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Shaheen R et al. "Effect of prenatal food supplementation on birth weight: an observational study from Bangladesh." AJCN (2006); 83:1355-61.

OBJECTIVES: National nutrition programs in Bangladesh have included prenatal food supplementation to reduce maternal and child malnutrition. The knowledge base is weak regarding the effect of prenatal food supplementation on the birth weight (BW) of infants in populations in whom low BW is prevalent and regarding any variation in effect based on maternal nutritional status. We examined whether observational data support an effect of daily prenatal food supplementation on BW by considering the duration of supplementation and whether the effect is modified by maternal postpartum weight (a proxy of prepregnancy weight) groups.

CONCLUSION: The association between duration of prenatal food supplementation and BW varies with maternal postpartum weight. A large effect was observed after the season with food insecurity (mid-August to mid-November).complemented with a balanced energy and protein supplement to produce a clinical effect on birth size.

Vaidya A et al. "Effects of antenatal multiple micronutrient supplementation on children's weight and size at 2 years of age in Nepal: follow-up of a double-blind randomised controlled trial." Lancet (2008); 371:492-9.

OBJECTIVES: The negative effects of low birthweight on the later health of children in developing countries have been well studied. However, undertaking programmes to address this issue can be difficult since there is no simple correlation between increasing birthweight and improving child health. In 2005, we published results of a randomised controlled trial in Nepal, in which 1200 women received either iron and folic acid or a supplement that provided the recommended daily allowance of 15 vitamins and minerals, over the second and third trimesters of pregnancy. Here, we report on 2-3 years' follow-up of children born during the trial. We visited children at home and obtained data for the primary outcomes of weight and height, for childhood illnesses, and maternal blood haemoglobin.

CONCLUSION: In a poor population, the effects of maternal multiple micronutrient supplementation on the fetus persisted into childhood, with increases in both weight and body size. These increases were small, however, since those exposed to micronutrients had an average of 2% higher weight than controls. The public-health implications of changes in weight and blood pressure need to be clarified through further follow-up.

Huybregts L et al. "Prenatal food supplementation fortified with multiple micronutrients increases birth length: a randomized controlled trial in rural Burkina Faso." AJCN (2009).

OBJECTIVES: Prenatal multiple micronutrient (MMN) or balanced energy and protein supplementation has a limited effect on birth size of the offspring. The objective was to determine

whether a prenatal MMN-fortified food supplement (FFS) improves anthropometric measures at birthcompared with supplementation with an MMN pill alone.

CONCLUSION: The provision of FFS to pregnant women resulted in higher birth length than did MMN supplementation. For women with a suboptimal prepregnancy nutritional status, MMN supplementation should be complemented with a balanced energy and protein supplement to produce a clinical effect on birth size.

Chaparro CM and Dewey KG. "Use of lipid-based nutrient supplements (LNS) to improve the nutrient adequacy of general food distribution rations for vulnerable sub-groups in emergency settings." Matern Child Nutr. (2010); 6 Suppl 1:1-69.

OBJECTIVES: Currently, the main food and nutrition interventions in emergency settings include general food distribution (GFD) rations, which are provided to the affected population as a whole, and selective (or supplementary) feeding programs (SFP), which are to be provided to nutritionally vulnerable or malnourished individuals. In addition to logistical and operational challenges that may limit the intended effect of these programs, the nutritional quality of the food commodities provided may be insufficient to meet the needs of infants and young children and PLW. The focus of this document is the potential role of LNS in meeting the nutritional needs of these vulnerable subgroups, with the goal of preventing malnutrition in emergency-affected populations.

CONCLUSION: The results indicate that the typical GFD ration currently provided in emergency settings--based on cereals, pulse, an FBF such as corn-soy blend (CSB), oil, salt and sugar-does not meet the nutritional needs of infants and young children and PLW. The hypothetical intake from a ration composed of food aid commodities (based on the current USAID/USDA specifications for exported food aid commodities used in emergency settings), and including breast milk for children 6-24 months of age, provided less than 75% of the recommended intake for several micronutrients for certain age/physiologic groups, including calcium, iron, zinc, B vitamins such as riboflavin, B6 and B12, and fat-soluble vitamins such as D, E and K. It also generally contained lower than recommended levels of fat and essential fatty acids. The initial LNS formulation for each target group was designed to provide 100% of the recommended amount (RDA or RNI) for most micronutrients per daily dose (20 g, approximately 118 kcal) of LNS. This would ensure consumption of the recommended levels of each nutrient even if the ‘base’ diet changed.

