are listed	17 (47.2%)	Resources for patient use are listed	19 (46.3%)
Education provided to patient is listed	31 (86.1%)	Education provided to patient is listed	32 (78.0%)
Patient's response to education is listed	11 (30.6%)	Patient's response to education is listed	29 (70.7%)
Learner readiness is listed	18 (50.0%)	Learner readiness is listed	23 (56.1%)
Patient's response to the care is recorded	6 (16.7%)	Patient's response to the care is recorded	15 (36.6%)

Stage 4: Act

Organizational leadership was presented with results from the preceding stages and a project report detailing recommendations for future iterations and spread to other RR RNs in the LHIN. A number of changes were recommended based on observations made during project implementation and evaluation that could be adapted into future iterations of the SNCPs where it remains dynamic to needs and changing guideline recommendations, (as seen in Table 3).

Table 3. Recommendations

Improve consistency between the initial assessment form and reassessment • Sections for weights and blood glucose on reassessment form • Section for patient education on initial assessment form
Add date of last assessment section to forms • Allows for progress to be tracked
Interface chart with Care Coordinator documentation • Allows for comprehensive team care
SNCP and documentation included in orientation and continuing education initiatives
Improve electronic format • Change to an electronic form where data can be extracted • Capability for program evaluation
Add SNCP documentation to organization policy and procedures
Expand to other common co-morbid diseases - Diabetes

Discussion

In this paper, the authors highlight the importance of applying evidence-based guidelines for chronic disease management to documentation in community practice, as a way of improving communication and documentation by implementing SNCPs.

Nurses in this project thought the SNCPs and the care provided were based on clinical guidelines. This finding is consistent with those of Pöder, Fogelberg-Dahm and Wadensten (2011) where perceived knowledge of evidence-based guidelines improved when SNCPs were implemented. One interesting finding that warrants attention is the lack of documentation of the patients' response to nursing actions and education as a specific outcome. One explanation is that it is difficult to capture a response during the initial home visit when teaching commences. Park (2014) also concluded that individual patient characteristics and treatment potential make it difficult to standardize core outcomes. Although we did note an improvement in documentation of patient response to care, this remains an area that can be targeted for future standardization efforts. Specific education provided was also identified as a documentation gap in the pre-intervention chart review stage. However after SNCPs' implementation, the post-intervention chart audit showed this information existed in 86.1% of initial assessment charts and 78% of reassessment charts. Inclusion of patient outcomes is important for tracking changes over time and evaluation of the current state. When comparing the post-intervention initial and reassessment forms, documentation of the patient response to education rose from 30.6% at initial visit to 70.7% at reassessment visit. Documentation of the patient's experience with symptom management is essential, as symptom awareness and incongruity between subjective and objective findings can be used to guide education and supports (Ahmadi, Månsson, Lindblad, & Hildingh, 2014; Schumacher, Hussey, & Hall, 2018; Taylor, Hobbs, Marshall, Leyva-Leon, & Gale, 2017). The SNCP for HF contains objective outcomes such as the weight chart and, in conjunction with the physical assessment, is used to reinforce daily monitoring and application of the heart failure zones. Our SNCP included actions to evaluate the symptoms and provide education at each visit, thereby facilitating development of crucial somatic reading skills to detect early symptom change (Jurgens, 2006; Riegel et al., 2010).

The SNCPs also acted as a decision aid for the nurses during the visit and as a reminder to document the patient's progress with education and self-management practices. The presence of decision aids in the form of guideline-based tools has been shown to facilitate clinical reasoning (ten Ham, Ricks, van Rooyen, & Jordan, 2017). Reducing the gap between guideline recommendations and practice is most effective when expected change behaviours are less complex and clearly described (Grol & Grimshaw, 2003). The nurses in our project found the simplicity of the SNCPs reduced documentation time while maintaining pertinent content. This quality improvement project demonstrated that nursing interventions and patient-related outcomes can be used for program evaluation. The SNCPs consolidate key indicators of guideline-based interventions to one area of the chart, which improved visibility, comprehensiveness, specificity, and consistency of nursing interventions that were carried out during the home visit (Johnson, Edward, & Giandinoto, 2018).

Several limitations were apparent in the planning and implementation of the project that warrant mentioning. This was a quality improvement project and the rigours of a full research study were not employed. The audit tool was adapted to the needs of this project. There were several items removed from the NMCAT, thus affecting the validity of the tool. The items removed from the NMCAT were not relevant to electronic documentation and were deemed unnecessary. Content of SNCPs were constrained due to size limitations within the existing electronic documentation system and the condensed version does not include all possible nursing interventions. The scope of this project was a single site and confined to a small group of nurses. Funding did not allow for creation of a live document with embedded decision support.

Lessons learned from this quality improvement project should be taken into consideration for future iterations of the PDSA cycle. Chart audits, although an effective method of tracking quality improvement initiatives, were difficult to perform given that the chart is a stand-alone document (Barisic, 2017; Dash et al., 2018). Future recommendations include adopting a documentation platform that supports data extraction. An additional issue is that the Care Coordinator assessment is documented in the Resident Assessment Instrument for Home Care (RAI HC), which does not have the capacity to link with the nursing documentation form. Linking nursing data with RAI data has vast implications to improve information exchange and influence care delivery (Dash et al., 2018).

Our aim was to improve community nursing documentation by implementing evidence-based SNCPs. SNCPs provide consistent, clear communication, thereby enhancing integration across the healthcare system. The community is a well-placed setting to provide education and chronic disease supports between episodic care, as shown by the documentation gaps this project addressed. We targeted specific language and representation of nursing interventions that demonstrate problem solving and behaviours regarding teaching/patient learning of self-management, to align with the role of the RR RN. This project affirmed that SNCP for community nursing is a feasible strategy to translate evidence-based knowledge into documentation practice and improve documentation clarity and consistency. Our results are encouraging for community nurses and administrators who are involved in emerging programs that foster continuation of care and consistency throughout the health system. ♥

REFERENCES

Ahmadi, N.S., Månsson, J., Lindblad, U., & Hildingh, C. (2014). Breathlessness in everyday life from a patient perspective: A qualitative study using diaries. *Palliative and Supportive Care, 12*, 189–194. https://doi.org/10.1017/S1478951512001095

Andreae, C., Ekstedt, M., & Snellman, I. (2011). Patients' participation as it appears in the nursing documentation, when care is ruled by standardized care plans. *International Scholarly Research Network*. Retrieved from. https://doi.org/10.5402/2011/707601

Barisic, V. (2017). Clinical chart audits as a potential process improvement strategy within the radiation therapy department of a community-based cancer center. *Journal of Medical Imaging and Radiation Sciences, 48*(1), 68–73. https://doi.org/10.1016/j.jmir.2016.08.005

Björvell, C., Wredling, R., & Thorell-Ekstrand, I. (2002). Long-term increase in quality of nursing documentation: Effects of a comprehensive intervention. *Scandinavian Journal of Caring Sciences, 16*(1), 34–42.

