

Physical Activity in Rehabilitation and Health Promotion for Populations with Risk Factors and Cardiovascular Diseases

Course lectures: Thursday 16:00-18:00, September 18th – January 17th, 2018

Instructor: Liza Grosman-Rimon Ph.D.

Tel: +1 416-509-6740 WhatsApp

Email: l.grosman.rimon@gmail.com

Class Location: TBA

Course Objectives and Learning Outcomes:

1. Explore and understand the physiological processes in cardiovascular diseases and their effects on functional capacity and well-being
2. Examine and practice assessment methods in populations with risk factors and with established cardiovascular diseases using exercise as an assessment tool
3. Gain the ability to provide recommendations for physical activity and develop health promotion strategies based on the best available scientific evidence.
4. Gain knowledge of technological innovation in health promotion and rehabilitation in different populations, including healthy individuals, patients with risk factors and patients with chronic diseases
5. Discuss advantages and disadvantages of the use of technology in health
6. Gain knowledge of different methods for assessing effectiveness and health outcomes of health promotion and rehabilitation programs that incorporate technological innovation

Course Description:

This course is designed for graduate students in the field of exercise sciences and rehabilitation, physical education and health sciences who wish to deepen their understanding of the pathophysiology of cardiovascular diseases, physical activity in rehabilitation, and health promotion approaches for populations with risk factors and patients with existing cardiovascular diseases. Conceptual approaches for rehabilitation will be discussed. The course will also focus on harnessing technological innovation in health promotion and rehabilitation. Advantages and disadvantages of the use of technology in health will be discussed. Students will gain knowledge of different methods for assessing effectiveness and health outcomes, and will be able to develop health promotion and rehabilitation programs that incorporate technological innovation.

Pre-requisites: Basic knowledge of physiology and the cardiovascular system

Fall Semester: September 14th - January 18th; Exam Period: January 20th – February 15th

Session Dates:

Session	Dates	Session Topic
Session 1	October 18	Overview of cardiovascular physiology in health and disease and introduction to cardiac rehabilitation
Session 2	October 25	Current treatment of heart disease in the context of cardiac rehabilitation
Session 3	November 1	Cardiac rehabilitation in patients with established cardiovascular disease
Session 4	November 8	Cardiac rehabilitation in individuals with cardiovascular risk factors
Session 5	November 15	Adaptations and physiologic changes with exercise in healthy individuals and in patients with cardiovascular disease
Session 6	November 22	Measurement in rehabilitation practice - patient outcomes
Session 7	November 29	Harnessing technological innovation in rehabilitation and health promotion (Student project presentation)
Session 8	December 6	New models of rehabilitation (Student projects presentation) (Term paper due)
Session 9	December 13	Sex and gender differences in cardiovascular disease and rehabilitation
Session 10	December 20	Rehabilitation in complex patients and patients with co-morbidities (Student presentation)
Session 11	December 27	Integrated rehabilitation program - life style modification
Session 12	January 3	Evidence Based Practice in Rehabilitation - Research and methodologies in cardiac rehabilitation
Session 13	January 10	Patient centred care in rehabilitation Quality improvement and new strategies
Session 14	January 17	Cardiac Rehabilitation Practice in a Global Context; What can we learn from different countries or regions? (Student presentation)

Session 1:

October 18 Overview of cardiovascular physiology in health and disease and introduction to cardiac rehabilitation

- Introduction to the course, including different requirements, assignments, due dates and evaluation scheme
- Overview of the cardiovascular system in health and disease, basic physiological concepts, and the need for cardiac rehabilitation

Session 2:

October 25 Cardiac rehabilitation in patients with established cardiovascular disease

- Introduction to the pathophysiology of the cardiovascular system in atherosclerosis, coronary artery disease, and heart failure
- Learning about etiology, symptoms and epidemiology of cardiovascular diseases
- Exploring and understanding the physiological processes in cardiovascular diseases and their effects on functional capacity and well-being
- Rehabilitation in patients with established cardiovascular disease

Pre-class activities:

Read the following articles

Eur J Heart Fail. 2011 Apr;13(4):347-57. Exercise training in heart failure: from theory to practice. A consensus document of the Heart Failure Association and the European Association for Cardiovascular Prevention and Rehabilitation. Piepoli MF, Conraads V, Corrà U, Dickstein K, Francis DP, Jaarsma T, McMurray J, Pieske B, Piotrowicz E, Schmid JP, Anker SD, Solal AC, Filippatos GS, Hoes AW, Gielen S, Giannuzzi P, Ponikowski PP.

Session 3:

November 1 Current treatment of heart disease in the context of cardiac rehabilitation

- Pharmacological management of heart failure – discussing indications and counter-indications
- Introduction of surgical treatments and interventions for cardiovascular disease: coronary artery bypass graft (CABG), angioplasty, valve replacement, transcatheter aortic valve implantation (TAVI) and heart transplantation
- Advanced therapy for heart failure - device therapy, implantable cardioverter defibrillator (ICD), cardiac resynchronization therapy (CRT) and left ventricular assist device (LVAD)
- Rehabilitation challenges

Pre-class activities: Read the following articles:

Exercise perspective on common cardiac medications. Dizon LA, Seo DY, Kim HK, Kim N, Ko KS, Rhee BD, Han J. Integr Med Res. 2013 Jun;2(2):49-55.

