

## Policy Extract

### [Nutrition in pregnancy](#)

This briefing paper will outline the physiological changes that take place during pregnancy and the influence of maternal diet and nutritional status on fetal outcome. The current UK dietary recommendations for women both prior to and during pregnancy will be discussed in detail, together with their evidence basis. Food safety issues are also covered, as well as diet-related conditions during pregnancy, such as anaemia and gestational diabetes. Issues relating to specific groups, including vegetarians and teenagers, are discussed in the final section.

### Physiological changes during pregnancy

#### Key points:

- For women with a normal pre-pregnancy weight, an average weight gain of 12 kg (range 10–14 kg) is associated with the lowest risk of complications during pregnancy and labour, and with a reduced likelihood of having a LBW infant.
- In practice, women who are normally of a healthy weight vary widely in the amount of weight they gain during pregnancy.
- There are currently no official recommendations for weight gain in the UK; however, in the USA, there are recommendations based on pre-pregnancy BMI.
- Low gestational weight gain is associated with an increased risk of having a LBW baby. Conversely, excessive weight gain is associated with complications during pregnancy and an increased likelihood of overweight and obesity in the mother after the birth.
- Several metabolic and hormonal changes take place during pregnancy that help to meet the demands of the growing fetus, e.g. increased absorption of minerals, such as iron and calcium.

### Birthweight and the fetal origins hypothesis

#### Key points:

- A birthweight of 3.1–3.6 kg has been shown to be associated with optimal maternal and fetal outcomes for a full-term infant.
- Macrosomia (birthweight >4.5 kg) is associated with a number of obstetric complications, as well as higher rates of neonatal morbidity and mortality.
- LBW (birthweight <2.5 kg) is associated with an increased risk of neonatal morbidity and mortality, as well as an increased risk of diseases in later life.
- There are a number of risk factors for having a LBW infant, including low pre-pregnancy BMI, poor diet, smoking and use of alcohol or drugs during pregnancy, and many of these factors are associated with low socioeconomic status.
- LBW is associated with increased rates of CVD, hypertension and type 2 diabetes in adulthood. The fetal origins hypothesis states that these effects may be a consequence of 'fetal programming', whereby a stimulus or insult at a critical, sensitive period in development has a permanent effect on physiology, structure or metabolism of tissues and organs.

- However, there is little evidence that in healthy, well-nourished women, the maternal diet can be manipulated in order to prevent LBW and the risk of subsequent diseases in later life of the offspring.

## **Essential fatty acids and pregnancy**

### **Key points:**

- The long-chain PUFAs, AA and DHA are important for fetal development of the brain, nervous system and retina, so an adequate supply is essential during pregnancy.
- There is currently a lot of research interest in fish oil supplements and their potential benefits during pregnancy. There is some evidence that increasing the intake of long-chain n-3 PUFAs during pregnancy (e.g. from fish oils) may have beneficial effects on birthweight and the duration of pregnancy; however, not all studies have produced consistent results.
- The best dietary source of long-chain n-3 PUFAs is oil-rich fish, and regular consumption of oil-rich fish is recommended during pregnancy (up to two portions per week). However, taking cod liver oil supplements is not advised during pregnancy as they can contain high levels of vitamin A (see section 7.1).

## **Pre-pregnancy nutritional issues**

### **Key points:**

- It is recommended that women who are considering a pregnancy should try to achieve a healthy bodyweight (BMI of 20–25), as being either underweight or overweight can affect both fertility and birth outcome.
- Pre-pregnancy nutritional status is an important determinant of fetal growth and development, and therefore a healthy and varied diet is important for women planning a pregnancy. Certain food safety recommendations should also be followed (see section 7).
- It is now well established that taking a folic acid supplement prior to conception and during the first 12 weeks of pregnancy helps prevent the occurrence of NTDs, such as spina bifida.

## **Nutritional requirements during pregnancy**

### **Key points:**

- With a few exceptions, the dietary recommendations for pregnant women are the same as for other adults.
- There is an increased requirement for energy, protein and several micronutrients during pregnancy, including thiamin, riboflavin, folate and vitamins A, C and D.
- The energy costs of pregnancy have been estimated at around 321 MJ (77 000 kcal), in a recent consultation by WHO, but this is not spread evenly throughout pregnancy. Most of the extra energy requirement is during the second and third trimesters.
- In the UK, an extra 200 kcal of energy per day is recommended during the third trimester only. However, this assumes a reduction in physical activity level, and women who are underweight or who do not reduce their activity level may require more.
- There is an increased requirement for folate throughout pregnancy to help prevent megaloblastic anaemia. In addition to the recommendation to take supplemental folic

acid until the 12th week, it is advisable to consume plenty of folate-rich foods throughout pregnancy.

