GRADUATE AND POSTDOCTORAL STUDIES

McGILL UNIVERSITY

FINAL ORAL EXAMINATION
FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

OF

ANNE MARIE CHOMAT
INSTITUTE OF PARASITOLOGY
MATERNAL STRESSORS IMPACT MATERNAL WELLBEING AND CORTISOL AND INFANT GROWTH IN RURAL GUATEMALA: INSIGHTS FROM QUALITATIVE AND QUANTITATIVE APPROACHES

Wednesday, 17 February 2016
2:00pm

Institute of Parasitology, Room P117
McGill University, Macdonald Campus

COMMITTEE:
Dr. G.S.V. Raghavan (Pro-Dean) (Bioressource Engineering Department)
Dr. T. Geary (Chair) (Institute of Parasitology)
Dr. M. Scott (Supervisor) (Institute of Parasitology)
Dr. K. Koski (Co-supervisor) (School of Dietetics and Human Nutrition)
Dr. T. Johns (Internal Examiner) (School of Dietetics and Human Nutrition)
Dr. H. Ramiro Melgar-Quiñonez (External Member) (School of Dietetics and Human Nutrition)

Dr. Josephine Nalbantoglu, Dean of Graduate and Postdoctoral Studies
Members of the Faculty and Graduate Students are invited to attend
ABSTRACT

Background: Despite decades of nutrition interventions, Guatemala has one of the highest rates of child stunting in the world, especially affecting its indigenous population. Impaired linear growth may be a consequence of maternal stresses associated not only with malnutrition and infection but also with psychosocial factors, the effects of which may be mediated by cortisol.

Objective: In 8 marginalized rural Mam-Mayan communities in the Western Highlands, to (1) characterize women’s exposure to nutrition, infection and psychosocial stressors vs. resilience factors, (2) describe the maternal diurnal salivary cortisol rhythm in pregnancy and postpartum (PP) and explore its association with psychosocial variables, (3) assess the cumulative impact of maternal-level factors (nutritional, infectious, psychosocial), social factors (autonomy, social support, domestic violence), and household factors (socioeconomic status, food security) on early infant growth, and (4) evaluate whether maternal cortisol may be a mediator in the vertical transmission of stress.

Methods: Grounded in participatory action research and a socio-ecological framework, this mixed-methods, observational study enrolled a longitudinal cohort of 155 women, seen during pregnancy (6-9 mo), early (0-6 wks) and later (4-6 mo) PP, and 2 cross-sectional cohorts (60 early, 56 later PP). Maternal and infant anthropometry was recorded, maternal fecal, urine and saliva samples were collected, and questionnaires explored maternal, social and household factors. For PhotoVoice, 23 women used cameras to document sources of stress vs. resilience for local women, and shared photo-elicited narratives through 6 group sessions.

Results: Diet diversity was low and only 38% of women were food secure. Urinary and gastrointestinal infections were rare (<5%). Most participants reported low maternal autonomy (81%), high paternal support (70%) and small support networks (2.7±1.3 individuals); 22% reported domestic violence. Many women (20-50%) had local idioms of distress (enojo, susto, nervios). Infant stunting was common (36% early PP, 43% later PP). Waking and evening salivary cortisol concentrations were 13.1±5.2 and 5.0±3.0 nmol/l in pregnancy and 6.1±3.1 and 2.2±2.3 nmol/l PP. Lower household wealth, food insecurity, shorter maternal stature, high autonomy, high paternal support, low/moderate social support and domestic violence were associated with a more stressed cortisol rhythm. Domestic violence increased the likelihood of feeling overwhelmed (OR=27.3) and of experiencing local idioms of distress (OR=2.3-5.4). Dirt floor, lack of prior day meat consumption, insufficient breast milk, and short maternal stature were associated with lower early PP height-for-age (HAZ) and increased likelihood of stunting. Early PP, infants of mothers with greater paternal support, autonomy and emotional distress were more likely to be stunted. Higher concentrations of early PP evening salivary cortisol increased the likelihood of stunting. Change in HAZ between early and later PP (ΔHAZ) was positively associated with maternal height, BMI and female gender, and negatively with autonomy, problems with partner and difficulty breastfeeding.
Later PP waking cortisol was positively associated with ΔHAZ. Photovoice narratives highlighted 2 scenarios of particular vulnerability: (1) experiencing domestic violence, low autonomy and socioeconomic dependence, and (2) being a single mother with few employment options and limited rights. Additional sources of stress were poverty and the absence of social support and social services. Sources of resilience were family, nature, agriculture, traditional knowledge/practices and spirituality.