Session 4:

November 8 Cardiac rehabilitation in individuals with cardiovascular risk factors

- Discussing the effects of exercise rehabilitation on cardiovascular risk factors in individuals without apparent cardiovascular disease
- Risk factor reduction in populations at high risk for cardiovascular disease, with focus on hypertension, diabetes, inflammation, depression, dyslipidemia and obesity
- Potential mechanisms for risk factor modification with exercise rehabilitation

Pre-class activities:

Read the following articles: J Am Coll Cardiol. 2015 Feb 3;65(4):389-395. Cardiac rehabilitation and risk reduction: time to "rebrand and reinvigorate". Sandesara PB1, Lambert CT1, Gordon NF2, Fletcher GF3, Franklin BA4, Wenger NK1, Sperling L5

Session 5:

November 15 Adaptations and physiologic changes with exercise in healthy individuals and in patients with cardiovascular disease

- Discussing central and peripheral adaptation of the cardiovascular system to physical activities
- Benefits of cardiac rehabilitation
- Physiological changes in healthy individuals and in patients with cardiovascular disease
- Presenting several land mark clinical trials, case studies and experimental studies
- Discussing challenges that are unique for cardiac rehabilitation and potential solutions

Pre-class activities:

Read the following article:

Circulation. 2003 Mar 4;107(8):1210-25. Exercise and heart failure: A statement from the American Heart Association Committee on exercise, rehabilitation, and prevention. Piña IL, Apstein CS, Balady GJ, Belardinelli R, Chaitman BR, Duscha BD, Fletcher BJ, Fleg JL, Myers JN, Sullivan MJ; American Heart Association Committee on exercise, rehabilitation, and prevention.

Session 6:

November 22 Measurement in rehabilitation practice – patient outcomes

- Overview of various diagnostic and prognostic tools including echocardiography, cardiopulmonary exercise testing, six minute walk test, chronotropic responses, autonomic nervous system, variety of biomarkers measured by blood test and their clinical significance.
- Monitoring progress and patient safety

Pre-class activities:

Read the following articles:

Cardiopulmonary exercise testing and its application. Albouaini K, Egred M, Alahmar A, Wright DJ. Heart. 2007 Oct;93(10):1285-92. Review.

Session 7:

November 29 Harnessing technological innovation in rehabilitation and health promotion

- Discussing needs for improvement in current rehabilitation practice
- Introducing new innovations that improve patient participation, patient outcomes, and the delivery of rehabilitation programs
- Focus on tele-rehabilitation for patients with cardiovascular disease or individuals at high risk
- Pros and cons of new technological advancement

(Term paper due)

Pre-class activities:

Prepare a short presentation and a summary for class discussion (more detailed instructions to follow)

Read the following articles:

Telehealth interventions versus center-based cardiac rehabilitation of coronary artery disease: A systematic review and meta-analysis.

Huang K, Liu W, He D, Huang B, Xiao D, Peng Y, He Y, Hu H, Chen M, Huang D.

Eur J Prev Cardiol. 2015 Aug;22(8):959-71. doi: 10.1177/2047487314561168. Epub 2014 Dec 8. Review.

Session 8:

December 6 New models of rehabilitation, presenting your ideas for innovation in rehabilitation

- Discussing the need for new models of rehabilitation
- Evaluation of innovative practices and models
- Students will present their ideas for innovation in rehabilitation to the class. Class discussion will follow

Pre-class activities:

Read the following articles:

BMJ. 2015 Sep 29;351:h5000. doi: 10.1136/bmj.h5000. Cardiac rehabilitation. Dalal HM1, Doherty P2, Taylor RS3.

Session 9:

December 13 Sex and gender differences in cardiovascular disease and in rehabilitation

- Sex and gender differences in the cardiovascular system in health and in disease
- How sex hormones during pre- and post-menopause affect cardiovascular risk factors

- Epidemiological approach to sex differences
- Sex and gender differences in rehabilitation outcomes, barrier to referral, participation

Pre-class activities:

Read the following articles: Eur J Cardiovasc Prev Rehabil. 2007 Apr;14(2):163-71.

Gender-specific issues in cardiac rehabilitation: do women with ischaemic heart disease need specially tailored programmes? Bjarnason-Wehrens B, Grande G, Loewel H, Völler H, Mittag O.