- Some groups of women in the UK are vulnerable to vitamin D deficiency, and it is recommended that pregnant women take a vitamin D supplement of 10 µg per day throughout pregnancy as a precautionary measure.
- There is no increment in calcium requirements during pregnancy as metabolic adaptations enable more efficient absorption and utilisation during this period. However, certain groups, such as teenagers, require more as they are still growing.
- A large proportion of young women in the UK have low iron stores, and therefore may be at risk of anaemia should they become pregnant. Furthermore, iron intakes in the UK appear to be decreasing. Pregnant women are therefore advised to consume plenty of iron-rich foods during pregnancy and in some cases, iron supplementation may be necessary.

## **Food safety issues during pregnancy**

### **Key points:**

- Excessive intakes of vitamin A, in the form of retinol, are toxic to the developing fetus and may cause birth defects; therefore, pregnant women, or those who may become pregnant, are advised to limit their intake of vitamin A by avoiding liver and liver products and supplements containing retinol.
- Alcohol consumption in high amounts can be potentially damaging to the developing embryo and may cause fetal alcohol syndrome. The DH advises pregnant women, and those who may become pregnant, to limit their alcohol consumption to no more than 1–2 units, once or twice per week.
- High intakes of caffeine during pregnancy may increase the risk of LBW or miscarriage, and therefore pregnant women, or those who may become pregnant, are advised to limit their intake of caffeine to 300 mg per day.
- Pregnant women are advised to pay particular attention to food hygiene and to avoid certain foods during pregnancy in order to minimise the risk of food poisoning from potentially harmful pathogens, such as listeria and salmonella.
- Pregnant women and those who may become pregnant are advised to consume no more than two portions of oil-rich fish per week, to avoid exposure to dioxins and PCBs. They should also avoid shark, marlin and swordfish, and limit their intake of tuna to prevent exposure to methylmercury, which can be harmful to the developing fetus.
- The incidence of peanut allergy in children is on the increase; however, there is a lack of evidence that prenatal exposure to peanuts causes the development of peanut allergy in infants. Pregnant women are currently only advised to avoid peanuts during pregnancy if there is a strong family history of allergic disease.

## **Diet-related conditions during pregnancy**

### **Key points:**

- Symptoms of morning sickness, nausea and vomiting are commonly reported in pregnancy. Changes in appetite and taste (e.g. cravings or aversions to foods) also frequently occur. As long as the diet is balanced overall, such changes are unlikely to have any adverse effect on nutritional status.

- It is also common for women to suffer from constipation during pregnancy; increasing fibre intake, drinking plenty of fluids and taking gentle exercise can help alleviate the condition.
- Anaemia in pregnancy has effects on both the mother and the fetus, and may lead to a variety of symptoms. In most cases, it is caused by iron deficiency, which is fairly common during pregnancy but can be difficult to diagnose. IDA is a risk factor for both LBW and pre-term delivery, and is usually treated with oral iron supplementation.
- GDM is the most common metabolic disorder of pregnancy, occurring in around 2% of all cases. GDM is more common in certain ethnic groups and women who are overweight or obese. It can lead to an increased likelihood of complications, such as macrosomia and labour difficulties. Dietary management is usually sufficient in treating the condition, but more research is needed in this area.
- Hypertensive disorders, such as pre-eclampsia, can sometimes occur towards the end of pregnancy. Obesity is a risk factor for pre-eclampsia, but there is some evidence that other dietary factors may be linked. Research is ongoing into whether supplementation during pregnancy (e.g. with antioxidant vitamins or calcium) may help prevent this condition.

### **Issues for specific groups**

#### **Key points:**

- Vegetarians and vegans can have difficulty meeting their requirements for certain micronutrients during pregnancy, particularly riboflavin, vitamin B12, calcium, iron and zinc.
- Studies comparing birth outcomes (e.g. birthweight, length of gestation) in vegetarian or vegan mothers and omnivores, have so far not produced consistent results.
- Most vegetarian and vegan women should be able to meet their nutrient requirements during pregnancy with careful dietary planning. However, those on very restricted diets may also need to consume fortified foods or supplements.
- Teenage pregnancy occurs at a time when the maternal body already has high nutrient requirements for growth and development, and therefore there is potential competition for nutrients. Moreover, a large proportion of teenage girls have low intakes of a range of nutrients that are important during pregnancy.
- There are a number of nutrition-related problems associated with adolescent pregnancy, including low gestational weight gain and an increased risk of a number of complications, e.g. LBW and IDA.
- The main nutrients of concern with regard to teenage pregnancy are calcium, iron and folate. In particular, folic acid supplements are often not taken prior to conception either because the pregnancy is unplanned, or because teenagers are unaware of the importance of taking folic acid. Teenage pregnancy therefore presents particular challenges for health professionals.
- Dieting during pregnancy has been associated with an increased risk of NTDs and a number of other potential complications. An appropriate amount of weight gain during pregnancy is important for fetal development and a healthy pregnancy outcome. Pregnancy is therefore not an appropriate time for dietary restriction and dieting should be strongly discouraged.