School of Kinesiology
Faculty of Health Sciences
Western University

KIN 4420B
IMPACT OF EXERCISE DURING PREGNANCY ON CHRONIC DISEASE RISK
Winter 2019

Instructor:
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Exercise & Pregnancy Lab.
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Office Hours: By appointment.

Classses:
Mo 2:30PM-4:30 PM
FIMS & Nursing Bldg
Room 1200

Graduate Teaching Assistant: Taniya Nagpal

NOTE: All course information including grades, assignment outlines, deadlines, etc. are available via OWL. Check the website regularly for course announcements.

Calendar Description
(Academic Calendar found online): Discussion of human pregnancy and the impact of exercise to prevent or treat cardiovascular disease, obesity and metabolic syndrome/type 2 diabetes will occur. The theory of the "Thrifty phenotype" will be discussed and the mother/fetal link to chronic disease risk. Active living during pregnancy and exercise prescription will be emphasized.
1 lecture hour, 1 seminar hour, 0.5 course

My Course Description:

This course provides an overview of human pregnancy and the impact of exercise to prevent or treat cardiovascular disease, obesity and metabolic syndrome/type 2 diabetes. The theory of the "Thrifty phenotype" will be discussed and the mother/fetal link to chronic disease risk, including discussion of "Developmental Origins of Health and Disease". Active living during pregnancy will be emphasized using the Canadian guidelines (PARmed-X for pregnancy) for low-risk pregnant women. In addition, exercise prescription for special populations of pregnant women across the exercise continuum including women with gestational diabetes or obesity will also be discussed.

Anti-requisite(s)!Pre-requisite(s)!Co-requisite(s)
You are responsible for ensuring that you have successfully completed all course pre-requisites, and that you have not taken an anti-requisite course.

Unless you have either the requisites for this course or written special permission from the course department to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Course Format:
Two hours;
One hour lecture followed by one hour seminar discussion.
Mon. 2:30- 4:30 pm, Location FIMS & Nursing Building Room 1200

Learning Objectives: Upon completion of this course students will:

1) Gain knowledge and understanding of different theories of fetal origins of adult diseases.
2) Gain knowledge and understanding of current research in the area of exercise during pregnancy for a low risk pregnant population.
3) Gain knowledge and understanding of current research in the area of how exercise during pregnancy can prevent or be used to treat different disease states.
4) Engage in seminar discussions and present orally on a research paper to the class.
5) Create and implement an exercise and lifestyle intervention for active low risk pregnant women and pregnant women with disease risk.

Topics for Discussion:

1) The "Downside of Upright"
2) "Thrifty genotype" and "Thrifty phenotype" – developmental influences of adult diseases. DOHaD – Developmental Origins of Health and Disease.
3) DOHaD and adult diseases that may have origin from fetal life.
   a. Cardiovascular disease
   b. Obesity
   c. Type 2 diabetes/Metabolic syndrome
4) Impact of exercise during pregnancy on chronic disease risk.
5) Importance of active living during pregnancy
   a. The PARmed-X for pregnancy – medical prescreening, aerobic exercise guidelines, muscle conditioning guidelines and safety considerations for low risk pregnant women
   b. Promoting active living during pregnancy in low risk women.
6) Designing an exercise program for pregnant women across the exercise continuum – from activity restricted to recreational to elite athlete.
7) Using an exercise and lifestyle intervention to prevent excessive weight gain and gestational diabetes in pregnant women with risk factors.

Course Evaluation Summary:
1) Class participation & on line discussion forum – 15%
2) Journal Article Review – 15%
3) Group presentation to Class – 20%
4) Final exam - 50%

Journal Article Review:
Each student will chose a paper from the literature (upon approval of Instructor) related to class and critically evaluate it in one page of assessment.

Discussion Forums on OWL:
Students will be divided into groups of 3 to form a discussion group forum on OWL relating to specific questions regarding special topics relating to the course.

Group presentation to Class:
Each student will work with their group of 3 to choose one research paper from the literature (on approval of Professor) and present it to the class for 10 minutes, followed by 5 minutes of questions. Other students in the class and the professor will evaluate the presentation.

Mandatory Readings (*Preliminary List)*: All required readings will be posted on OWL

Jan. 7, 2019 Topic – Introduction to course.

Jan. 14, 2019 Topic – "Downside of Upright"
Reading(s):

1) Ackerman, J. 2006. The downside of upright. National Geographic. 210(1):126-145.
2) Mitteroecker, P, Huttegger, S, Fischer, B, Pavlicev, M 2016. Cliff-edge model of obstetric selection in humans. Proc Natl Acad Sci USA Dec 5. pii: 201612410.

