

RECOVERY AND CARDIAC REHABILITATION (CR) FOR WOMEN



LAND ACKNOWLEDGEMENT

I would like to acknowledge that the land on which I live is the traditional unceded territory of the Wolastoqiyik (Maliseet), Passamaquoddy and Mi'kmaq Peoples. This territory is covered by the "Treaties of Peace and Friendship". Today, this meeting place is still the home to many Indigenous people from across Turtle Island and I am grateful to have the opportunity to live and work on this land.



Disclosure Statement

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This presentation was prepared by Dr. April Pike, Dr. Kajenny Srivaratharajah, Ms. Helena Van Ryn, Dr. Martha Mackay and reviewed by members of the Canadian Women's Heart Health Alliance.

The University of Ottawa Heart Institute is the convening body of the Canadian Women's Heart Health Alliance, which is a network of experts and advocates from across Canada aiming to improve women's cardiovascular health across the lifespan.



Visit CWHHA.ca for more information.

Learning Objectives

At the end of this module, you will be able to:



Explain the benefits of cardiac rehabilitation (CR) for women living with cardiovascular disease.



Identify barriers that deter women from participating in CR.



Describe factors that may increase women's participation in CR.



Summarize the main components of a CR program.



CASE STUDY | Ms. M.L.



- 47 year-old Caucasian woman, being discharged 4 days post-NSTEMI
- Coronary angiography showed non-obstructive coronary artery disease medical management recommended
- Past medical history:
 - Hyperlipidemia discharged on rosuvastatin 20 mg OD
 - Hypertension discharged on ramipril 5 mg OD
 - Smoking 1 pack cigarettes/day
 - Body mass index (BMI) 32
- Anxiously waiting to talk with someone about how she should manage her cardiovascular health at home. She has several burning questions.





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CASE STUDY Ms. M.L.'s Questions





Participation in CR: Benefits

- **Goal of CR:** "restoration of optimal physiological, psychological and vocational status, and reduction of risk of cardiac morbidity and mortality."
- A Cochrane review demonstrated **26% reductions** in cardiovascular (CV) mortality and **18% reduction** in re-hospitalization in patient referred for CR compared to controls.
- Acute coronary syndrome (ACS)/coronary artery disease (CAD) quality indicators includes referral to CR as a CORE element of care.
- The American Heart Association (AHA) and Canadian Association of Cardiac Prevention and Rehabilitation (CACPR) state CR should be mandated for all eligible women.





Participation in CR: Barriers

What do you think are the key factors that deter women from engaging in CR Programs?

Referral Bias:



Fewer women are referred to CR than men. Men are 1.5 times more likely to be referred to CR. In Ontario, only **52%** of patients are referred post revascularization & only **39%** in Alberta.



Lower participation in CR occurs in women, ethnic minorities and those with a lower socioeconomic status.



Even if referred, only about 1/3 of patients participate in CR post myocardial infarction (MI)!

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Participation in CR: Barriers (cont.)





Barriers to Participation by Women in Cardiac Rehabilitation/Secondary Prevention Programs

Type of Barrier	Examples	
Financial	Low income	
	Transportation issues (cost and time)	
	Medical insurance coverage issues	
Social	Racial/ethnic minority	
	 Family responsibilities and stressors 	
	Low education levels	
Lifestyle	Smoking	
	Physical inactivity	
Comorbidities	Obesity	
	Diabetes mellitus	
	Previous MI	
	Other health issues or beliefs	
Institutional	Limited physician referrals	
	Long waiting lists	
	Hours of operation that conflict with work schedules	
	Location of service	

Adherence



⁴Grace, S.L. et al. 2014. Progress in cardiovascular diseases. 56(5): 530-535. ⁵Supervia, M. et al. 2017. Mayo Clinic Proceedings. 92(4): 565-577.