Session 10:

December 20 Rehabilitation in complex patients and patients with co-morbidities

- Introduction to comorbidity – addressing comorbidity in rehabilitation programs
- Discussing the possible effects of comorbidities, including participation, patient safety, and health outcomes
- Special considerations in cardiac rehabilitation (e.g., patients post-surgery , patients with device therapy, heart transplantation, and post-surgical pain)

(Student presentation)

Pre-class activities:

Read the following articles:

J Heart Lung Transplant. 2015 Aug;34(8):1005-16. Exercise physiology, testing, and training in patients supported by a left ventricular assist device. Loyaga-Rendon RY, Plaisance EP, Arena R3, Shah K

Session 11:

December 27 Integrated rehabilitation program; life style modification

- Introduction to the research of the integrated rehabilitation approach - non-pharmacologic therapy
- Diet and supplements in cardiovascular disease and weight monitoring in heart failure
- Changing life style (smoking cessation, alcohol intake and regular participation in physical activities).

Pre-class activities:

Read the following articles

Cardiovasc Diagn Ther. 2012 Mar;2(1):38-49. Cardiac rehabilitation past, present and future: an overview. Mampuya WM.

(Student presentation)

Session 12:

January 3 Evidence Based Practice in Rehabilitation - Research and methodology in cardiac rehabilitation

- Understanding study design and research methodologies in cardiac rehabilitation; understanding study design, experimental approaches and levels of evidence
- Discussing different types of research (meta-analysis, clinical trials, observational studies) and advantages and disadvantages when using scientific findings to create guidelines
- Providing recommendations for physical activity and developing health promotion strategies based on the best available scientific evidence.

Pre-class activities:

Bring the following articles to Class

Session 13

January 10: Patient centred care in rehabilitation

- Definition and goals of patient-centered care in cardiac rehabilitation
- Strategies to achieve patient centered care : effective communication, partnership, inter-professional collaboration, health promotion strategies
- Promoting equity

Pre-class activities:

Read the following articles: Eur J Prev Cardiol. 2012 Oct;19(5):1082-8. Expectation, satisfaction, and predictors of dropout in cardiac rehabilitation. Wittmer M1, Volpatti M, Piazzalunga S, Hoffmann A.

Session 14:

January 17 Cardiac Rehabilitation Practice in a Global Context; What can we learn from different countries or regions?

- Cardiac rehabilitation around the world: discussing referral, participation, resources and outcomes in high income and low income countries
- What can we learn from different countries/regions
- Cardiac rehabilitation delivery model for low-resource settings
- Discussing the criteria for take home exam evaluation

Pre-class activities:

Review the material from previous classes.

Read the following articles: Prog Cardiovasc Dis. 2017 Sep - Oct;60(2):267-280. doi: 10.1016/j.pcad.2017.08.007. Epub 2017 Aug 24. A Review of Cardiac rehabilitation Delivery Around the World. Pesah E, Supervia M, Turk-Adawi K, Grace SL.

Evaluation Scheme

	% of Total Grade	Date Due
Seminar presentation	25%	TBA
Term paper	15%	
Attendance and participation	10%	Every class
Take-home final exam	50%	TBA

Assignments

Seminar Presentation

Choose a topic from the provided list or develop a topic of your own approved by the course director. You will have 20 minutes for the presentation with 10 minutes for questions and discussion. You should provide resources and peer-reviewed articles ahead of time to encourage peer participation. You will be assessed on the development of the topic, presentation and response to questions (more details will be given closer to the date).

Term Paper

Choose one of the following topics:

1. Discuss the pros and cons of your choice of one technological approach for rehabilitation.
2. Describe the challenges of using technology in rehabilitation and suggest a solution, if possible.
3. Design a novel technology that can improve patient outcomes and/or the delivery of rehabilitation.

Write a 2 page summary, including figures and graphs, to illustrate your ideas. You will have 15 minutes to deliver your idea to the class.

Final Examination

Take-Home exam – The student will be given the choice of four out of five assigned questions on various topics discussed during the course. You will have to support the argument and include references to the literature. You can use figures, tables and diagrams to illustrate your points. You may consider using reference software tools (e.g. EndNote, Reference Manager or RFWorks). Please use the journal *Circulation: Heart Failure* bibliography style for referencing.

Participation

Students are expected to attend all classes. During the classes and peer presentations, students will be awarded participation marks for classroom discussions and contributing questions (10%).

Moodle

Throughout the semester, I will be using Moodle to provide you with course/assignment/exam information, messages, discussion, etc. It is your responsibility to consult Moodle on a regular basis to ensure that you receive all relevant course documentation and information.

Email Policies and Assignment Submission

Please submit your assignments via email or in person at the beginning of the class. Please include a cover page for your assignment including name, student ID#, email address, course name and code, instructor name, assignment name and date. Please use “Win MED cardiac rehab” as the subject of your email. Please expect a return email within 24-48 hours.

Academic Integrity

The course complies with the policies and procedures of the Code of Behaviour on Academic Matters.

Late Penalties

Late submission of assignments will result in a penalty of 5% (out of 100), and a further 5% per day afterwards. If the assignment is late as a result of illness you must provide an official U of T Student Medical Certificate. If the assignment is late due to other circumstances please communicate with me via email.

Electronic Devices

Laptops and tablets are allowed in class. Please turn off any other electronic devices as a courtesy to other students in the class.