Adu-Afarwuah S et al. "Acceptability of lipid-based nutrient supplements (LNS) among Ghanaian infants and pregnant or lactating women." Matern Child Nutr. (2011); 7:344-56.

OBJECTIVES: Inadequate micronutrient intake during pregnancy, lactation and infancy is a major problem in many developing countries. Lipid-based nutrient supplements (LNS) can improve micronutrient status, growth and development of infants, and also have potential to improve nutritional status of pregnant and lactating women. The objective of the study was to test the acceptability of LNS designed for infants (LNS-20gM) and pregnant or lactating women (LNS-P&L).

CONCLUSION: On average, infants consumed 76.2% of the test meal [95% (confidence interval) CI: 65.7, 86.7], while women consumed 87.1% (95% CI: 82.6, 91.6). During the 14-day period, median daily consumption of LNS-20gM was 19.3 g, very close to the recommended 20 g d(-1), while that of LNS-P&L was one sachet, as recommended. We conclude that LNS-20gM and LNS-P&L were well accepted.nal micronutrient supplementation require further research.

Haider BA et al. "Effect of multiple micronutrient supplementation during pregnancy on maternal and birth outcomes." BMC Public Health (2011); 11 (Suppl 3): S19.

OBJCTIVES: Given the widespread prevalence of micronutrient deficiencies in developing countries, supplementation with multiple micronutrients rather than iron-folate alone, could be of potential benefit to the mother and the fetus. These benefits could relate to prevention ofmaternal

complications and reduction in other adverse pregnancy outcomes such as small-for-gestational age (SGA) births, low birth weight, stillbirths, perinatal and neonatal mortality. This review evaluates the evidence of the impact of multiple micronutrient supplements during pregnancy, in comparison with standard iron-folate supplements, on specific maternal and pregnancy outcomes of relevance to the Lives Saved Tool (LiST).

CONCLUSION: This review provides evidence of a significant benefit of MMN supplementation during pregnancy on reducing SGA births as compared to iron-folate, with no significant increase in the risk of neonatal mortality in populations where skilled birth care is available and majority of births take place in facilities. Given comparability of impacts on maternal anemia, the decision to replace iron-folate with multiple micronutrients during pregnancy may be taken in the context of available services in health systems and birth outcomes monitored.

Kawai K et al. "Maternal multiple micronutrient supplementation and pregnancy outcomes in developing countries: meta-analysis and meta-regression." Bull World Health Organ 89 (2011); 6: 402–411B.

OBJECTIVES: To systematically review randomized controlled trials comparing the effect of supplementation with multiple micronutrients versus iron and folic acid on pregnancy outcomes in developing countries. MEDLINE and EMBASE were searched. Outcomes of interest were birth weight, low birth weight, small size for gestational age, perinatal mortality and neonatal mortality. Pooled relative risks (RRs) were estimated by random effects models. Sources of heterogeneity were explored through subgroup meta-analyses and meta-regression.

CONCLUSION: Maternal education or gestational age at initiation of supplementation may have contributed to the observed heterogeneous effects on perinatal mortality. The safety, efficacy and effective delivery of maternal micronutrient supplementation require further research.

Yang Z et al. “Review of fortified food and beverage products for pregnant and lactating women and their impact on nutritional status.” Matern Child Nutr. (2011); 7 (Suppl. 3): 19–43.

CONCLUSION: Fortified food supplements containing milk and essential fatty acids offer benefits to improving maternal status and pregnancy outcome. Fortified beverages containing only multiple micronutrients have been shown to reduce micronutrient deficiencies such as anaemia and iron deficiency.

Roberfroid D et al. “Prenatal Micronutrient Supplements Cumulatively Increase Fetal Growth.” J Nutr. 142 (2012):548-54.

OBJECTIVES: Prenatal multiple micronutrients (UNIMMAP) improve fetal growth only moderately compared to iron and folic acid alone (IFA). Whether this is due to insufficient amounts of UNIMMAP or to IFA being in reality an active control is unknown. We assessed the association between cumulative micronutrient intake (CMI) and fetal growth by secondary analysis of a randomized controlled trial in Burkina Faso where tablet intake was directly observed.

CONCLUSION: In conclusion, for both IFA and UNIMMAP, the effect on fetalgrowth is cumulative. The supplementation should therefore begin as early as possible in pregnancy, even if the growth increment per CMI is higher in late than in early pregnancy. Women with a low BMI should also receive extra energy.