**Implications:** This transdisciplinary research highlighted the importance of integrating psychosocial interventions into research and intervention programs targeting early infant growth, and sheds light on important strategies to increase resilience and empower women and communities to break the intergenerational cycle of poor growth and reduced lifetime health and opportunity.
CURRICULUM VITAE

UNIVERSITY EDUCATION

2012 - present  Fellow, Global Health Research Capacity Strengthening Program (GHR-CAPS)  
Unité de Sante Internationale, CHUM, Montréal, Canada
2010 - present  PhD, Parasitology and Environmental Sciences  
McGill University, Montréal, Canada
2007 - 2009  MPH, Global Health  
Tufts University, Boston, USA
1999 - 2003  MD  
Jefferson Medical College, Philadelphia, USA
1995 - 1999  BA, Biological Sciences  
Wellesley College, Wellesley, USA

EMPLOYMENT

2009 - present  Attending Physician, contracted  
Department of Infectious Diseases and Geographic Medicine  
Tufts Medical Center, Boston, USA
2009 - present  Adjunct instructor  
Department of Public Health and Community Medicine  
Tufts University School of Medicine, Boston, USA
2006 - 2015  Senior House Physician  
Lemuel Shattuck Hospital, Boston, USA
2006 - 2009  Medical Director of Senior House Physicians  
Lemuel Shattuck Hospital, Boston, USA

GRANTS

2013 – present  Global Mental Health Seed Grant, Grand Challenges Canada

AWARDS

2015  Bridging fund, Center for Host & Parasite Interactions (McGill University)
2011  Programme de bourses d’excellence pour étudiants étrangers
(PBEEE) du ministère de l’Éducation, du Loisir et du Sport du Québec (McGill University)

2011  Nell I. Mondy Fellowship, Sigma Delta Epsilon-Graduate Women in Science (GWIS)

2011  Graduate Excellence Fellowship, Institute of Parasitology (McGill University).

2009  Department of Public Health Global Health Fellowship (Tufts University School of Medicine).

2009  Delta Omega Honorary Society in Public Health (Tufts University School of Medicine).

2003  Award for Excellence in Teaching, presented by the Tufts University School of Medicine Class of 2005, for the demonstration of a sincere concern for students, an ability to share knowledge effectively, and a manner that inspires by example (Tufts University School of Medicine)

2003  Beach Memorial Scholarship for academic merit, demonstrated institutional commitment and community service (Jefferson Medical College)

2003  The Dean’s Student Service Award, awarded to the medical student who has given generously of time and talents for service of classmates and Jefferson Medical College (Jefferson Medical College)

2002  Leah J. Dickenstein Award, Certificate of Commendation for student creativity and leadership in founding the Jefferson Arts and Medicine Society (Jefferson Medical College)

2001  Hobart Amory Hare Medical Honor Society, student branch of Jefferson’s department of Internal Medicine (Jefferson Medical College)

1999  Lingos Prize in the Life Sciences, awarded for aptitude for independent research and depth of understanding of the life sciences (Wellesley College)

1999  Magna Cum Laude, Durant Scholar, Sigma Xi Honors Society for undergraduate academic achievements (Wellesley College).

1998  First Prize in the Third Generation Award for Writing in the Sciences (Wellesley College)

PUBLICATIONS

Chomat AM, Solomons NW, Koski KG, Garcia Maldonado M, Scott ME. Diurnal salivary cortisol is influenced by maternal and psychosocial factors in pregnant and postpartum Mam-Mayan mothers in the Western Highlands of Guatemala. Submitted to Social Science and Medicine.

Chomat AM, Solomons NW, Koski KG, Wren HM, Vossenaar M, Scott ME. Quantitative methodologies reveal a diversity of nutrition, infection/illness and psychosocial stressors during pregnancy and lactation in rural Mam-Mayan mother-infant dyads from the Western Highlands of Guatemala. Food &