Blair, W., & Smith, B. (2012). Nursing documentation: Frameworks and barriers. *Contemporary Nurse, 41*, 160–168. https://doi.org/10.5172/conu.2012.41.2.160

Bubeníková, Š., & Procházka, M. (2015). Validation of diagnostic elements of the nursing diagnosis 00132 acute pain in midwifery. *Profese Online 8*(2), 1–4. https://doi.org/10.5507/pol.2015.008

Bui, A.L., Horwich, T.B., & Fonarow, G.C. (2011). Epidemiology and risk profile of heart failure. *Nature Reviews Cardiology, 8*(1), 30–41. https://doi.org/10.1038/nrcardio.2010.165

Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada. (2014). *Tri-council policy statement: Ethical conduct for research involving humans 2014*. Retrieved from http://www.pre.ethics.gc.ca/pdf/eng/tcps2-2014/TCPS_2_FINAL_Web.pdf

Cardiac Care Network. (2014). *Strategy for community management of heart failure in Ontario*. Toronto, ON: Cardiac Care Network. Retrieved from http://www.ccn.on.ca/ccn_public/uploadfiles/files/Strategy_for_Community_Mgmt_in_HF_in_ON.pdf

Carpenito-Moyet, L.J. (2006). *Nursing diagnosis: Application to clinical practice*. Philadelphia, PA: Lippincott Williams & Wilkins.

Cheevakasemsook, A., Chapman, Y., Francis, K., & Davies, C. (2006). The study of nursing documentation complexities. *International Journal of Nursing Practice, 12*, 366–374. https://doi.org/10.1111/j.1440-172X.2006.00596.x

College of Nurses of Ontario. (2017, February). *Practice standard: Documentation*. Retrieved from http://www.cno.org/globalassets/docs/prac/41001_documentation.pdf

Costa, A.P., Hirdes, J.P., Bell, C.M., Bronskill, S.E., Heckman, G.A., Mitchell, L., … Stolee, P. (2015). Derivation and validation of the detection of indicators and vulnerabilities for emergency room trips scale for classifying the risk of emergency department use in frail community-dwelling older adults. *Journal of the American Geriatrics Society, 63*, 763–769. https://doi.org/10.1111/jgs.13336

Dahm, M.F., & Wadensten, B. (2008). Nurses' experiences of and opinions about using standardised care plans in electronic health records—A questionnaire study. *Journal of Clinical Nursing, 17*, 2137–2145. https://doi.org/10.1111/j.1365-2702.2008.02377.x

Dash, D., Heckman, G.A., Boscart, V.M., Costa, A.P., Killingbeck, J., & d'Avernas, J.R. (2018). Using powerful data from the interRAI MDS to support care and a learning health system: A case study from long-term care. *Healthc Manage Forum, 31*, 153–159. https://doi.org/10.1177/0840470417743989

Evans, J., Chen, Y., Camp, P. G., Bowie, D.M., & McRae, L. (2014). Estimating the prevalence of COPD in Canada: Reported diagnosis versus measured airflow obstruction. *Statistics Canada, 25*(3), 3–11. https://doi.org/82-003-X

Ezekowitz, J.A., O'Meara, E., McDonald, M.A., Abrams, H., Chan, M., Ducharme, A., … Sussex, B. (2017). 2017 Comprehensive update of the Canadian cardiovascular society guidelines for the management of heart failure. *Canadian Journal of Cardiology, 33*, 1342–1433. https://doi.org/10.1016/j.cjca.2017.08.022

Gjevjon, E.R., & Hellesø, R. (2010). The quality of home care nurses' documentation in new electronic patient records. *Journal of Clinical Nursing, 19*(1–2), 100–108. https://doi.org/10.1111/j.1365-2702.2009.02953.x

Goldhar, J., Daub, S., Dhalla, I., Ellison, P., Purbhoo, D., & Sinha, S.K. (2014). Integrated client care for frail older adults in the community: Preliminary report on a system-wide approach. *Healthcare Quarterly, 17*(3), 61–69.

Grol, R., & Grimshaw, J. (2003). From best evidence to best practice: Effective implementation of change in patients' care. *The Lancet, 362*, 1225–1230. https://doi.org/10.1016/S0140-6736(03)14546-1

Hawkins, N.M., Petrie, M.C., Jhund, P.S., Chalmers, G.W., Dunn, F.G., & McMurray, J.J. (2009). Heart failure and chronic obstructive pulmonary disease: Diagnostic pitfalls and epidemiology. *European Journal of Heart Failure, 11*, 130–139.

Health Quality Ontario. (2019). *Chronic Obstructive Pulmonary Disease (COPD): The quality standard in brief.* Queen's Printer for Ontario. Retrieved from https://www.hqontario.ca/Evidence-to-Improve-Care/Quality-Standards/View-all-Quality-Standards/Chronic-Obstructive-Pulmonary-Disease

Heart & Stroke. (2016). *The burden of heart failure.* Heart & Stroke. Retrieved from https://www.heartandstroke.ca/-/media/pdf-files/canada/2017-heart-month/heartandstroke-reportonhealth-2016.ashx?la=en&hash=0478377DB7CF08A281E0D94B22BED6CD093C76DB

Howlett, J.G., Chan, M., Ezekowitz, J.A., Harkness, K., Heckman, G.A., Kouz, S., … Canadian Cardiovascular Society Heart Failure Guidelines Panels. (2016). The Canadian cardiovascular society heart failure companion: Bridging guidelines to your practice. *The Canadian Journal of Cardiology, 32*, 296–310. https://doi.org/10.1016/j.cjca.2015.06.019

Jansson, I., Bahtsevani, C., Pilhammar-Andersson, E., & Forsberg, A. (2010). Factors and conditions that influence the implementation of standardized nursing care plans. *The Open Nursing Journal, 4*, 25–34. https://doi.org/10.2174/1874434601004010025

Jefferies, D., Johnson, M., & Griffiths, R. (2010). A meta-study of the essentials of quality nursing documentation. *International Journal of Nursing Practice, 16*, 112–124. https://doi.org/10.1111/j.1440-172X.2009.01815.x

Johnson, L., Edward K.L., & Giandinoto J.A. (2018). A systematic literature review of accuracy in nursing care plans and using standardized nursing language. *Collegian, 25*, 355–361.

