Background and Objectives:

Over one-quarter of a million women die each year from complications of pregnancy and childbirth. Of these, 99% occur in developing countries with the majority occurring in Sub-Saharan Africa and South Asia. In low-income countries, the maternal mortality ratio is still 100-200 times higher than in Europe or North America. The four major causes of death from obstetric complications are hemorrhage, sepsis, eclampsia, and obstructed labor. The World Health Organization (WHO) estimates that approximately 20% of maternal deaths are due to indirect causes—diseases that are not complications of pregnancy, but that are complicated or aggravated by it, such as malaria, anemia, HIV/AIDS, and cardiovascular disease. The objective of this review was to examine the evidence for nutrition deficiencies or the provision of specific nutrients during pregnancy in increasing or decreasing risk of the four major, direct causes of maternal deaths: postpartum hemorrhage (PPH); sepsis or infection (S); pre-eclampsia and eclampsia (PE/E); and obstructed labor (OL).

Methods:

Multiple searches of the literature, using key words, were conducted in PubMed and POPLINE in 2011 to identify studies on nutrition and the four main, direct causes of maternal mortality. The search did not focus on calcium or magnesium because WHO had recently reviewed the available evidence related to these two micronutrients and the prevention and treatment of pre-eclampsia/eclampsia. The “snowball technique” was used to find additional related studies and reviews by checking the references in systematic review papers and the articles and reviews identified through the search engines. The WHO website was used to identify the remaining articles. Of the 216 records retrieved, 116 were selected as relevant to the topic. Of these, 46 were selected for review and the remaining 70 articles were excluded because they were not controlled trials or observational studies. A review instrument was developed and used to record standard information on each study, including information about the type of study (e.g., observational), subjects and sample size, the article’s proposed mechanism for the nutrient of interest, results, and program and intervention inputs.

Results:

Most of the results were conflicting with studies finding positive, negative, or no effect of nutritional status or nutrient supplementation on the 4 obstetric outcomes. There was a consistent finding in 3 studies that confirms that short stature puts women at risk for OL. Iron-folic acid supplements decreased the risk of PPH in two studies while anemia increased the risk of PPH in two studies and had no effect in another. One analysis identified a 25% decrease in maternal mortality with a 1 g/dl increase in pregnancy hemoglobin. Many of the studies investigated the effect of single nutrients on PE/E. In two separate studies, selenium and lycopene supplements decreased the risk of PE/E. In another study, folic acid and vitamin B-12 levels had no effect on the risk of PE/E, but homocysteine levels increased risk of PE/E. Vitamin D supplements decreased the risk of PE/E in two studies and had no effect on PE/E in two studies. Low vitamin D levels increased the risk of PE/E. Vitamin C and E supplements decreased risk of PE/E in three studies but had no effect in 1 study and vitamin C (2 studies) and E (1 study) alone had no effect. High dietary intake of vitamin C decreased risk of PE/E in one study. However, a systematic review found no effect of vitamin C on PE/E. High and low dietary intake of essential fatty acids (n-3; n-6) were found to increase the risk of PE/E in two separate studies. A systematic review found no effect of marine oils on PE/E. A study on multi-micronutrient supplementation (MMN) found a decreased risk of sepsis when mothers received a MMN but an increased risk of OL.

Conclusions:

Much of the evidence for nutrition’s role in the 4 major obstetric complications that cause death is conflicting. Short stature in women, from nutrition insult during childhood, is consistently associated with obstructed labor, a finding from past research. Improving infant and young child feeding and nutrition thus becomes a key strategy in not only decreasing child mortality but also in decreasing maternal deaths from OL. Iron-folic supplements are known to reduce anemia and a reduction in anemia could lead to a decrease in PPH. The different findings in the studies may be due to study design, differences in the populations studied, or lack of power to detect an effect. In addition, a single nutrient may have less effect as a supplement than it does when it is present in food. More research is needed to evaluate if a nutritious diet, and all its nutrients and phytochemicals, improves obstetric outcomes for women in developing countries. However, there is enough evidence about the importance of an adequate maternal diet in general and on newborn outcomes. The international community needs to focus on improving the diversity of the diet of women in developing countries which will be beneficial to them and their babies.

Keywords:

pregnancy, nutrition, obstetric outcomes