

Focusing on Maternal Nutrition to Improve the Health and Well-Being of Pregnant Women in the United States

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Women's health, nutrition, and well-being across the continuum of preconception, pregnancy, and postpartum are critical for ensuring positive pregnancy outcomes and long-term outcomes for both mothers and their offspring.^{1,2}

CURRENT STATE AND IMPORTANCE OF MATERNAL NUTRITION

Poor maternal nutrition remains a critical public health problem globally, including the United States. The global prevalence of maternal underweight and short stature were 14.2% and 9.7%, respectively, in 2015, and nearly half were still anemic. Although we have made significant progress in reducing maternal underweight, there is considerable inequality by region, combined with little to no progress for the other indicators, such as anemia, and increases in overweight and obesity.^{1,3}

Studies have shown that routine prenatal iron-folate supplementation is effective in reducing anemia and

improving birth outcomes, but several other micronutrient deficiencies (vitamins A, D, B₁, B₂, B₆, B₁₂, and zinc) are common, especially during pregnancy and lactation, when requirements are increased,^{1,4} and factors such as climate change, the COVID-19 pandemic, and conflicts are expected to worsen the availability of and access to quality food across the globe by 2030.⁵ Although the prevalence of anemia during pregnancy is much lower in the United States than in other parts of the world, 1 in 10 pregnant women who participated in the Special Supplemental Nutrition Program for Women, Infants, and Children were anemic, and these rates were much higher in selected subgroups and also increased from 2008 to 2018 in some states.⁶ Poor diet quality and inadequate intakes of key nutrients such as *n*-3 fatty acids, iodine, and iron are also common in the United States.^{7,8} Data from the National Health and Nutrition Examination Surveys show that more than 95% of women of reproductive age, including pregnant women, do not meet the recommended intake of at least 250 milligram (mg) of the long chain *n*-3 fatty acids, docosahexaenoic acid, and

eicosapentaenoic acid, and iodine status is also suboptimal during pregnancy.^{8,9}

Finally, a major concern is the increased consumption of ultra-processed foods and reduced physical activity that have contributed to dramatic increases in obesity and overweight across the life course in the past three decades.¹⁰ Maternal obesity is a major risk factor for adverse pregnancy outcomes, including gestational diabetes, hypertension, preeclampsia, cesarean delivery, preterm delivery, large size for gestational age, and infant death, and recent data from the National Vital Statistics System show that prepregnancy obesity (body mass index >30 kg/m²) increased from 26.1% in 2016 to 29% in 2019 in the United States across all age, education, and race/ethnicity groups.^{10,11} Furthermore, women who are overweight or obese may also experience increased difficulties in breastfeeding their infants.¹²

CAUSES OF MATERNAL MALNUTRITION

The causes of maternal malnutrition are complex and multifactorial. Similar to child undernutrition, the distal causes, namely the underlying social, economic, and political context and the lack of capital (financial, human, physical, social, and natural), may affect maternal nutritional status either directly or indirectly through more proximal factors, including access to health services, water, and sanitation, women's status, and food insecurity.² Of particular note is the role of women's status, including access to education, early age at marriage or unplanned pregnancies, maternal empowerment, and gender equality. Although women have more rights in countries such as the United States, disparities remain for many of the above indicators. Similarly, food insecurity may

also affect women disproportionately in many settings, including the United States, and can be influenced by food affordability, availability, and distribution of food between household members. Finally, even in developed countries such as the United States, access to quality health care (both preventive and treatment of high-risk conditions) and healthy food, especially for pregnant and lactating women, remains a challenge in many communities that face a range of disparities. Collectively, these factors influence the health and nutritional status of women (inadequate dietary intake, care for women, and disease) both before and during pregnancy.