Johnson, M., Jefferies, D., & Langdon, R. (2010). The nursing and midwifery content audit tool (NMCAT): A short nursing documentation audit tool: 10-minute nursing documentation audit tool. *Journal of Nursing Management, 18*, 832–845. https://doi.org/10.1111/j.1365-2834.2010.01156.x

Jurgens, C.Y. (2006). Somatic awareness, uncertainty, and delay in care-seeking in acute heart failure. *Research in Nursing & Health, 29*(2), 74–86. https://doi.org/10.1002/nur.20118

Langley, G.J., Moen, R.D., Nolan, K.M., Nolan, T.W., Norman, C.L., & Provost, L.P. (1996). *The improvement guide: A practical approach to enhancing organizational performance.* New York, NY: Jossey-Bass.

Lavin, M.A., Harper, E., & Barr, N. (2015). Health information technology, patient safety, and professional nursing care documentation in acute care settings. *Online Journal of Issues in Nursing, 20*(2), 1–6.

Maas, M.L., Johnson, M., & Moorhead, S. (1996). Classifying nursing-sensitive patient outcomes. *Image: The Journal of Nursing Scholarship, 28,* 295–302. https://doi.org/10.1111/j.1547-5069.1996.tb00377.x

McKelvie, R.S., Heckman, G.A., Blais, C., Cox, J.L., Ezekowitz, J.A., Gong, Y., … Lambert, L.J. (2016). Canadian cardiovascular society quality indicators for heart failure. *Canadian Journal of Cardiology, 32*, 1038.e5–1038.e9. https://doi.org/10.1016/j.cjca.2015.12.027

Moser, D.K., & Watkins, J.F. (2008). Conceptualizing self-care in heart failure: A life course model of patient characteristics. *The Journal of Cardiovascular Nursing, 23,* 205–218. https://doi.org/10.1097/01.JCN.0000305097.09710.a5

Müller-Staub, M., Needham, I., Odenbreit, M., Lavin, M.A., & van Achterberg, T. (2007). Improved quality of nursing documentation: Results of a nursing diagnoses, interventions, and outcomes implementation study. *International Journal of Nursing Terminologies and Classifications: The Official Journal of NANDA International, 18*(1), 5–17. https://doi.org/10.1111/j.1744-618X.2007.00043.x

NANDA. (2012). *Nursing diagnoses: Definitions & classification 2012-2014*. Chichester, West Sussex: Wiley-Blackwell.

O'Donnell, D.E., Aaron, S., Bourbeau, J., Hernandez, P., Marciniuk, D.D., Balter, M., … Voduc, N. (2007). Canadian Thoracic Society recommendations for management of chronic obstructive pulmonary disease – 2007 Update. *Canadian Respiratory Journal, 14*(Suppl b), 5B-32B. https://doi.org/10.1155/2007/830570

Ontario Association of Community Care Access Centres. (2014). *Making way for change: Transforming home and community care for Ontarians.* Retrieved from http://hssontario.ca/Policy/White%20Paper/OACCAC-Whitepaper-FINAL.pdf

Park, H. (2014). Identifying core NANDA-I nursing diagnoses, NIC interventions, NOC outcomes, and NNN linkages for heart failure. *International Journal of Nursing Knowledge, 25*(1), 30–38. https://doi.org/10.1111/2047-3095.12010

Pöder, U., Dahm, M.F., Karlsson, N., & Wadensten, B. (2015). Standardised care plans for in hospital stroke care improve documentation of health care assessments. *Journal of Clinical Nursing, 24*(19–20), 2788–2796. https://doi.org/10.1111/jocn.12874

Pöder, U., Fogelberg-Dahm, M., & Wadensten, B. (2011). Implementation of a multi-professional standardized care plan in electronic health records for the care of stroke patients. *Journal of Nursing Management, 19*, 810–819. https://doi.org/10.1111/j.1365-2834.2011.01220.x

Prideaux, A. (2011). Issues in nursing documentation and record-keeping practice. *British Journal of Nursing, 20*, 1450–1454. https://doi.org/10.12968/bjon.2011.20.22.1450

Riegel, B., Dickson, V.V., Cameron, J., Johnson, J.C., Bunker, S., Page, K., & Worrall-Carter, L. (2010). Symptom recognition in elders with heart failure. *Journal of Nursing Scholarship, 42*(1), 92–100.

Schumacher, C., Hussey, L., & Hall, V. (2018). Heart failure self-management and normalizing symptoms: An exploration of decision making in the community. *Heart & Lung, 47*, 297–303. https://doi.org/10.1016/j.hrtlng.2018.03.013

Taylor, C.J., Hobbs, F.D.R., Marshall, T., Leyva-Leon, F., & Gale, N. (2017). From breathless to failure: Symptom onset and diagnostic meaning in patients with heart failure—A qualitative study. *British Medical Journal Open,* 7(3), e013648. https://doi.org/10.1136/bmjopen-2016-013648

ten Ham, W., Ricks, E.J., van Rooyen, D., & Jordan, P.J. (2017). An integrative literature review of the factors that contribute to professional nurses and midwives making sound clinical decisions. *International Journal of Nursing Knowledge, 28*(1), 19–29.

Thoroddsen, A., & Ehnfors, M. (2007). Putting policy into practice: Pre- and posttests of implementing standardized languages for nursing documentation. *Journal of Clinical Nursing, 16,* 1826–1838. https://doi.org/10.1111/j.1365-2702.2007.01836.x

Urquhart, C., Currell, R., Grant, M.J., & Hardiker, N.R. (2009). Nursing record systems: Effects on nursing practice and healthcare outcomes. *The Cochrane Database of Systematic Reviews,* (1). https://doi.org/10.1002/14651858.CD002099.pub2

Van Spall, H.G.C., Rahman, T., Mytton, O., Ramasundarahettige, C., Ibrahim, Q., Kabali, C., … Connolly, S. (2017). Comparative effectiveness of transitional care services in patients discharged from the hospital with heart failure: A systematic review and network meta-analysis: Comparative effectiveness of transitional care services in patients hospitalized with heart failure. *European Journal of Heart Failure, 19*, 1427–1443. https://doi.org/10.1002/ejhf.765

Voutilainen, P., Isola, A., & Muurinen, S. (2004). Nursing documentation in nursing homes—State-of-the-art and implications for quality improvement. *Scandinavian Journal of Caring Sciences, 18*(1), 72–81.

