Low perinatal and infantile vitamin B-12 (B-12) status have been associated with health complications. South Asians and residents of low- and middle-income countries may be at increased risk for low B-12 status.

The overall goal was to facilitate and screen for perinatal, neonatal, and infantile B-12 status. First, a reliable (recovery: 93–98%; CV: <7%) tool for B-12 status assessment in vulnerable populations was developed, using dried blood spot methylmalonic acid (DBS MMA) concentrations. MMA is the most specific functional B-12 biomarker. Given the minimal invasiveness and ease of DBS collection, DBS MMA may be convenient to use in newborns and populations in remote settings to estimate B-12 status. As such, a reference value of elevated neonatal DBS MMA concentration of >29.3 pmol/8-mm punch was computed per clinical guidelines (CLSI EP18-A3c). Further, B-12 status of South Asian and European pregnant women and their newborns living in Vancouver were compared. B-12 status was assessed in 751 healthy Vancouver women (50% South Asian, 50% European) during their 1st and 2nd trimester of pregnancy using multiple B-12 biomarkers, and in their newborns using DBS MMA concentration. South Asian pregnant women had a significantly lower B-12 status than European women, e.g. comparing 1st trimester mean (95% CI) serum total B-12 concentrations [189 (180; 199) pmol/L versus 246 (236; 257) pmol/L; P<0.0001]. This difference in B-12 status was not reflected in the DBS MMA concentrations of their newborns. Last, the prevalence of B-12 deficiency in mothers and their infants living in rural Indonesia was determined. The prevalence of infants (n=221) living in rural Indonesia with serum total B-12 concentrations <191pmol/L followed at age 6-, 9-, and 12-months was 27%. Maternal DBS MMA concentrations at 6 months postpartum were weakly, but statistically significantly (P=0.004), associated with infant serum MMA concentrations.

This research suggests DBS MMA is a convenient screening tool with use in vulnerable populations, including newborns. Pregnant South Asian women living in Vancouver and infants living in rural Indonesian were identified as populations at risk for low B-12 status. Future research evaluating outcomes and determinants of B-12 status is warranted to allow for targeted interventions.

BIOGRAPHICAL NOTES

Academic Studies: Vordiplom, University of Konstanz, 2007
Diplom, University of Hohenheim, 2011

GRADUATE STUDIES

Field of Study: Nutritional Biochemistry

Courses

HUNU 500 Research Methods Dr. Chapman
SPPH 400 Statistics for Health Research Dr. Guhn
HUNU 631 Food, Nutrition and Health Seminar Various

SELECTED AWARDS

Killam Graduate Teaching Award, University of British Columbia, 2016
Graduate Student Service Award, Faculty of Land and Food Systems, 2016
Four Year Fellowship for PhD Students, University of British Columbia, 2012
Doctoral Scholarship for Outstanding Women in Science, Simons Foundation, 2012

SELECTED PUBLICATIONS


SELECTED PRESENTATIONS


“Functional vitamin B-12 status in lactating women living in rural Indonesia assessed by using dried blood spot methylmalonic acid analysis.” *Experimental Biology*, San Diego, California. Apr 2-6, 2016.


**SUPERVISORY COMMITTEE**

Dr. Yvonne Lamers, Research Supervisor (Human Nutrition)
Dr. Susan Barr (Human Nutrition)
Dr. Jehannine Austin (Medical Genetics)
Dr. Joshua Miller (Nutritional Sciences, Rutgers University)

**PROGRAMME**

The Final Oral Examination
For the Degree of

DOCTOR OF PHILOSOPHY
(Human Nutrition)

**THERESA H SCHRODER**

Vordiplom, Chemistry, University of Konstanz, Germany
Diplom, Food Chemistry, University of Hohenheim, Germany

Friday, February 24, 2017, 9:00 am
Room 200, Graduate Student Centre
Latecomers will not be admitted

“Vitamin B-12 Status During Pregnancy and Infancy: Screening Tools and Assessment of Populations at Risk for Deficiency”

**EXAMINING COMMITTEE**

Chair:
Dr. Margot Van Allen (Medical Genetics)

Supervisory Committee:
Dr. Yvonne Lamers, Research Supervisor (Human Nutrition)
Dr. Susan Barr (Human Nutrition)
Dr. Joshua Miller (Nutritional Sciences, Rutgers University)

University Examiners:
Dr. Rajavel Elango (Experimental Medicine)
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