Jan. 21, 2019 Topic – "Developmental Origins of Health and Disease (DOHaD); thrifty genotype and thrifty phenotypes"
Readings:

3) Prentice, AM. 2005. Early influences on human energy regulation: Thrifty genotypes and thrifty phenotypes. Physiol. Behav. 640-645.
4) Hales, CN and Barker, DJP. 2001. The thrifty phenotype hypothesis. Br. Med. Bull. 60:5-20.
5) Prentice, AM, Rayco-Solon, P. and Moore, S.E. 2005. Insights from the developing world: thrifty genotypes and thrifty phenotypes.
6) Barker, DJP 2004. The developmental origins of adult disease. J. Am. Coll. Nutr. 23:588S-595S.

Jan. 28, 2019 Topic – "DOHaD and adult diseases that may have origin from fetal life" – Cardiovascular disease"
Readings:

7) Hanson MA, Gluckman PD. Developmental origins of health and disease: moving from biological concepts to interventions and policy. Int J Gynaecol Obstet. 2011 Nov;115 Suppl 1:S3-5.
8) Martin-Gronert MS, Ozanne SE. Mechanisms underlying the developmental origins of disease. Rev Endocr Metab Disord. 2012 Jun;13(2):85-92.
9) Law, CM et al. 2002. Fetal, infant and childhood growth and adult blood pressure: a longitudinal study from birth to 22 years of age. Circulation. 105:1088-1092.
10) Henry, SL et al. Developmental origins of obesity-related hypertension. Clin. Exper. Pharm. Physiol. 2012. 39 (9), 799-806.

Feb. 4, 2019 Topic – "DOHaD and adult diseases that may have origin from fetal life" – Obesity"
Readings:

11) Ravelli, AC, van Der eulen, JH., Osmond, C., Barker, DJP and Bleker, OP. 1999. Obesity at the age of 50 y in men and women exposed to famine prenatally. Am. J. Clin. Nutr. 70:811-816.
12) Oken, E. and Gillman, MW. 2003. Fetal origins of obesity. Obes. Res. 11:496-506.
13) Davenport, MH, Ruchat, S, Giroux, I, Sopper, M, Mottola, MF. 2013. Timing of excessive pregnancy-related weight gain and offspring adiposity at birth. Obstet Gynecol. 122(2, PART 1):255-261.

Feb. 11, 2019 Topic – "DOHaD and adult diseases that may have origin from fetal life" – Type 2 diabetes/metabolic syndrome"

Readings:

14) Hales, CN and Barker, DJP 1992. Type 2 diabetes mellitus: the thrifty phenotype hypothesis. Diabetologia 35;595-601.
15) Martin-Gronert, M, Ozanne S. 2013. Early life programming of obesity. Dev Period Med XVII(1):7-12.
16) Boney, CM et al. 2005. Metabolic syndrome in childhood: association with birth weight, maternal obesity and gestational diabetes mellitus. Pediatrics 115:e290-296.
17) Hattersley, AT and Tooke, JE. 1999. The fetal insulin hypothesis: an alternative explanation of the association of low birthweight with diabetes and vascular disease. Lancet. 353:1789-1792.

Feb. 25, 2019 Topic – "Impact of exercise during pregnancy on chronic disease risk"

Readings:

18) Wojtyła A, Kapka-Skrzypczak L, Paprzycki P, Skrzypczak M, Biliński P. 2012 Epidemiological studies in Poland on effect of physical activity of pregnant women on the health of offspring and future generations – adaptation of the hypothesis DOHaD. Ann Agric Environ Med. 19(2): 315-326.
19) Weissgerber, T, Wolfe, LA, Davies, G, Mottola, MF. 2006. Exercise in the prevention and treatment of maternal-fetal disease: A review of the literature. Applied Physiol. Nutrition & Metabolism 31:661-674.
20) Hopkins S, Cutfield W. 2011. Exercise in Pregnancy: Weighing up the long-term impact on the next generation. Exerc Sports Science Reviews 39(3):120-127.
21) Mottola MF, Artal R. 2016. Role of exercise in reducing gestational diabetes mellitus. Clin Obstet Gynecol Sep;59(3):620-628

Mar.4, 2019 Topic – "Importance of active living during pregnancy and evidence-based exercise guidelines"

Readings:

22) Mottola, MF. 2016. Components of exercise prescription and pregnancy. Clinical Obstet Gynecol 59(3):552-558.
23) Wolfe, LA and Mottola MF 2015. PARmed-X for Pregnancy. Canadian Society Exercise Physiology. Pp. 1-4. website: http://www.csep.ca/CMFiles/publications/parq/parmed-xpreg.pdf
24) Mottola MF. 2013. ACSM's Guidelines for Exercise Testing and Prescription, 9th edition. Chpt 8."Exercise Prescription for Healthy Populations with Special Considerations" (Deborah Riebe, Ed). Lippcott-Williams & Wilkins: USA. Pp.194-200.
25) Mottola MF, Artal R. 2016. Fetal and maternal metabolic responses to exercise during pregnancy. Early Hum Dev. 94:33–41.
26) Davies, G, Wolfe, LA, Mottola, MF, MacKinnon, C. 2003. Joint SOGC/CSEP Clinical Practice Guideline: Exercise in Pregnancy and the Postpartum Period. J Obstet Gynecol Can. 25(6):516-22.

Mar. 11, 2019 Topic "Designing an exercise program across the continuum – from activity restricted to recreational to the elite athlete and using exercise and lifestyle interventions to prevent excessive weight gain and gestational diabetes in pregnant women with risk factors"

Readings:

27) Brun, C, Shoemaker, JK, Bocking, A, Hammond, J, Poole, M, Mottola, MF 2011. Bed-rest-exercise, activity restriction and high-risk pregnancies: A feasibility study. Applied Physiol Nutrit Metabolism. 36(4):577-82.

28) Mottola, MF. 2010. Resistance-Training Strategies During Pregnancy. In: Resistance Training for Special Populations. (Swank, A, Hagerman, P Eds). New York: Delmar Cengage Learning. Pp. 345-356.
29) Mottola, MF 2015. Pregnancy, physical activity and weight control to prevent obesity and future chronic disease risk in both mother and child. Current Women's Health Reviews. 11(1):31-40.
30) Bo K, Artal R, Barakat R, Brown W, Davies G, Dooley M, Evenson K, Haakstad L, Henriksson-Larsen K, Kayser B, Kinnunen T, Mottola MF, Nyaard I, van Poppel M, Stuge B, Khan K. 2016. Exercise and pregnancy in recreational and elite athletes: 2016 evidence summary from the IOC expert group meeting, Lausanne. Part 1 - Exercise in women planning pregnancy and those who are pregnant. Br J Sports Med 50:571–589

Group Presentations to the Class:

Each group of 3 students will pick a time to present on one of the following 4 days:

March 18th, 25th and April 1st (April 8th if necessary) will be designated as Student presentation days.

Course/University Policies

1. **Lateness/Absences**: Assignments are due at the beginning of class on the assigned due date and will not be accepted late, except under medical or other compassionate circumstances. Electronic submission of assignments will not be accepted (unless otherwise specified) under any circumstances. Submitting a late assignment without appropriate documentation will result in a zero (0) grade. Appropriate documentation for assignments worth less than 10% should be submitted to the instructor. A missed mid-term examination, if applicable without appropriate documentation will result in a zero (0) grade. The **course policy is not to allow make-ups for scheduled midterms, presentations or final exams**, nor to assign a grade of "Incomplete" without acceptable and verifiable medical (or equivalent compassionate) reasons. Acceptable reasons might include hospital stays, serious illness, family emergencies (like serious accidents, illness or death) or similar circumstances.

2. **Documentation for Accommodation (Illness, Medical/Non-Medical Absences)**:
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf
The University recognizes that a student's ability to meet his/her academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. The University further recognizes that medical situations are deeply personal and respects the need for privacy and confidentiality in these matters. However, in order to ensure fairness and consistency for all students, academic accommodation for work representing 10% or more of the student's overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet his/her academic responsibilities.

A UWO Student Medical Certificate (SMC) is required where a student is seeking academic accommodation. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. An SMC can be downloaded under the Medical Documentation heading of the following website:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

Documentation is required for non-medical absences where the course work missed is more than 10% of the overall grade. Students may contact their Faculty Academic Counselling Office for what documentation is needed.

Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, examinations, etc. stating specific reasons and dates. Students must follow up with their professors and their Academic Counselling office in a timely manner. Documentation for medical requests for accommodation must be submitted within two (2) business days after the end date on the documentation, to the appropriate Academic Counselling Office of the student's Faculty of registration. For KIN students, you may go to the School of Kinesiology in 3M Centre room 2225 **NOT** to the instructor. It will be the Academic Counselling office that will determine if accommodation is warranted.