Wang, N., Hailey, D., & Yu, P. (2011). Quality of nursing documentation and approaches to its evaluation: A mixed-method systematic review. *Journal of Advanced Nursing, 67,* 1858–1875. https://doi.org/10.1111/j.1365-2648.2011.05634.x

Wodchis, W.P., Austin, P.C., & Henry, D.A. (2016). A 3-year study of high-cost users of health care. *Canadian Medical Association Journal, 188*, 182–188. https://doi.org/10.1503/cmaj.150064

Yin, H., Yang, L., & Ye, Q. (2018). A systematic review of the effectiveness of clinical nurse specialist interventions in patients with chronic obstructive pulmonary disease (COPD). *Frontiers of Nursing, 5*, 147–156. https://doi.org/10.2478/fon-2018-0019

Zeng, Q., & Jiang, S. (2012). Update in diagnosis and therapy of coexistent chronic obstructive pulmonary disease and chronic heart failure. *Journal of Thoracic Disease, 4*, 310–315. http://doi.org/10.3978/j.issn.2072-1439.2012.01.09

CCCN 2019 Spring Conference Highlights

The annual CCCN Spring Conference **Update Your Cardiovascular Nursing Toolkit** rotates among the ten CCCN provincial divisions and this year, Winnipeg and the Manitoba Chapter of CCCN were our hosts. This two day conference featured a combination of plenary, break-out sessions and great networking. Congratulations to all of our abstract presenters who submitted and presented during the conference. Thank you to our plenary and workshop presenters who shared their knowledge.

The Cardiovascular Nursing Excellence Recognition awards winner were announced during the annual general meeting portion of the conference. Congratulations to Dr. Lorraine Avery, PhD, RN, CNCC(C) the recipient of the Health Promotion and Advocacy Excellence Award in Cardiovascular Nursing and Karen Wiens BScN, RN, the recipient of Mae Gallant Leadership Excellence Award in Cardiovascular Nursing.

The Friday night networking reception included a tour of the Canadian Museum of Human Rights. From breathtaking architecture, to moving stories and captivating exhibits, the 90 minute tour only touched on what this outstanding museum has to offer. Following the tour, conference attendee enjoyed an evening of great food and conversation.

A big thank you to our volunteer conference committee, Emily Hyde, Rosanne Labossiere-Gee, Christina Kuttnig and Sandra Matheson for the many hours of work and planning that went into organizing our 2019 conference.

The CCCN Spring Conference couldn't happen without the generous support of our partners and sponsors.

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We look forward to seeing everyone in May 2020 in beautiful Calgary for the Annual Spring Conference.

Canadian Council of Cardiovascular Nurses Annual Spring Conference—May 2019 Conference Abstracts

Exploring Clinical Outcomes of Acute Ischemic Stroke Following a Door-to-Needle Quality Improvement Project

Alcock, S., Sawatzky, J., Strome, T., & Doerksen, K., Winnipeg, MB

It is anticipated that the incidence of stroke in Canada will increase over the next decade. Time-driven hyperacute stroke care with thrombolysis is known to increase the likelihood of a good clinical outcome. Following sub-optimal performance results for stroke care, our centre invested in a door-to-needle (DTN) quality improvement initiative. The purpose of this study was to determine if the resulting improved median DTN times and greater proportion of patients treated within 60 minutes of arrival at our tertiary care centre were associated with improved clinical outcomes. Guided by the Donabedian quality framework, we retrospectively reviewed charts of all consecutive patients (N=324) who received thrombolysis pre and post quality improvement initiative. Patient characteristics and process and outcome data were collected. Primary study outcomes included mortality, adverse events, discharge location and independence at discharge. Data analysis compared proportions using Chi Square and means using the 2-tailed t-test, with a significance level of .05. Results revealed that median DTN time (49 versus 70.5 min, $p < .001$) and the percentage of cases with a DTN ≤ 60 minutes (77.9 versus 31.4%, $p < .001$) improved post-intervention. In-hospital mortality was reduced, ($p = .013$) and the proportion of favourable versus unfavourable discharge locations improved, ($p = .005$). Mortality rates for all study patients with DTN ≤ 60 minutes were also significantly lower ($p = .004$) post intervention. Thus, our quality improvement initiative resulted in timelier care, and likely influenced improved clinical outcomes. Our findings highlight the ongoing need for organizations to invest in and deliver timely hyper-acute stroke care.

Communities Focusing on Cardiac Care: The Manitoba Acute Coronary Syndrome (ACS) Network

Avery, L., Ducas, J., Allen, D., Luu, J., Hiebert, B., & Kuttnig, C., Winnipeg, MB

The purpose of this paper is to describe the role of the Clinical Nurse Specialist (CNS) in the co-development of the Manitoba ACS Network and to showcase the best practice tools developed to support acute cardiac services, particularly related to myocardial infarction. CNSs are advanced practice nurses who contribute to the transformation of health systems, through their ability to support evidence-informed practice, innovation, creativity, and improvements to the delivery of healthcare services. Effective therapies and adherence to treatment guidelines have had a major impact on the mortality and morbidity of ACS in the last 20 years. Locally, there are particular challenges to ACS guideline-based management adherence. Such challenges include only one specialized cardiac care centre in the province, increasing the potential for variability in treatment of patients with ACS in sites remote from the cardiac centre. The ACS Network was developed to harmonize and optimize ACS care from symptom onset to community follow-up. Several meetings with key stakeholders across the province led to the development of 17 standards that focus on the rapid identification and treatment of ST-Elevation Myocardial Infarction, identification of Non-ST Elevation Myocardial Infarction, timely coronary catheterization and best practices pre and post hospital discharge. Algorithms, videos and an annual 'Heart Attack Day' were developed to facilitate knowledge exchange. Areas of current focus include ACS care in remote communities, monitoring and reporting and research. CNSs are well positioned to lead teams to facilitate the harmonization and integration of best practices to improve patient outcomes with ACS.

Chunk and Chew: Nurses' Role in Helping Patients to Understand and Integrate Health Information

Avery, L., Estrella-Holder, E., Szwajcer, A., & Warner, T., Winnipeg, MB

Patients with cardiovascular disease require the ability to acquire, understand and act on health information in order to make appropriate decisions about their health. This ability involves reading, listening, speaking, numeracy and critical analysis, communication and interaction skills. Approximately 60% of Canadian adults are living with low health literacy (LHL). This rate is higher in certain subgroups such as the elderly. The impact of LHL may translate into the inability of patients to adequately self-manage and adhere to the treatment plan. Nurses require the skills to be effective educators; approaching patient education strategically, choosing patient education materials wisely and evaluating understanding. The goal of this workshop is to provide an interactive forum to augment cardiovascular nurses' knowledge, skill and approach to apply health literacy (HL) communication competencies to cardiac patient education. At the end of this workshop participants will be able to: 1) apply HL skills in a "universal precautions" approach; (b) demonstrate the 'teach back' and 'chunk and check' method; (c) effectively integrate written and other education media according to HL principles to improve patient engagement; and (d) have an awareness of available HL resources. Given the prevalence of LHL and the burden of cardiovascular disease it is important that cardiovascular nurses meet the challenges related to HL. With the incorporation of HL communication skills, cardiovascular nurses are in a key position to have a profound positive impact on patient outcomes. Let us learn together and collaborate to be more effective educators.

