

Interactions within the 'double burden' of malnutrition: obesity, hyperlipidemia, insulin resistance and micronutrient deficiencies

Session Description

Many developing countries undergoing rapid urbanization and economic development are now experiencing the 'double burden' of over- and undernutrition. Obesity and diet-related chronic diseases are emerging as important health problems, yet vulnerable population groups remain micronutrient deficient. A potential interaction between this 'double burden' could have important public health consequences. Apart from the well established adverse health outcomes associated with these individual conditions, there is intriguing evidence that the combination of obesity with micronutrient deficiencies may be even more detrimental for health. For example:

- Studies in industrialized countries have consistently found higher rates of iron deficiency in overweight children and adults. Although the mechanism is unclear, the chronic inflammation and increased leptin production characteristic of obesity increase hepcidin secretion from the liver, which, along with hepcidin produced by adipose tissue, could reduce dietary iron absorption (1). Thus, the current surge in overweight in transition countries may impair efforts to control iron deficiency in the population.
- Correction of iodine deficiency-associated thyroid dysfunction (subclinical hypothyroidism) may improve the insulin and lipid profile, and thereby potentially reduce risk for cardiovascular disease. This previously unrecognized benefit of iodine prophylaxis may be important because iodine deficiency remains common in many rapidly developing countries with increasing rates of obesity and cardiovascular disease (2).
- Retinol-binding protein (RBP)-4 concentrations are determined to a large extent by vitamin A status but are also elevated in animal models of obesity and insulin resistance. A recent study has shown that independent of subclinical inflammation and vitamin A intakes, serum RBP4 and the RBP4-to-SR ratio are correlated with obesity, central obesity, and components of the metabolic syndrome in prepubertal and early pubertal children (3).

Purpose

The objectives of the session will be to educate and inform participants about the Interactions within the 'double burden' of malnutrition: obesity, hyperlipidemia, insulin resistance and micronutrient deficiencies. There will be emphasis on both the metabolism of these interactions and their public health significance. These findings may have particular relevance to Thailand, a country in transition.

Outcomes – participants should leave the session well informed on these issues

Session chair/moderator:

Professor Michael Zimmermann, Human Nutrition Division, Wageningen University, The Netherlands

Session Topics and Speakers:

Topic 1: *Correction of iodine deficiency: effects on lipid and insulin levels*

Speaker: Professor Pieter Jooste, Director Nutritional Intervention Research Unit Medical Research Council Cape Town South Africa (15 minutes + 5 minutes for questions)

Topic 2: *Vitamin A status, RBP and insulin resistance: new findings in children*

Speaker: Dr. Isabelle Aeberli, Laboratory for Human Nutrition Swiss Federal Institute of Technology (ETH), Zurich Switzerland (15 minutes + 5 minutes for questions)

Topic 3: *Obesity decreases iron absorption and increases risk for iron deficiency*

Speaker: Professor Michael Zimmermann, Human Nutrition Division, Wageningen University, The Netherlands (15 minutes + 5 minutes for questions)

Short Sessions