An "Accommodation Consideration Request Form" found online https://www.uwo.ca/fhs/kin/undergrad/files/accommodation_request.pdf or in the Kinesiology Undergraduate Office" for ALL accommodation requests must be submitted into the appropriate Academic Counselling office of the student's Faculty/School of registration. These documents will be retained in the student's file, and will be held in confidence in accordance with the University's Official Student Record Information Privacy Policy.

3. **Grades**: Where possible assignment objectives and rubrics will be posted on OWL. Should you have a concern regarding the grade you received for an assignment or feel that it is unfair in any way, you must wait 24 hours from the receipt of the assignment to approach the instructor or TA. In doing so, please make an appointment and prepare in writing, with evidence, why you feel your grade is inappropriate. Please be aware that in requesting a grade reassessment, your grade could go up/down/or stay the same. Note that calculations errors (which do occur!) should be brought to my attention immediately.
15% of course grades will be posted by the last day to drop a course.

A+	90-100	*One could scarcely expect better from a student at this*
A	80-89	*Superior work that is clearly above average*
B	70-79	*Good work, meeting all requirements and eminently*
C	60-69	*Competent work, meeting requirements*
D	50-59	*Fair work, minimally acceptable.*
F	below 50	*Fail*

4. **Scholastic offences**: They are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:.
https://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

A) Students must write their essays and assignments in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar). All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between Western University and Turnitin.com http://www.turnitin.com

B) Computer marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5. **Formatting** (as recommended by the course instructor): example- APA style is the approved style of writing for all assignments produced for this course. Please refer to Western University Library webpage for information on citation style and format or consult the APA publication manual: Publication manual of the American Psychological Association (6th ed.). (2009). Washington, DC: American Psychological Association.

6. According to the **Examination Conflict policy**, Please see the Office of the Registrar policy on Exam Conflict and Multiple Exam Situations
www.registrar.uwo.ca/examinations/exam_schedule.html

7. **Classroom Behaviour**: Class will begin promptly at the time specified at the top of page one of this syllabus. In the event that you must arrive late, please enter the classroom with a minimal disturbance to the class. Please keep all electronic devices on silent and avoid distracting classmates.

8. **Electronic Device Usage:**

During Exams - Unless you have medical accommodations that require you to do so, or explicit permission from the instructor of the course, you may not use any of the following electronic devices during ANY of the tests, quizzes, midterms, examinations, or other in-class evaluations: cellphones, smart phones, smart watches, smart glasses, audio players or recorders of any sort, video cameras, video games, DVD players, televisions, laptop/notebook/netbook computers, flashlights or laser pointers.

During Lectures and Tutorials: Although you are welcome to use a computer during lecture and tutorial periods, you are expected to use the computer for scholastic purposes only, and refrain from engaging in any activities that may distract other students from learning. Please be respectful to your fellow students and turn the sound off. If the professor receives complaints from other students regarding noise or other disruptive behavior (e.g. watching videos on YouTube.com, updating your Facebook status, playing Solitaire), your classroom privileges will be revoked. From time to time, your professor may ask the class to turn off all computers, to facilitate learning or discussion of the material presented in a particular class. **Unless explicitly noted otherwise, you may not make audio or video recordings of lectures – nor may you edit, re-use, distribute, or re-broadcast any of the material posted to the course website.**

9. **Health and Wellness:** As part of a successful undergraduate experience at Western, we encourage you to make your health and wellness a priority. Western provides several on-campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students receive membership in Western's Campus Recreation Centre as part of their registration fees. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page (http://www.music.uwo.ca/), or the McIntosh Gallery http://www.http://www.mcintoshgallery.ca/

Further information regarding health and wellness-related services available to students may be found at http://www.health.uwo.ca/.

Students who are in emotional/mental distress should refer to Mental Health@Western (http://www.health.uwo.ca/) for a complete list of options about how to obtain help.

STUDENT CODE OF CONDUCT
The purpose of the Code of Student Conduct is to define the general standard of conduct expected of students registered at Western University, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed, and set out the disciplinary procedures that the University will follow. For more information, visit https://www.uwo.ca/univsec/pdf/board/code.pdf

ENGLISH PROFICIENCY FOR THE ASSIGNMENT OF GRADES
Visit the website http://www.uwo.ca/univsec/pdf/academic_policies/exam/english.pdf

SUPPORT SERVICES
There are various support services around campus and these include, but are not limited to:
1. *Student Development Centre* -- *http://www.sdc.uwo.ca/ssd/*
2. *Student Health & Wellness* -- http://www.health.uwo.ca/
3. *Registrar's Office* -- *http://www.registrar.uwo.ca/*
4. *Ombudsperson Office* -- *http://www.uwo.ca/ombuds/*