



# Nutrition in Pregnancy



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Nutrition in pregnancy is essential, not just for the mother's wellbeing and resilience throughout her pregnancy, and on delivery outcomes, but also the unborn baby. A mother's nutritional status may potentially influence their infant's early nutrition and growth, as well as long-term health conditions.

Whilst conditions such as gestational diabetes and hyperemesis gravidium have huge impacts on nutrition in pregnancy, this article will focus on the general food and nutrition needs in pregnancy and where pre-existing medical conditions may further increase nutritional requirements.

## Foods and drinks to avoid & food hygiene

**Table 1** indicates the most recent NHS advice, updated in February 2020, of which foods and drinks to avoid or limit in pregnancy.<sup>1</sup> The table also includes some further advice from the British Nutrition Foundation around limitations of some fish.<sup>2</sup>

The advice about alcohol was updated by the Department of Health in 2016 to state that it is '*safest to avoid alcohol in pregnancy*' and differed from previous advice where limited numbers of units were considered safe.<sup>3</sup>

Much of the NHS advice is due to the risk of food poisoning, with advice around caffeine to reduce the risk of miscarriage.

If women do develop food poisoning, they should be advised to contact their GP. In February 2020, the Food Standards Agency warned that eating out accounts for 37% of foodborne norovirus and that takeaways account for 26%.<sup>4</sup> If pregnant women chose to eat out in restaurants or takeaway outlets, it may be prudent to suggest that they avoid those with lower hygiene ratings (e.g. under 4-star

ratings from the local authority food hygiene inspection). Pregnant women could also inform staff when ordering that they are pregnant, in the same way one might inform of food allergies, to heighten diligence in food preparation and ensure the necessary foods are avoided.

## Hygiene at home

The NHS guidance discusses washing soil from fruit and vegetables,<sup>1</sup> however it may be prudent to wash all fruit and vegetables to remove any potential pathogens. In 2014, a UK Food Standards Agency survey indicated that 44% of those surveyed wash raw chicken before preparing it, which can cause the spread of pathogenic bacteria around the kitchen.<sup>5</sup> This demonstrates there may be varying practices in food safety in the home setting. Point 14<sup>9</sup> of the Standards of Proficiency for dietitians registered in the UK with the Health and Care Professions Council states that dietitians should 'be able to advise on safe procedures for food preparation and handling and any effect on nutritional quality'.<sup>6</sup> It is crucial for dietitians to discuss food preparation and handling at home, as well as which foods to avoid.

There has been speculation as to whether unripe or semi-ripe papaya should be avoided, as some regions of Asia believe that it may cause miscarriage or early labour.<sup>7</sup>

A lab-based study using the uterine tissue of rats given unripe papaya experienced contractions of the uterine muscles, which did not occur when rats were given ripe papaya. The latex present in unripened papaya is perpetrated to this link.<sup>7</sup>

Since unripe papaya is not essential to human health and with the utmost precaution, based on this limited animal model data, it may be wise for pregnant women to avoid unripe or semi-ripe papaya. They can safely enjoy ripened (yellowed) papaya.

## Energy requirements

The additional reference nutrient intake for energy applies to the third trimester only, where an extra 200 kcal is recommended.<sup>8</sup>

Women who are under or overweight may need more bespoke energy prescriptions and will benefit from a detailed dietetic assessment. In the UK, there are no formal recommendations for the amount of weight a woman should gain in pregnancy. Research suggests women who are obese are more likely to have a dialogue about bodyweight in pregnancy, and women of all bodyweights would like more engagement from their healthcare professionals about bodyweight in pregnancy.<sup>9</sup>

## Micronutrients

### Iron

There is an increased gastro-intestinal absorption of iron, and there may be a theoretical 'saving' of iron during pregnancy since menstruation ceases, and as such there is no increased dietary reference nutrient intake during pregnancy. Despite this, the demands of the growing foetus mean some women develop iron deficiency anaemia in pregnancy. In pregnancy, iron deficiency anaemia can be linked to increased rates of maternal and perinatal mortality, premature birth and other adverse outcomes.<sup>10</sup> The diagnosis can be complicated by the interpretation of blood tests and the usual laboratory parameters are not always accurate, since the maternal blood volume increases over pregnancy, causing a dilutional effect. In 2011, the World Health Organisation proposed to define anaemia in pregnancy using the cut offs shown in **Table 2**.<sup>11</sup> This may be useful when women need iron supplementation over and above dietary measures to improve intake. Iron rich water has been used as a successful prophylaxis strategy for pregnant women to prevent iron deficiency anaemia.<sup>12, 13</sup>

