Maternal Nutrition Interventions to Improve Maternal, Newborn and Child Health Outcomes

Usha Ramakrishnan, Beth Imhoff-Kunsch and Reynaldo Martorell

Maternal undernutrition affects a large proportion of women in many developing countries, but has received little attention as an important determinant of poor maternal, newborn, and child health (MNCH) outcomes such as intrauterine growth restriction, preterm birth (PTB), and maternal and infant morbidity and mortality [1]. We recently evaluated the scientific evidence on the effects of maternal nutrition interventions on MNCH outcomes as part of a project funded by the Gates Foundation to identify critical knowledge gaps and priority research needs [2]. In addition to systematic reviews that focused on nutrition interventions during pregnancy, we also evaluated nutrition-sensitive interventions before and during pregnancy that included antihelminthics in pregnancy, nutrition education and counseling, household food production, short interpregnancy interval, early age at first childbirth, nutrition before and during pregnancy, and intergenerational influences on child growth and undernutrition because of their potential impact on maternal and child health outcomes. A standardized tool was used for study data abstraction, and the effect of nutrition interventions during pregnancy or factors such as interpregnancy interval on MNCH outcomes was assessed by meta-analysis, when possible. Authors graded the quality of evidence for each intervention, where data were available, using the Child Health Epidemiology Reference Group’s (CHERG) adaptation of the GRADE methodology as a guide [3, 4]. We reviewed meta-analyses of the following specific supplementation trials during pregnancy: iron or iron + folic acid, vitamin A, select B vitamins, vitamin D, n-3 long-chain polyunsaturated fatty acids, iodine, zinc, calcium, multiple micronutrient, balanced protein-energy, and antihelminthics. The number of trials ranged from 0 to 20 and varied by type of intervention and outcome measured. The majority of included trials reported more information on newborn outcomes such as low birthweight (LBW; <2,500 g), birthweight, and PTB
(<37 weeks gestation) than on maternal outcomes. We found only 3 trials that examined maternal mortality. Several nutrient interventions provided during pregnancy have beneficial effects on MNCH outcomes, but are not widely adopted. For example, prenatal calcium supplementation decreases the risk of PTB by 24% and increases birthweight by 86 g; prenatal zinc, omega-3 fatty acids and multiple micronutrient supplements reduce the risk of PTB by 14%, early PTB (<34 weeks) by 26%, and LBW by 14%, respectively. Among currently implemented interventions, balanced protein-energy and iron-folic acid supplementation during pregnancy significantly reduces the risk of LBW by 20–30% in controlled settings, but variable programmatic experiences have led to questionable effectiveness. Among nutrition-sensitive interventions, early age at pregnancy and short interpregnancy intervals were associated with increased risk of PTB, LBW and neonatal death, but major gaps remain on the role of women’s nutrition before and during early pregnancy and nutrition education and counseling. These findings emphasize the need to examine the benefits of improving maternal nutrition before and during pregnancy both in research and program delivery.

References

2. Special Issue: Improving maternal, newborn, and child health outcomes through better designed policies and programs that enhance the nutrition of women. Paediatr Perinat Epidemiol 2012;26(suppl 1):1–325.