Knowledge Sources Valued in Clinical Practice: What Nurses Are Saying

Avery, L., Lobchuk, M., Park, C., & Moffatt, M., Winnipeg, MB

The emphasis of empirical knowledge in nursing practice is evident. It is argued that a holistic approach to practice requires the use and valuing of pluralistic knowledge sources. The purpose of this paper is to present part of a quantitative analysis of a mixed methods study that investigated the relationship between nurses' perceived importance of knowledge sources and empowerment. It was hypothesized that clinical practice nurses would perceive empirical knowledge to be the most important knowledge source used in practice. Three vignettes were developed incorporating six knowledge sources identified in the literature. The vignettes were structured around three junctures to reflect a realistic progression of a patient's hospital stay and included the patient's admission, the hospital stay and discharge. Each section included a 'most likely' (reflective of the participant's current practice environment) followed by a 'most desirable' (reflective of the participant's perception of an ideal practice environment) scenario. The mean score for each of the six knowledge sources increased from a 'most likely' to a 'most desirable' scenario for each of the junctures of the vignette. The top three knowledge sources included empirical, esthetic and personal knowledge. Additional analysis of variance comparing knowledge sources demonstrated no statistical differences between the top three knowledge sources. Findings from this analysis were supported by the qualitative component of this study. The practice of cardiovascular nursing care is supported by an approach that incorporates, where appropriate, knowledge obtained from multiple knowledge sources. The results of this study support such a realistic evidence-informed practice environment.

One Size Does Not Fit All: Complex Case Rounds and Decision Making

Avery, L., Scott-Herridge, J., Ducas, R., Seifer, C., Hiebert, B., & Love, R., Winnipeg, MB

The purpose of this paper is to describe how treatment decisions are made for patients with complex medical issues at a local heart centre and how these decisions have impacted patient outcomes. Healthcare must be delivered fairly and cost-effectively. Acknowledging the need for individualized decision making allows heart teams to make the best decision at the right time. Challenges exist, as there is only one specialized cardiac care centre in the province. Careful equitable stewardship of resources is needed to ensure the demand for services may be met. Complex case rounds (CCR) were developed in 2013 to provide a forum for discussion of complex patient cases where the best treatment option is uncertain. CCR are the "showcase"™ rounds for the Cardiac Sciences Program (CSP), with participation from all specialities within the program. Recent proposed opportunities to enhance learning and referrals include: 1) follow-up and discussion of patients previously presented, 2) morbidity reviews, 3) review of outcome data, 4) an ad-hoc heart team process outside of the weekly round schedule, and 5) the participation of nurses in presenting patient cases. Outcome data for 238 patients discussed between November 2013 and October 2017 demonstrate that when recommendations are followed outcomes include a reduction in emergency room visits and hospital re-admissions. Cardiovascular nurses' contributions and knowledge about their patients are important in the consideration of various treatment decisions and their active contribution at CCR is important to this decision making.

Exploring the Relationship between Self-Efficacy, Physical Activity, and Cardiovascular Risk in Women at Moderate to Higher Risk for Cardiovascular Disease

Banman, L., Sawatzky, J., Avery, L., & Duhamel, T., Winnipeg, MB

Women are at significant risk for cardiovascular disease (CVD), and this threat increases dramatically with age. Physical activity (PA) has been shown to reduce the risk of CVD in women. Furthermore, self-efficacy has been identified as a strong predictor of whether a woman will engage in this health behaviour. As part of a larger intervention study, and guided by the Health Promotion Model, we utilized baseline study data to explore the association between self-efficacy, PA, and CVD risk in a sample of older women (>55 years), at moderate/high risk for CVD (N=120). On average, the participants were 68 years old, overweight, highly educated, and highly active. Data analyses revealed no significant correlation between cardiac risk and self-efficacy. However, there was a positive correlation between BMI and frailty, and a general decline in physical fitness (6-minute walk test; 6MWT) with increasing age. Frailty also emerged as a significant predictor of exercise self-efficacy. Moderate self-reported physical activity and the 6MWT were the only activity measures to significantly predict any of the self-efficacy variables. These findings suggest cardiovascular nurses should incorporate self-efficacy and frailty into their CVD risk assessments and risk reduction strategies for aging female patients. This study provides novel research evidence regarding the influence of frailty on the exercise self-efficacy of aging women at risk for CVD. The findings also support emerging data related to the relationship between BMI and frailty. Thus, this research establishes foundational evidence for future nursing research in this area.

Differences in Prescribed Cardiac Medications and Five-year Mortality between Manitoba First Nations and Non-First Nations Angiography Patients

Dahl, L., Schultz, A., Thronsdon, K., McGibbon, E., Sawatzky, J., Nguyen, T., Katz, A., Sinclaire, M., & Cook, C., Winnipeg, MB

Improved pharmacological therapies for management of cardiovascular disease (CVD) have contributed to lower mortality rates. This study explored guideline-recommended cardiac medication prescriptions among First Nations (FN) and non-FN patients following angiography, and whether rates of filling prescriptions over the following year (medication use proxy) explained CVD mortality disparities. Patients who had an AMI in the seven days prior to angiography, or were revascularized within a year post-angiography were included in the study. Medications analyzed were beta-blockers, ACE-inhibitors, statins, and clopidogrel. Medication possession ratios (MPR) were calculated for one-year period post-angiography. Patients were assigned to one of four categories: 1) not dispensed; 2) low MPR (<40% MPR); 3) intermediate MPR (≥40% to ≤79% MPR); and 4) high MPR (≥80% MPR). Cox proportional models adjusting for baseline characteristics and MPR categories examined difference in the five-year all-cause and cardiovascular mortality outcomes between FN and non-FN patients. FN patients had a higher proportion of dispensed ACE-inhibitors and clopidogrel, lower proportion of dispensed statins, and similar proportion of dispensed beta-blockers, compared to the non-FN group. FN patients had a 50% increased risk of all-cause mortality and a 38% increased risk of cardiovascular mortality after controlling for baseline characteristics, and including the MPR categories only slightly moderated the risk. FN patients had higher all-cause and CVD mortality than non-FN patients, even after controlling for the use of guideline-recommended medication. Although secondary prevention is essential to cardiac health, it is important that nurses have specific knowledge about FN cardiac impacts of the social determinants of health.