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Comorbid Conditions Associated With an Increased Risk of CVD in Women

Comorbid Condition	Impact on Women's Heart Health	
Polycystic ovary syndrome	 Associated with obesity, insulin resistance, hyperinsulinemia,⁸ metabolic syndrome,^{8,9} dyslipidemia,^{10,11} impaired glucose tolerance, type 2 diabetes mellitus,¹² and obstructive sleep apnea.^{13,14} 	
Autoimmune disorders (eg, rheumatoid arthritis and systemic lupus	 2 to 10 times more common in women.¹⁵ Associated systemic inflammation increases the risk of premature atherosclerotic CVD, as well as many other cardiovascular disorders of the myopericardium, valves, and conduction system.¹⁶ 	
erythematosus)	 Associated chest, jaw, neck, shoulder, or back pain; fatigue; dyspnea; and exhaustion can be difficult to differentiate from clinical CVD symptoms and may delay recognition of a CVD diagnosis.¹⁷ 	
Breast cancer	 Breast cancer survivors are more likely to die from CVD.^{19–21} 	
	 Cancer treatment—related cardiac toxicity can occur with anthracycline-based chemotherapy, trastuzumab-targeted therapy, and radiation therapy (left-sided breast cancer); noninvasive cardiac testing can be used to detect cardiovascular toxicity.²⁰ 	
Chronic kidney disease	 Women with reduced kidney function are at greater risk of CVD than men.²¹ 	
	 Hypertensive disorders of pregnancy and gestational diabetes mellitus increase the risk of chronic kidney disease progression.²² 	
	Women on dialysis have a CVD mortality rate similar to age-matched men. ²³	
Depression	 Incidence is 2 times higher in women than in men.^{24,25} 	
	 Increases a women's risk for a cardiac event by 50% to 70%^{26,27} and correlates with fatal cardiac events in postmenopausal women.²⁸ 	
	 Almost 2 times more women than men experience depression after cardiac diagnosis^{29,30}; younger women are particularly susceptible.³¹ 	
	 Post-MI depression increases by 2 to 3 times the risk of all-cause mortality, cardiac mortality, and cardiac morbidity.³² 	

CVD indicates cardiovascular disease; MI, myocardial infarction.

Other barriers

- Women with disabilities
- Geographic disparities
- Ethnic minorities
- Religion
- Socioeconomic status
- Education
- Sexuality/gender

Keys to Success

- Self-management
- High degree of **self-efficacy**
- Strong **social support network** critical to program adherence
- Home based CR models or hybrid programs for those with barriers to attending structuredoutpatient programs.
- Program models using mobile phones, the internet and other communication technologies.





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Components of CR





Smoking cessation



Exercise r



Stress management



Nutrition



Psychosocial support



Risk factor

management

(DM, HTN,

HCHOL)



Behaviour change/ motivational interviewing



⁷CACPR. 2009. 3rd Edition.

Behaviour Change: Healthcare Professional's Role



- Communicate benefits/risks of not making health behaviour changes.
- Help develop realistic personal goals.
- Discuss level of self-efficacy and address barriers to goal attainment.
- Identify key areas requiring education and treatment.
- Referral to appropriate resource.
- Regular follow-up and evaluation of progress.
- Reinforce adherence to medications and CVD management strategies.



Nutrition Advice | Ms. M.L.

What nutritional advice would you give Ms. M.L.?



Nutrition

Diet linked to dyslipidemia, reduced vascular endothelial function, decrease physical inactivity, Type II diabetes, hypertension & obesity.



The INTERHEART Study: 8/9 modifiable factors linked to risk of MI influenced by diet.



Diets low in saturated fats, trans fats and cholesterol but high in nutrient dense, **fiber-rich plantbased ingredients reduce the risk of CVD.**



Nutritional counselling can help women reduce blood glucose, cholesterol levels and target a healthier body weight.



10 Tips for Healthy Eating

- 1. Plan your meals and cook at home.
- 2. How you eat is as important as what you eat.
- 3. Listen to your body. Eat when you're hungry and stop when you feel satisfied.
- 4. Eat at regular times. Eat breakfast within 1 to 2 hours after waking up.
- 5. Plan healthy snacks.
- 6. Eat a variety of vegetables and fruit at every meal.
- 7. Eat whole grains more often.
- 8. Eat fish at least twice a week.
- 9. Include legumes like beans, chickpeas, lentils, nuts and seeds more often.
- 10. Don't be afraid of fat You need fat for good health and it adds flavour to your cooking.



Dyslipidemia

Statin therapy targets to decrease the risk of CVD events and mortality:

- LDL-C level consistently <2.0 mmol/L or
- >50% reduction of LDL-C

Consider more aggressive treatment in higher-risk individuals:

- In those with recent ACS and established CVD, consider more aggressive targets (LDL-C <1.8mmol/L or >50% reduction) (IMPROVE-IT)
- May require combination of ezetimibe & maximally-tolerated statin



Diabetes

"ABCDES" to reduce heart disease and stroke in diabetes

A A1C target $\leq 7\%$

- **B** BP control less than 130/80
- C Cholesterol- LDL less than 2.0 mmol/L
- D | Drugs with evidence for vascular protection and cardiovascular outcome benefits (ACEI/ARBs, SGLT-2 Inhibitors and GLP-1 receptor agonists)
- E Exercise/eating- Maintaining a healthy weight is key. Regular physical activity, weight-loss management and healthy eating.
- **S** Smoking cessation and stress management



⁹Diabetes Canada Clinical Practice Guidelines Expert Committee. (2018). Can J Diabetes. 42(1): S1-S325.

