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Nutrition in the first 500 days of life

At the turn of the millennium a call for action was made based on the recognition that little or no improvements had been made in maternal and child nutrition despite considerable economic growth in most developing countries in the last two decades ⁽¹⁾. The ‘first 1000 days of life’ has been recognised as a critical period for growth and development of young children, resulting in important attention being given to increased survival, breastfeeding and complementary feeding practices ⁽²⁾. However, as stated in a recent review by Mason *et al.* ⁽³⁾, actions have been directed more to the child than to the mother. The first 500 days of life is the period from conception to about 6 months of age when the infant is entirely dependent for its nutrition on the mother, either by the placenta or exclusive breastfeeding.

This issue of *Public Health Nutrition* includes seven papers focusing on adherence to dietary guidelines ⁽⁴⁻⁶⁾, dietary intake assessment ^(7,8), and micronutrient status in pregnancy ^(9,10).

Adherence to dietary guidelines

Although an increasing number of evidence-based interventions are available ⁽³⁾, few studies of longitudinal design examine how adherence to specific dietary guidelines during pregnancy affects women’s nutrition and birth outcomes. In this issue, three birth cohort studies examine adherence to food-based guidelines during pregnancy. Hillesund *et al.* ⁽⁴⁾ describe the development of a diet score for assessing degree of adherence to a sustainable regional diet (New Nordic Diet, NND) and its association with both gestational weight gain and fetal growth in the very large Norwegian Mother and Child Cohort Study (MoBa). Adherence to the NND during pregnancy, rich in fruits and vegetables, whole grain bread, and drinking water among other foods, may contribute to optimal gestational weight gain in normal-weight women and improve fetal growth. Morton *et al.* ⁽⁵⁾ determine adherence to nutritional guidelines by pregnant women in the Growing Up in New Zealand study according to maternal characteristics. The findings suggest a low adherence for all food group recommendations. Although as Morton *et al.* ⁽⁵⁾ highlight in relation to their non-European ethnic group intakes, a greater adherence to a minimum recommended number of servings does not translate directly into better nutritional status. The authors concluded that the large variability in adherence to the current New Zealand guidelines between ethnic groups indicates the need for ethnicity-specific interventions that are consistent with their dietary practices and beliefs. Additionally, in the Growing Up in Singapore Towards healthy Outcomes (GUSTO) study, Chen *et al.* ⁽⁶⁾ found that ethnic differences in food consumption were pronounced during the postpartum period in 1027 Chinese, Malay and Indian women as a result of a mix of traditional beliefs and modern dietary advice.

Together, the findings of these three studies provide support for the development of dietary guidelines during the pregnancy using sustainable regional foods adapted to diverse cultural and economic groups to improve dietary compliance and ultimately the health of women and their children. Current dietary guidelines for pregnancy are not sufficiently based on studies that consider the full spectrum of meaningful obstetric and postnatal outcomes for mother and child – for example, size at birth, length of gestation, maternal weight retention, childhood adiposity, and child IQ, to name but a few. It is entirely possible that current guidelines do not adequately capture the range of dietary patterns from which good obstetric and postnatal outcomes can be obtained. This highlights opportunity for more food-based interventions in addition to prospective cohort studies, commencing before and during pregnancy, to inform future revisions of dietary guidelines.

Dietary intake assessment

In this issue of *Public Health Nutrition*, two cross-sectional studies assess the ability of short dietary assessment methods to rank pregnant women relative to biomarkers. Svensson *et al.* ⁽⁷⁾ evaluate the ability of a short dietary questionnaire to estimate energy intake compared with total energy expenditure measured by the doubly labelled water method in both non-pregnant and pregnant women in Umeå, Sweden. Oken *et al.* ⁽⁸⁾ assessed 30 d fish intake in Boston, USA, using three approaches: (i) a single question on total fish consumption; (ii) a brief FFQ that includes twenty-one questions, with four on intake of fish; and (iii) a focused FFQ with thirty-six questions about different finfish and shellfish. They measured Hg in whole blood and hair and fatty acids from plasma. The findings of the two studies suggest that carefully designed methods aimed to make it easier and more time efficient to report dietary intake can underestimate energy intake on a group level but are able to rank food intakes. Both studies agree that the optimal method of assessing dietary intake depends on the purpose of the study. Taking into account the need for easy-to-administer dietary assessment tools in large-scale population studies, longer questionnaires provide no advantage over shorter questionnaires in ranking intakes during pregnancy.

Micronutrient status during pregnancy

In the review article by Mason *et al.* ⁽³⁾, the following six priority evidence-based interventions were identified for low- and middle-income countries to improve nutrition in the first 500 days of life: 1) supplementation with iron-folic acid, or iron with other multiple micronutrients; 2) iodine fortification of salt, or supplementation in rare cases; 3) balanced protein energy supplementation for settings of seasonal or chronic food insecurity when substantial resources and adequate logistics are available, usually targeted (these supplements should be fortified with micronutrients); 4) legislation and outreach to reduce the numbers of births to teenagers; 5) family planning programs

aimed at increasing interpregnancy intervals; and 6) conditional cash transfers. As socio-economic disadvantage also exists within high-income countries, the two studies on micronutrient status of pregnant women in this issue of *Public Health Nutrition* effectively illustrate the importance of these interventions in different settings. Bruns *et al.* ⁽⁹⁾ assessed sociodemographic correlates of micronutrient intakes from food and dietary supplements in the Programming of Intergenerational Stress Mechanisms (PRISM) study, an urban, ethnically diverse sample of 274 pregnant women in the USA. Factors associated with multiple antioxidant inadequacies included being Hispanic or African American, lower education and self-reported economic related food insecurity. Kapil *et al.* ⁽¹⁰⁾ assessed the current status of iodine nutrition among 1711 pregnant women in Himachal Pradesh, India, an endemic region for iodine deficiency. Total goitre rate ranged from 19.9% to 42.2%. The percentage of pregnant women consuming adequately iodized salt (iodine content of 15 ppm and more) ranged from 48.5% to 68.3%. Counterintuitively, the district (Solan) with the lowest urinary iodine concentration and percentage of pregnant women consuming adequately iodized salt also had the lowest total goitre rate, with no explanation offered for this discrepancy except that the samples from Solan were analysed twice ⁽¹⁰⁾. The outcomes of micronutrient deficiencies require careful monitoring at the same time as dietary data are collected to strengthen the evidence when shaping nutritional guidelines for pregnancy.

The articles included in this month's issue cover a broad range of topics related to nutrition in the first 500 days and are consistent with priorities identified previously. We hope that the points highlighted here can further contribute to the design of future research and interventions focused on priorities for a common agenda for women's and children's nutrition.

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