

## Supplements in pregnancy

Roslynn van Schoor

### Introduction

Although adequate nutrition is essential through all stages of life, it is undoubtedly the cornerstone of ensuring health during pregnancy. Pregnancy demands an increased nutrient intake as a result of the drastic changes the female body undergoes to provide for the growing foetus. Studies show that insufficient intake of micronutrients during pregnancy can cause harm to both the mother and child. There is also evidence to suggest that the preconceptual nutritional status of a woman can influence pregnancy outcome. For this reason, it is advised that women consume high levels of nutrient-dense foods before and during pregnancy, as well as throughout lactation. However, this is not always feasible, particularly in developing countries where prospective mothers may not have access to an abundance of high-quality foods. In order to maintain an optimal nutritional status during pregnancy, it has become common practice for women to take prenatal supplements. Although nutrient supplementation has the potential to improve pregnancy outcome, an excessive intake of certain vitamins and minerals can cause more harm than good.<sup>1,2</sup>

### The role of micronutrients\* and supplements in pregnancy

Poor nutritional status during pregnancy has been proven to increase the risk of illness and even death for both the mother and child. Suboptimal nutrient intake during pregnancy is associated with higher instances of high blood pressure in pregnancy, intrauterine growth restriction (IUGR) and preterm delivery. If nutritional needs cannot be met through diet, it is advised that women take prenatal supplements before and during pregnancy, as well as throughout lactation.<sup>1,2,3</sup>

The female body undergoes many physiological changes during pregnancy, one of which is a 15% increase in metabolic rate. This means that an additional 320 to 452 kcal/day should be consumed to allow for a healthy weight gain of about 12.5 kg over the duration of the pregnancy. Other changes include hormonal adjustments, altered nutrient metabolism, increased cardiac output, a 50% increase in blood volume and the development of specialised maternal tissues such as the placenta and mammary glands.<sup>4</sup> Some of the most essential nutrients required for this process include folic acid, vitamin B<sub>12</sub>, iron, and many others.<sup>1</sup>

### Folic acid

Folic acid is arguably the most essential micronutrient for maternal health and foetal development. It is required for blood and DNA synthesis and ensures proper placental growth. Folate is acquired naturally through the consumption of fortified grains and dark, leafy vegetables. Recommended daily intake of folate increases from 400 ug to between 600 and 800 ug during pregnancy.<sup>4</sup> Folic acid requirements are further increased in obese women, as well as for women who drink alcohol, smoke or have certain illnesses (e.g. diabetes mellitus).<sup>1</sup> Low folic acid intake is associated with an increased risk of miscarriage, low birth weight and preterm delivery. Folic acid is most important in the first 28 days of pregnancy as it plays an instrumental role in the development of the foetal nervous system. Neural tube defects such as spina bifida often occur as a result of insufficient folate intake during the early stages of pregnancy. It is therefore advised that prospective mothers increase their folate intake before conception. In unplanned pregnancy, which is prevalent in South Africa, sufficient nutrient care in early pregnancy is often not achieved.<sup>5</sup> For this reason, birth defects resulting from folic acid insufficiency remain an issue. It is difficult to reach recommended folate requirements through diet alone and supplementation is often advised. However, high levels of folic acid may mask vitamin B<sub>12</sub> deficiency and increase risk of miscarriage. A multivitamin containing no more than the recommended daily allowance (RDA) for folic acid is advised for prospective mothers.<sup>3,4</sup>

\*Macronutrients = carbohydrates, proteins and fats; Micronutrients = vitamins, minerals and trace elements

## Vitamin B<sub>12</sub>

Vitamin B<sub>12</sub>, also known as cobalamin, functions with folate to allow for optimal growth and normal development of the foetus. The RDA of vitamin B<sub>12</sub> during pregnancy is 2.6 ug. Animal-based products and fortified grains are the primary sources of vitamin B<sub>12</sub>.<sup>2</sup> Vegans, or individuals following restrictive diets, are often at risk for vitamin B<sub>12</sub> deficiency, which can have a negative impact on the pregnancy. Vitamin B<sub>12</sub> is often included in multivitamin, prenatal supplements.<sup>1</sup>

## Iron

Blood volume increases dramatically during pregnancy, which causes a decline in haemoglobin and iron levels.<sup>3</sup> Consequently, iron requirements increase dramatically from 18 ug to 27 ug during pregnancy. Lack of iron can result in iron-deficiency anaemia which compromises oxygen transport across the placenta. This increases the risk of preterm delivery, poor foetal brain development and complications during delivery. It is difficult to reach the higher RDA for iron during pregnancy by means of diet alone, which is why iron supplementation is strongly advised. This being said, excessive iron intake can reduce zinc absorption, which can lead to various complications. Iron requirements remain high after pregnancy to compensate for the blood lost during childbirth and to promote healthy lactation.<sup>1,4</sup>

## Vitamin A

Vitamin A sufficiency has been shown to reduce instances of maternal but not foetal death.<sup>3</sup> Although vitamin A requirements increase by 10% during pregnancy, birth defects caused by excess intake means that supplementation is not recommended.<sup>4</sup>

## Zinc

Zinc requirements increase from 8 µg to 11 µg. Even a slight zinc deficiency increases the risk of poor foetal development, and oral clefts.<sup>3,4</sup>

## Vitamin D

Vitamin D is often included in prenatal supplements due to the role it plays in proper skeletal development of the foetus. The RDA for vitamin D for a healthy adult, as well as for pregnant women, is 600 ug per day. Vitamin D requirements can easily be met through adequate sun exposure, if not through dietary means.<sup>1,4</sup>

## Selenium

The selenium RDA for pregnant women is 60 ug/day. Studies have shown that adequate selenium intake prevents the

development of high blood pressure in the mother and growth restriction in the foetus.<sup>4</sup>

## Others

Adequate intake of micronutrients such as calcium, magnesium, copper and the B vitamins is also necessary for a healthy pregnancy. Another important aspect to consider during pregnancy, is the sufficient intake of essential fatty acids. Omega-3 and -6 fatty acids have been shown to improve foetal cognitive development and can be included in nutritional supplements if needs are not met through diet.<sup>2</sup>

## Choosing prenatal supplements

The increased macro- and micronutrient requirements of pregnant women are difficult to achieve through diet alone. This is especially true if the prospective mother has a poor nutritional status, follows unhealthy lifestyle practices (e.g. drinks alcohol or smokes) or is chronically ill. Dietary supplementation with multivitamins is beneficial in ensuring proper growth and development of the foetus, maintaining maternal health and reducing risk of pregnancy-related complications. Prenatal supplements should not contain more than 100% of the RDA of a specific nutrient as excessive intake of certain vitamins and minerals can have toxic effects.<sup>1,4</sup>

## Conclusion

Pregnancy requires increased energy and micronutrient intake. Poor nutrition in pregnancy is associated with maternal and foetal health implications. For this reason, women should ensure that they meet their RDAs for all essential macro- and micronutrients\*. If this cannot be achieved by consuming a variety of nutrient-dense foods, it is highly recommended that women take prenatal supplements before and during pregnancy to ensure the optimal health of their child.

## References

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