Smoking Cessation

Considerations in Women



3x MI risk among premenopausal and middle-aged women who smoke, compared to men.



Women who smoke more than 25 cigarettes/day have higher prevalence of hypertension.



Combination nicotine replacement therapy (NRT) is more effective than placebo (OR 2.73, 95% CI 2.07–3.65) or nicotine replacement monotherapy.



²¹Stachenko, S. J., et al. (1992). CMAJ, 146(11), 1989.
 ²²Woolf, S.H. JAMA 1999: 282 (24) 2358-65
 ²³Cahill, K., et al. (2013). Cochrane database of systematic reviews, (5).

Smoking Cessation (cont.)

Types of approaches



Smoking cessation support should be more affordable to vulnerable populations



²⁴Hemsing, N., et al.(2015). Journal of social work practice in the addictions, 15(3), 267-287.

Hypertension | Ms. M.L.

How can Ms. M.L. improve her blood pressure?



Hypertension



• Higher rates in **post-menopausal women (>65 years of age)**

ANADIAN WOMEN'S

ART HEALTH CENTRE

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- Can be associated with **diverse symptoms including**:
 - Chest pain
 - Intra scapular pain
 - Fatigue
 - Headaches
 - Hot flashes
 - Poor sleep patterns
 - Arrhythmias
 - Shortness of breath

Hypertension (cont.)

- Can be prevented by **controlling dietary and lifestyle risk** factors.
- Restrict sodium intake to less than 2,000 mg (1 teaspoon) /day.
- Weight reduction if overweight (5-10% of body weight).
- Target **physical activity** of 150 minutes/week.
- **Monitor blood pressure** (<135/85, <130/80 for pts with diabetes; if no contraindications, can pursue more aggressive targets such as SBP<120 (SPRINT).
- Initiate **pharmacological therapies** (ACE Inhibitor/ARB, betablocker).





Physical Activity

Regular physical activity is one of the most powerful health promoting practices that clinicians can recommend for patients



150 minutes of moderate- to vigorous-intensity aerobic physical activity per week / 10+ minute bouts. ß

Muscle and bone strengthening activities using major muscle groups X 2 days per week.

The goals of a health– related resistance training program:

- Make activities of daily living less stressful.
- Prevent chronic disease and health conditions (eg. osteoporosis, Type-2 diabetes, obesity).



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¹²Warburton, D. E., Nicol, C. W., & Bredin, S. S. (2006). Cmaj, 174(6), 801-809.
 ¹³Colbert, J. D., et al. (2015). European journal of preventive cardiology, 22(8), 979-986.
 ¹⁴American College of Sports Medicine. (2018). Wolters Kluwer publisher, 480 pages.

Physical Activity | Ms. M.L.

What kinds of exercise do you think Ms. M.L. should be doing to improve her CV health?

Endurance activities are continuous activities (e.g., walking)

Strength activities, such as weight training, strengthen muscles and bones and improve posture. Aim for similar activities at least two times a week. Flexibility activities, such as yoga, housework or golfing keep your muscles relaxed and your joints mobile. Balance activities include standing on one foot or standing on your toes while holding onto the back of a chair.

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Stress Management | Ms. M.L.

How can Ms. M.L. reduce her stress?



Stress

- Women report lower quality of life and higher stress levels than men.
- **Social context:** women experience CVD different than that of men.



- Have lower education levels
- Lower occupation status and earn less money
- Are more likely to be single parents
- Traditionally assume more caregiver responsibilities and household tasks
- "Sandwich Effect"
- Prevalence of depression in women attending 12-week cardiac rehab decreased from 23% to 12%





Stress Management For Women

- Screen women for stress and factors contributing to stress.
- Relaxation/breathing training beneficial for certain subgroups (e.g., ICD recipients)
- Consider pharmacological therapy.
- Refer to qualified professional (e.g., psychologist, social worker) for counseling or stress management program.
- Psychosocial support is **IMPORTANT**
 - Women less likely to have a caregiver
 - Screen and refer to addiction program if substance misuse
 - Screen for anxiety (e.g. GAD-7), depression (e.g. PHQ-9)
 - Screen for sleep problems
- Offer of community services, programming and resources.