Metal Hypersensitivity Screening in Inpatient Cardiac Care Settings

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There is an increased risk of adverse events among patients with metal hypersensitivity undergoing procedures involving metal implantation. Studies show that patients with hypersensitivity to the compositions of coronary stents (iron, nickel, molybdenum or chromium) were 2.7 times more likely to experience in-stent restenosis compared to those without metal hypersensitivity. Similar findings are reported in patients undergoing orthopedic, dental and neurosurgical procedures. Pre-procedural screening of metal hypersensitivity could mitigate the risk for adverse events, however, there abound anecdotal evidence that clinicians including nurses do not inquire about metal hypersensitivity in the prospective patient. A recent study found two simple questions "Do you get rashes when jewelry touches your skin" or "Do you get rashes when metal touches your skin," have high sensitivity in identifying patients who might potentially experience adverse outcome. In this current study we aim to survey frontline nurses about allergy screening to determine the current allergy screening procedures and to create awareness about metal hypersensitivity screening. A cross-sectional study is planned with the goals to explore the current pre-procedure metal hypersensitivity screening among frontline nurses, explore perceived barriers to implementing this evidence into clinical practice and evaluate the uptake of the metal hypersensitivity screening by clinicians. Data analysis will include descriptive data (i.e. frequencies and percentages) of metal hypersensitivity screening among patients admitted into inpatient cardiac care settings. Qualitative data about barriers to implementation will also be included. We expect high uptake of metal hypersensitivity screening and mixed results with regards to the association between metal hypersensitivity and adverse patient outcomes.

Exploring Perception of Cardiovascular Disease Risk in Female Nurses

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Globally, cardiovascular disease (CVD) is the leading cause of death in women. Although an accurate perception of CVD risk may influence risk factor reduction behaviours, few studies have explored actual and perceived risk in healthy women of all ages. Therefore, the purpose of our study was to explore actual and perceived risk for CVD in women across the lifespan. This cross-sectional survey study included a convenience sample of female registered nurses with no history of CVD, residing in Winnipeg, Manitoba (N=816). Data analysis included descriptive, bivariate, and multivariate procedures ($p<.05$). The results revealed a significant positive correlation between actual and perceived risk of CVD in the study participants. Perception of CVD risk was significantly related to age, fearing CVD as their greatest health risk, having discussed CVD risk with their primary HCP, and a positive family history of CVD. Although most participants (76%) reported a family history of CVD, only 27.5% had discussed CVD risk with their primary healthcare provider and many (~60%) were not aware of any current CVD prevention campaigns. The findings of this study are significant, as they provide novel insights into the perception of CVD risk among women across the lifespan. Nurses are ideally situated to develop strategies to promote accurate risk perception in their peers and their female patients. As well, nurses can play a central role in improving CVD outcomes in women by advocating for more effective CVD risk assessment and awareness strategies for cardiovascular health promotion in women of all ages.

Time is "Tick"ing: A Case Study of Lyme Disease-Related Carditis

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Lyme disease is caused by the bite of black legged ticks carrying Borrelia burgdorferi. Approximately one third of the 6,209 cases of Lyme disease reported in Canada between 2009 and 2017 occurred in 2017 alone. Along with the classic clinical manifestations of Lyme disease, B. burgdorferi can infect all layers of the heart, the valves, and the aorta. This inflammatory process can affect electrical conduction and cause atrioventricular (AV) block arrhythmias. Cardiac manifestations are rare; only 4-10% of patients develop cardiac complications. However, delays in diagnosis and treatment can affect patient outcomes. A case report will be used to highlight the significance of this rare, but increasing threat to Canadians. Mr. P., a male in his early forties with no significant medical history, presented with a two- to three-week history of fever, chills, general malaise, and decreased appetite. On his second presentation to hospital, a small, red target-like rash on his central chest had spread to his shoulders and abdomen and he complained of joint and muscle pain. He was found to be in third degree heart block. The details of the case, including treatment and patient outcomes will be discussed in this presentation. Lyme disease-carrying ticks are moving into more areas in Canada at an alarming rate. Therefore, the number of patients with Lyme disease will also undoubtedly also increase. This case report highlights the key role of cardiovascular nurses in prevention, early detection and treatment of the rare, but dangerous cardiac complications of Lyme disease.

Let's Talk About Illicit Drugs: When Drug Use and Hospital Care Collide

Hyde, E., Gilchrist, S., & Throndson, K., Winnipeg, MB

Healthcare facilities within the Winnipeg Regional Health Authority have been challenged with increasing emergency room visits and hospital admissions related to injection drug use. The Cardiac Sciences Program has seen a 125% increase in infective endocarditis in the past year. While these patients require expert cardiac nursing care, the challenge of balancing the competing priorities of substance use and the long course of antibiotic treatment requiring hospitalization can strain this nurse-patient relationship.

Recognizing this strain and realizing that healthcare providers' lack of knowledge about this patient population, we decided to facilitate education session for nurses at our healthcare facility. Emphasis was placed on understanding the substances and how they impact patient behaviour, harm reduction philosophy and language, and nursing regulatory responsibilities. The overwhelming response to these educational sessions has led to development of a framework, tangible tools, and further educational sessions. The framework ensures alignment with existing resources. The tangible tools include communication tools for communicating both with people who inject drugs and families of this population. The content of the educational sessions was drawn from feedback to the prior sessions. The increase in endocarditis related to increased use of injection drugs throughout Canada has highlighted the need for nursing to develop expertise in providing care to this patient population. Attitude, language, and acceptance are crucial components to a therapeutic relationship and are necessary to ensure that people who inject drugs feel valued, safe, and cared for by staff in our hospitals.

Let's Talk About Sex: Sexual Activity Education Needs of Couples Following Diagnosis of Acute Coronary Syndrome Using Interpretive Description

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More than 70,000 Canadians are diagnosed with acute coronary syndrome (ACS) annually. Discharge and follow-up education related to sexual activity is not routinely provided, resulting in increased uncertainty, depression, and anxiety. The purpose of this study is to explore sexual activity educational needs of adults newly diagnosed with ACS and their partners. The research question is "What are the sexual activity educational needs of couples following diagnosis of ACS?" An interpretive descriptive design will be used to explore this complex rehabilitation phenomenon in a way relevant and useful to nursing practice. Using purposive sampling, adults with ACS and their partners will be recruited upon discharge from a cardiology unit. Inclusion criteria include adult couples in which one person was diagnosed with ACS within the last month, and an ability to read, speak, and write English. Exclusion criteria are ACS complicated by a stroke, a treatment plan for cardiac surgery, and an inability to read, speak, and write English. Semi-structured, digitally recorded interviews will be conducted with 10 to 15 couples. Digital recordings will be transcribed verbatim. Additional data sources are clinical practice guidelines and the researcher's reflective journal. Data will be analyzed using constant comparative methods and thematic analysis for common educational needs. Preliminary findings will be emailed to participants to critically consider. Multiple data sources and the member check will contribute to trustworthiness. The findings will provide a basis for the co-creation of an innovative, state-of-the-art educational tool to meet the sexual activity education needs of adult couples with ACS.