PRIORITY AREAS AND KNOWLEDGE GAPS

Despite progress resulting from improvements in living conditions and women's status, there remain several important priority areas and knowledge gaps for improving women's nutrition (Box 1). Although there is a strong evidence base for maternal nutrition interventions, most of them focus on pregnancy, which is a very narrow yet important window of opportunity. For example, several systematic reviews provide evidence supporting the provision of prenatal iron-folate supplementation to improve birth outcomes, but studies evaluating preconception interventions are still limited, with the exception of preconceptional folic acid.^{2,3} The success story of folate

fortification is an excellent example of public-private partnership that has significantly reduced the burden of preventable neural tube defects and congenital anomalies in the United States and several other countries globally by reaching women during the critical period when they do not know that they are pregnant. Mandatory fortification of cereal grain products went into effect in January 1998 in the United States, and studies show that the number of neural tube defects, such as spina bifida, have dropped by 25%.¹³ Similar efforts are needed to find ways to ensure that women enter pregnancy in optimal health and with good nutrition. Another major gap is the paucity of representative data, even in the United States, on nutrient intakes and status, especially among pregnant and lactating women, which are needed to track trends and target appropriate interventions.

Although the United States has one of the lowest infant mortality rates, declining steadily from the 1990s to an all-time low of 5.6 deaths per 1000 births in 2019, pregnancy-related deaths and serious complications for mothers have increased during the past 30 years, with significant disparities by race/ethnicity and region.¹⁴ There is no doubt that obesity and related chronic diseases, such as high blood pressure, diabetes, and heart disease, are important risk factors that need to be addressed even before women conceive and continue beyond

delivery by including provision of comprehensive care referrals postpartum to step up the next pregnancy for success. Although there is convincing evidence about the benefits of lifestyle interventions that include nutrition education and promotion of physical activity to reduce the burden of non-communicable diseases such as diabetes and cardiovascular disease, most of these studies have focused on high-risk individuals or older adults,^{15,16} and there is an urgent need to test and integrate effective interventions for women during the reproductive years.

FUTURE DIRECTIONS

The next frontier requires a greater focus on implementation science and equity to decrease disparities in women's health and nutritional status and use a life-cycle approach that begins in early childhood through the school-age years and early adulthood. Globally, efforts are underway to improve the health and nutritional status of adolescent girls and to find ways to encourage health checkups for women before they become pregnant. Strategies that address the dual burden of malnutrition that includes both under- and overnutrition and micronutrient malnutrition are urgently needed and should include approaches that focus on the food environment and promote healthy lifestyles that address both diet quality and quantity and physical activity.

Last but not least, interventions are needed to strengthen health systems that will ensure timely access to quality antenatal and postpartum care, combined with targeted interventions for high-risk groups and innovative strategies that prioritize preconception nutrition and access to health and family planning resources. Finding effective

BOX 1— Priority Areas for Improving Women's Nutrition

- Increased focus on women's nutrition across the continuum of preconception, pregnancy, and postpartum
- Greater focus on implementation science and equity to decrease disparities in women's health and nutritional status
- Implementation of strategies that address the dual burden of malnutrition, especially overnutrition and micronutrient malnutrition
- Innovations to strengthen health systems and ensure timely access to quality care for women

ways to increase access to routine annual health checkups that include the identification of risk factors such as overweight and obesity, prediabetes, hypertension, and anemia, which could result in complicated pregnancies followed by quality postpartum care, are urgently needed.

In conclusion, although there is a need to continue to support current efforts to ensure timely and early access to quality antenatal and postpartum care for all pregnant and lactating women, an increased focus on women's health and nutrition with a commitment to improve preconception care is needed to improve the health and well-being of current and future generations. **AJPH**

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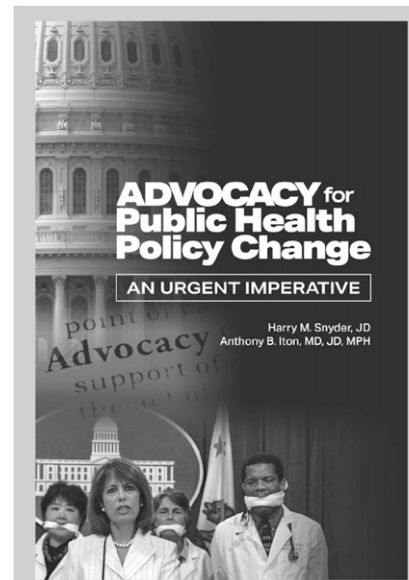
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CONFLICTS OF INTEREST

The author has no conflicts of interest to declare.

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