Traditional CVD Risk Factors and Their Impact on Women's Cardiovascular Health

Traditional Risk Factor	Implications for Women	
Smoking	Single-most modifiable risk factor for developing MI. ³⁵	
	 Increases the risk of CVD in women aged <55 years by 7 times.³⁵ 	
Hypertension	• Prevalence and incidence higher in women than men aged >60 years. ³⁶	
	• Poorer hypertension control in women than men aged >60 years. ³⁷	
	 Women treated with antihypertensive medications have higher systolic blood pressures than men.³⁷ 	
	Additive interaction between current smoking and hypertension on IHD incidence in women. ³⁸	
Diabetes mellitus	• Women with diabetes mellitus are at a 2 to 4 times greater risk for IHD compared with men with diabetes mellitus. ^{39,40}	
Obesity	More women than men in Canada are overweight and obese. ⁴¹	
	 Metabolic effects of obesity are associated with increased CVD risk.⁴¹ 	
Physical inactivity	 Across all ages, women are less physically active⁴² and spend more time in sedentary activities.⁴³ 	
Cholesterol	• Low HDL cholesterol is a stronger predictor of IHD mortality in women than in men, especially in women aged ≥65 years. ⁴⁴	
	• Elevated LDL cholesterol, a strong predictor of IHD risk in women aged <65 years, is less predictive in older women. ⁴⁴	
Stress	 Women may be more vulnerable to the adverse effects of psychosocial stress, occupational stress, and sleep disturbances, increasing their risk of CVD.⁴⁵ 	
	• Disproportionately more unpaid housework and family responsibilities may exacerbate and sustain high stress levels because of conflicting demands. ⁴⁵	
	Discrimination and gender roles may further increase the environmental psychosocial stress, as may sex and gender differences in stress responses. ^{40,46}	

CVD indicates cardiovascular disease; HDL, high-density lipoprotein, IHD, ischemic heart disease; LDL, low-density lipoprotein; MI, myocardial infarction.

Sex Differences for Pharmacologic Therapy for IHD

Treatment	Sex Differences	Pregnancy
ACE inhibitors	 Women are 1.7 times more likely to be ACE inhibitor intolerant.¹⁰⁵ 	ACE inhibitors and ARBs are pregnancy category C (animal studies have shown an adverse effect on the fetus) for the first
ARBs	 Maximum serum concentrations (given the same dosage) of losartan and telmisartan are 2 times higher in women than in men.¹⁰⁶ 	trimester of pregnancy and are category D (human fetal risk has been shown) during the second and third trimesters ⁷⁸
	 No sex-specific restrictions for ARBs, except for pregnant and lactating women¹⁰⁷ (see box below on pregnancy). 	
Aspirin	 Platelet inhibition effect of aspirin varies in women and men; the underlying reasons are unclear.¹⁰⁸ 	 Daily low-dose aspirin use in pregnancy is recommended for women at high risk of preeclampsia.¹⁰⁹
		 It is considered safe and is associated with a low likelihood of serious maternal or fetal complications or both.
β Blockers	• Despite the beneficial effect of β blockers on cardiac workload and myocardial oxygen demand, ¹¹⁰ women are less likely to receive treatment with β blockers than men. ^{111,112}	- β Blockers are among list of first-line antihypertensive monotherapies for use during pregnancy. 113
Statins	 In primary and secondary prevention trials, women and men achieve equal benefit from statins in reducing recurrent CVD events.¹¹⁴ 	 Statin therapy during pregnancy for LDL-C reduction is reported to be safe for mother and fetus.¹¹⁶
	 Women taking statins may be at a higher risk of dia- betesmellitus¹¹⁵ and statin-induced myotoxicity.¹¹⁴ 	

Women and the Under's

- Under RESEARCHED
- Under DIAGNOSED
- Under TREATED
- Under SUPPORTED
- Under AWARE