Smoking Cessation Volunteer-Led Program

Krauter, M., Sohrabipour, S., Chen, R., & May, E., Newmarket, ON

Canadian smoking cessation guidelines emphasize the importance of healthcare provider interventions, in particular, offering assistance through brief interactive sessions regarding tobacco use, and offering nicotine replacement therapies and other smoking cessation medications to improve the chances of a successful quit attempt (CAN-ADAPTT, 2011). Predictable tobacco-illness trajectories often result in smokers accessing the healthcare system for health-related concerns. Hospitalizations provide a unique opportunity for intervention, as a tobacco user's motivation to quit is increased during this time of vulnerability (Rigotti, Munafo, & Stead, 2007). The ideal hospital-based interventions demonstrate successful long-term abstinent rates. However, they rely on sustainable financial and personnel resources that are not guaranteed province- or country-wide. In an attempt to address the lack of smoking cessation initiatives at the in-patient level, Southlake Regional Health Centre has trialed an alternative volunteer-led model. The Smoking Cessation Volunteer (SCV) program aims to assist in identifying tobacco-using patients on hospital admission, followed by provision of emotional support and practical assistance through patient education, community resource identification, and facilitating follow-up post hospitalization. While healthcare providers continue to deliver guideline-directed smoking cessation counselling and pharmacotherapy, SCVs have the time necessary to provide emotional support and assist in layman's interpretation of smoking cessation information shared during counselling. They also assist the patient in identifying community resources that resonate with their current status, geographical location, and readiness to quit. SCVs may provide an alternative medium for information dissemination and smoking cessation support. Current investigations are being conducted to further evaluate this model.

Virtual Heart Failure Management in the Long Term Care Setting

Krauter, M., Wilson, M., & Porepa, L., Newmarket, ON

Heart failure (HF) disproportionately affects long-term care home (LTCH) residents, accounting for significant mortality rates and unplanned transfers to acute care facilities. Although multidisciplinary HF management programs improve patient outcomes and hospitalizations, LTCH residents have limited access to this care compared to community-dwelling adults. There is a paucity of data to help guide HF care in the LTCH setting. As a result, an optimal approach to this patient population has not been established. The purpose of this pilot study is to determine whether a collaborative care model via a virtual specialized heart function focused clinic will offer an opportunity to improve management and prevent HF exacerbations in this vulnerable patient population. Southlake Regional Health Centre HF Program provides videoconferencing follow-ups with LTCH patients recently discharged from a HF-related hospitalization. The goals of this program are: 1. Promote interprofessional relationships between LTCH healthcare providers (general practitioner and nurse practitioner-led outreach teams) and HF specialists to facilitate long-term HF chronic disease management, 2. Improve communication and continuity of care at transition points, and 3. Address educational needs for nursing, patients and caregivers. Data will be collected from the patient electronic medical record and paper chart review. Outcomes include hospital readmission rates, hospital length of stay, compliance with guideline-directed therapy and stakeholder satisfaction. Results of this pilot study will inform the development of an optimal care plan to address chronic HF management in the LTCH patient population.

Moving Safely After Heart Surgery: A Single Centre's Journey to Individualize Sternal Precautions after Median Sternotomy

Landry, B., & Warren, S., Winnipeg, MB

The purpose of this paper is to describe a recent change in practice in safely ambulating cardiac surgery (CS) patients post median sternotomy. A median sternotomy allows access to the heart, the mediastinal structures, and great vessels during cardiac surgery. Once the sternum is closed, stainless steel wires are used to stabilize the sternum until it heals, which will take six to eight weeks. Sternal precautions protect the sternum during this time to prevent any movement or strain that may disrupt this process and cause complications or instability. Our traditional approach was restrictive regarding weight and range-of-motion activities, and was not individualized or evidence based. This resulted in CS patients”™ experiencing difficulty moving within the limitations and complete tasks important to them once home, or conversely being kept in hospital additional days, as they could not transfer or mobilize within these restrictions. “Moving Safely” is a novel approach to sternal precautions at St. Boniface Hospital based on kinesiological principles of movement that was implemented in July 2018. A physiotherapist-led multi-disciplinary team solicited feedback from cardiac surgeons and the CS program, developed resources, and trained multiple disciplines in an effort to improve patients”™ functional outcomes and decrease length of stay without negatively impacting sternal dehiscence rates. This presentation will outline the steps involved in the change, as well as the resources, training experiences and anecdotal outcomes and impact on practice to date.

Turning Cardiac Health Education on its Head: A KTE Initiative based on the Educational Preferences of Clinicians and Women with Heart Disease

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Background: Dispelling the Differences in Cardiac Prodromal Symptoms between Women and Men; a multi-media Knowledge Transfer Exchange strategy, was the premise of this research project to provide evidenced-based knowledge and information of preclinical early warning signs of the development of coronary artery disease.

Objectives: Through a user-centred design, in partnership with community (Heart Niagara), academic/clinical (Brock University/Niagara Health) and scientific partners (Canadian Council of Cardiovascular Nurses) and affected citizen knowledge user groups (Cardiac Health Foundation of Canada), we: 1) developed, designed and delivered critical education on cardiac prodromal symptoms, and 2) provided on-line access to evidenced-based information/research on cardiac prodromal symptoms in the form of educational materials, e-resource products for future educational use and reference.

Methods: In order to ensure information and education about the early warning signs of heart disease was getting to women and healthcare providers (HCPs) in ways they would be able to use and uptake knowledge we conducted qualitative interviews. Interviews occured with four HCPs, and eight women with ischemic heart disease. Semi-structured interviews were completed, and data were analyzed by themes using NVivo10. Participants were asked how they currently access information, and what kind of messaging and education would make an impact on their learning and retention.

Results: HCPs wanted information that was research-based, and easy to access in a timely manner. For example, when HCPS have a few minutes between patients. To meet their need, the Health Care Professional section of the website sokeefemccarthy.ca was created. This has infographics, research summaries, and voice over narrations of current prodromal research.

Women wanted educational information that was also easy to access. To meet their needs, 1) an online version of the Prodromal Symptoms-Screening Scale [PS-SS] was created, and provides a way to initiate the conversation about heart disease to their HCP, 2) a video of women talking about their prodromal symptom (PS) experiences, 3) research summaries and videos with information about PS, 4) informational strategies at events, and 5) infographics about these resources.

Conclusion: These evidence-based knowledge dissemination products and resources are available on the Heart Innovation Research Program website. This knowledge transfer exchange strategy continues to generate active engagement of end users regionally, provincially and nationally. Follow up electronic analytics of the level of e-engagement will be conducted to determine the effect and relevant knowledge dissemination uptake to our respective target audiences.

The Content Validity of the Prodromal Symptoms-Screening Scale [PS-SS]: An Expert Panel

Ostrowski, L., Heedo-Lee, W., Tsang, J., & O'Keefe-McCarthy, S., St. Catharines, ON

Background: The Prodromal Symptoms-Screening Scale (PS-SS) is a tool that guides both patients and clinicians to identify encroaching heart disease, explore problematic symptoms, and assess individuals at risk. However, prior to the PS-SS being used in clinical practice, we needed to determine the content validity index (CVI).

Methods: A purposeful sample of clinical and scientific experts and affected citizens rated the relevance of each item using a four-point scale. The content validity was completed for each item (I-CVI), as well as the total scale expressed as the mean item CVI (S-CVI/AVE). Items with an I-CVI greater than 0.7 were retained. Items with an I-CVI ranging from 0.5-0.7 were revised and clarified. Items containing an I-CVI less than 0.5 were discarded, unless supported by current scientific literature.

Results: Seventeen panel members were approached to rank the PS-SS. Of these, nine fully completed the ranking package; (53% response rate). Of these, six experts included (two nurse practitioners, three critical cardiovascular registered nurses and one physician) and three were individuals with heart disease. Item CVI's ranged from .50 to 1.0. No items were removed, as all were supported and validated by clinical, patient and scientific literature for inclusion. The total content validity index score was 0.81, which indicates strong content validity. The inter-rater reliability for raters that scored items as quite relevant 3 or 4 extremely relevant was 0.77, which indicates good agreement between raters.

Conclusion: The content validity, the first step in psychometric evaluation of construct validity of a measurement tool, was established at 0.81 with strong inter-rater reliability at 0.77. The PS-SS has potential to provide proactive screening of individuals at high risk for CAD.

Differences in Five-year Outcomes and Follow-up Care Post Index Coronary Angiography among First Nation People and all other Manitobans

Schultz, A., Dahl, L., Throndson, K., McGibbon, E., Sawatzky, J., Elbarouni, B., Cooke C., Brownlie, J., & Fransoo, R., Winnipeg, MB

Evidence demonstrates higher rates of acute myocardial infarctions (AMI), Ischemic Heart Disease (IHD) hospitalizations, and mortality among First Nation (FN) people, compared to the general population. While explanations generally focus on individual behavioural choices, historical and persistent colonial practices also influence health status and access to healthcare. In this study, we compared health and treatment outcomes among FN and non-FN patients, while controlling for age, sex, socio-economic status, rural/urban residence, co-morbidity, and revascularization procedures. A retrospective study of health administrative data for all Manitoba adult index coronary angiography (ICA) recipients from 2000/01-2008/09 was conducted. Recipients were stratified into AMI and non-AMI groups. Adjusted Cox proportional hazards models estimated associations between ethnicity and five-year all-cause mortality, cardiovascular mortality, cardiovascular-related hospitalizations, PCI, and CABG procedures. The likelihood of visiting a family physician, internist, or cardiovascular specialist at three months and one year post AMI was analyzed. In total, 25,816 ICAs were identified (AMI = 6,497; non-AMI = 19,319). In both groups, FN recipients had increased all-cause and cardiovascular mortality, and increased rehospitalizations for AMI, congestive heart failure, IHD, and all-causes within five years. FN recipients were less likely to visit a family physician, internist, or cardiovascular specialist within three months, or within one year of angiography. FN patients in both groups experienced worse health outcomes, even after controlling for individual characteristics. Furthermore, FN patients seem to face disparity in access to follow-up care with family physicians and specialists. Some may be receiving follow-up care from nursing stations, where there is likely limited access to expert cardiac consultation.

Listening and Learning about How to Improve Heart Health Care among First Nation Peoples

Throndson, K., Schultz, A., Sinclaire, M., & Sawatzky, J., Winnipeg, MB

Cardiovascular-related disparities among First Nation populations are increasing, which includes higher morbidity and mortality when compared to non-First Nation Canadians. While health disparities among First Nation people are often explained by the presence of various individual risk factors, emerging evidence suggests that historical and persistent colonial practices equally influence health status. Moving towards a greater understanding of issues requires looking beyond individual lifestyle and behaviour choices, to recognize how attitudes, behaviours, and institutions in healthcare shape access to care. In this presentation we will share the results of a meeting held with First Nations health leaders, health professionals, and academics involved in cardiac care services to explore issues around cardiovascular health among First Nations people and to identify key priorities from their perspectives. Eighteen people attended the one-day facilitated meeting. Through our collaborative discussions five key themes concerning health priorities specific to heart health emerged: access, relocation and emotion, bureaucracy, cultural barriers, colonialism, and prevention and education. In this presentation each theme will be addressed, including strategies for nurses to enhance their support and care of First Nation People. Nurses are at the forefront of healthcare service delivery and, as such, can play an integral role in improving the experiences of First Nation people seeking cardiac care. In the current era of reconciliation, integrating such strategies into your daily practice holds the potential to improve cardiovascular care and heal relations with First Nations people, now and in the future.

Cardiac Surgical Unit Advanced Life Support (CSU-ALS)

Warren, S., & Landry, B., Winnipeg, MB

Less than 3% of patients experience cardiac arrest following cardiac surgery and historically there has been a wide variation in survival to discharge. Advanced Cardiac Life Support (ACLS) is a well-established protocol for attempting to improve survival to discharge outcomes in both out of hospital and in-hospital cardiac arrest. However ACLS protocols do not address the unique causes of arrest in the post-cardiac surgery population and may, in fact, cause harm.

CSU-ALS is an alternate approach in which two studies have shown a four-fold increase in survival to discharge when utilized in patients with a median sternotomy less than 10 days post-op, instead of proceeding to ACLS.This interactive presentation will incorporate case studies and audience polling, as it reviews cardiac arrest scenarios in out of hospital, in-hospital and post cardiac surgery patients. The main reasons patients arrest after cardiac surgery, as well as the components of the ACLS protocol that have the potential to cause harm in this population and the alternative CSIU-ALS algorithm will be illustrated. The Society of Thoracic Surgeons 2017 expert consensus statement for the resuscitation of patients who arrest after cardiac surgery will be reviewed, as well as the CSU-ALS process including expectations for each of the six roles and the re-sternotomy team will be discussed.

Adoption of CSU-ALS algorithm by nursing, and the team ensures an approach to resuscitation that has the potential to increase survival to discharge in post cardiac surgery patients.

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