Recommended Actions to Address Knowledge and Care Gaps for Women and CVD

Gaps	Recommended Actions
Under-aware	 Healthcare institutions, nonprofit organizations, and patient partners should create positive environments and encourage open dialogue with women and men to help them become familiar with their risks, similarities, and differences.
	 Research funders, including nonprofit and government funding agencies, and researchers should play an active role in knowledge translation and ensuring new research findings are made accessible beyond the research community.
Under-diagnosed and under-treated	 Universities and healthcare institutions should train researchers and healthcare providers at all career stages (undergraduate, graduate, and postgraduate) on sex- and gender-based differences in cardiovascular health and disease as well as analysis and reporting.
	 Healthcare systems should identify strategies to accelerate the implementation of sex- and gender-specific diagnosis and treatment as new evidence becomes available.
	 Research institutes, funders, healthcare systems, academic institutions, professional societies and organizations, and nonprofit organizations should focus on translating knowledge into clinical practice, to make emerging sex- and gender-specific therapies and interventions accessible to women.
	 Governments should develop systems of accountability to ensure sex and gender equity is applied to cardiovascular care and practices.
Under-supported	 Research institutes, funders, healthcare systems, academic institutions, professional societies and organizations, and nonprofit organizations should work with patient partners to better understand barriers to women's ability to adhere to recovery support programs, such as cardiac rehabilitation.
	 Healthcare institutions, nonprofit organizations, and patient-led support groups should work together to boost knowledge and awareness of risk factors and CVD management that meet the needs of women at all stages of life.
Under-researched	Funders of CVD research should:
	 Invest in sex- and gender-based analysis and research training, and in building capacity in basic biomedical, clinical, health systems, and population health, to properly design and conduct sex- and gender-based analysis research.
	· Adopt policies that require researchers to collect, analyze, and report data by sex and gender.
	 Encourage and support research into understanding sex- and gender-based differences in cardiovascular physiological and pathophysiological characteristics through focused and directed requests in grant application.
	 Develop strategies to understand women's hesitancy to participate in research and clinical trials and to break down barriers to adopting sex- and gender-based analyses.

Key Messages





Key Messages



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CR is an effective means to reduce morbidity and mortality due to CVD in women. Education re: management of one's CVD risk factors can decrease future CVD in women.

Health care providers must refer women to appropriate resources to manage their CVD.

Women have unique CV risk factors that need to be addressed by CR.



Women focused CR

- Women focused CR offered by 40.9% of countries that have CR globally
- Under referred, under enrolled, less adherence
- Preference for yoga or dance
- Issues of privacy
- Systematic review-1/3 tailored to women;60% had psychosocial component, <20% had non traditional exercise

Women focused CR components

- >50% women
- Tailored psychosocial screening, education and exercise
- Mode/setting of delivery-transportation and time barriers; privacy
- Team to include staff with expertise in women and CVD/mental health
- Principles-empowerment, accessibility, innovation,
- online

https://www.healtheuniversity.ca/EN/CardiacCollege/Pages/learnonline.aspx A focus on special populations

Indigenous women

Indigenous women

- Twice as likely to develop CVD
- 53% higher death rate vs. non -Indigenous women
- Younger age of onset
- Poor access to medical care
- Socioeconomic and cultural barriers

Indigenous women

- Elevated rates of CVD in Indigenous women vs. non Indigenous
- Unique risk factor profiles (less hypertension; more diabetes and dyslipidemia, obesity)
- Social, economic and political inequities
- Racism, colonialism, violence and intergenerational trauma
- Access to health care

Unique Determinants of Health Indigenous Peoples face:



A focus on special populations

COVID -19

Long COVID

- HOW DOES THE WHO DEFINE LONG COVID?
- HOW COMMON IS LONG COVID
- WHAT ELSE DO STUDIES SHOW ON LONG COVID SYMPTOMS?
- DO PEOPLE RECOVER FROM LONG COVID?
- DO COVID-19 VACCINES HELP WITH LONG COVID?

COVID -19-implications for women

- 47% of cases are women
- As a result of the COVID-19 response, women have experienced greater
 - caregiving responsibilities due to reduced or cancelled on-site school/daycare attendance and increased online learning at home, and heightened caretaker roles for relatives (e.g., grocery shopping for elderly family members)
 - job insecurity as Canadian women are notably more affected by job loss amid the pandemic
 - difficulties accessing sex- specific health services following the closure of women's health centres (e.g., abortion clinics, deeming them elective procedures
 - domestic violence, compared with men

COVID-19-Implications for women

- Exacerbation of inequity to access during the pandemic
- Virtual care and lack of resources(Internet connectivity)
- Lack of confidence with unsupervised exercise/remote monitoring
- Further increases the barriers for rural and Indigenous communities

Questions?



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