**Table 1: Food & Drinks to Avoid or Limit in Pregnancy**

Food to avoid	Notes
Uncooked/rare/cured meat	<ul style="list-style-type: none"> <li>Cured meats (e.g. pepperoni, salami) can be eaten if they have been frozen for four days in the freezer to kill bacteria, otherwise they should be avoided.</li> </ul>
Uncooked/raw fish and shellfish	
Oily fish with potentially very high levels of mercury should be completely avoided (e.g. shark, swordfish, marlin)	<ul style="list-style-type: none"> <li>Other oily fish (e.g. salmon, mackerel, trout) should be limited to twice per week due to pollutants (e.g. dioxins and Polychlorinated biphenyls [PCBs])</li> <li>Fresh or tinned tuna does not contribute to omega-3 intake but needs to be limited to 2 fresh tuna steaks, or 4 medium sized cans</li> <li>The British Nutrition Foundation also cite that other non-oily fish (e.g. dogfish, sea bass, sea bream, turbot and crab) should be limited to twice a week due to dioxins and PCBs risks<sup>2</sup></li> <li>Well-cooked fresh or frozen fish/shellfish can be eaten</li> <li>Sushi that has been made from frozen fish can be eaten.</li> </ul>
Unpasteurised/raw cows', goats' or sheep's milk	
Mould ripened soft rind cheeses, (e.g. Camembert, Brie) and soft blue cheeses (e.g. Roquefort)	<ul style="list-style-type: none"> <li>If they have been baked, and are steaming hot, they can be eaten</li> <li>Hard cheeses, including those with mould (e.g. Stilton) can be eaten.</li> </ul>
Soft/undercooked hen eggs without a Lion Mark	<ul style="list-style-type: none"> <li>Eggs with a Lion mark can be eaten raw or undercooked.</li> </ul>
Pâté	<ul style="list-style-type: none"> <li>Any pâté should be avoided due to risk of listeriosis (including vegetable pate).</li> </ul>
Game that may have been shot with lead	
Liver, and any liver products (e.g. haggis)	<ul style="list-style-type: none"> <li>This is due to high levels of vitamin A.</li> </ul>
<b>Drinks:</b> <ul style="list-style-type: none"> <li>Alcohol should be avoided</li> <li>Caffeine intake should be limited to 200 mg per day.</li> </ul>	

**Table 2: Diagnostic levels of Anaemia for Pregnant Women<sup>11</sup>**

	Non-anaemia	Mild anaemia	Moderate anaemia	Severe anaemia
Haemoglobin (g/L) at sea level	110 or higher	110-109	70-99	Lower than 70

Indigestion (dyspepsia), constipation and nausea are common side effects of iron supplementation which are also common symptoms during pregnancy. Data has shown this can reduce the compliance of some women with prescribed iron supplementation.<sup>12</sup>

Iron rich water supplementation has been demonstrated to have less side effects as the higher absorption means less iron needs to be taken to have the same effect on iron stores.<sup>13</sup> Pregnant women have been shown to be more able to easily comply with iron rich water *versus* ferrous sulphate tablets.<sup>12</sup>

### Vitamin D

The Department of Health and Social Care recommend a daily dose of 10 micrograms (400 IU) vitamin D to all women who are pregnant. As a fat-soluble vitamin, vitamin D supplementation should be taken with food.<sup>14</sup>

A randomised control trial in the Republic of Ireland of white-skinned women found that a maternal intake of around 30 micrograms (1200 IU) vitamin D was able to maintain maternal serum 25(OH)D concentrations at equal or greater than 50 nmol/l during pregnancy for almost all study subjects (99%).<sup>15</sup> A biochemical level of under 50 nmol/l is generally accepted to be insufficient,<sup>15</sup> although laboratory measures do vary. Ninety-five per cent of women in the study had umbilical levels of vitamin D greater or equal to 30 nmol/l.<sup>15</sup>

This study suggests women may need greater levels of supplementation than the current guidelines. It is known that women with darker skin are at greater risk of vitamin D deficiency than the white-skinned women in this study,<sup>15</sup> and more individualised assessment using a blood test may be indicated for higher risk women.

### Folate

Folate deficiency is linked with an increased chance of neural tube defects and a supplemented intake of folate is recommended through folic acid, folinic acid or 5-methyltetrahydrofolate (5-MTHF).<sup>16</sup> It has been argued in the scientific literature that these three methods of supplementation are not equivocal.<sup>16</sup>

It is recommended that women planning to conceive take 400 micrograms of folic acid for at least three months before trying to become pregnant, and

to continue for the first trimester. A systematic review reports that taking pre-conception folic acid has been demonstrated to reduce the risk of small for gestational age (SGA) babies at birth.<sup>17</sup> SGA is linked to increase neonatal mortality and morbidity and may increase risk of long-term health conditions, such as cardiovascular disease.<sup>17</sup> Whilst folic acid is universally recommended for all women, folic acid supplementation can mask a vitamin B12 deficiency.<sup>17, 18</sup> This is of particular note, since vitamin B12 injections are not licensed in pregnancy, but women may take them for long-term conditions, such as following bariatric surgery. A risk and benefit discussion around continuing vitamin B12 treatment with the managing team may be appropriate.

A higher dose of 5 mg folic acid should be prescribed (since this is not easily available as an over the counter dose in a single dose) for women at greater risk of neural tube defects. This includes those with:<sup>18</sup>

- A pre-existing diagnosis of diabetes
- Coeliac disease
- A body mass index greater than 30 kg/m<sup>2</sup>
- A pre-existing folate or vitamin B12 deficiency
- Sickle cell disease
- A prescription for anti-epileptic medication
- And, those who have had a previous pregnancy where the foetus developed a neural tube defect.

Women with pre-existing vitamin B12 deficiency, or at risk of, or with haematological conditions, should be monitored closely biochemically in view of the folic acid-vitamin B12 relationship.

### Iodine

A recent update on iodine and the UK situation on iodine was recently published in this publication, and further details the risk of mild to moderate iodine deficiency on a child's cognition and development.<sup>19</sup> This update highlights that there is currently no UK recommendation for women to take iodine supplementation in pregnancy.<sup>19</sup>

## Pregnancy multivitamin & minerals

In 2016, a non-systematic review, which was widely publicised in the British media, concluded that multivitamin and mineral supplementation was not indicated in

pregnancy, and women should take vitamin D and folic acid only.<sup>20</sup> Since there is limited research on the impact of supplementation on pregnancy outcomes, consideration should be given to the potential ease of pregnant women taking one tablet (i.e. a pregnancy multivitamin and mineral), rather than two (vitamin D and folic acid) or three tablets (plus iodine), bearing in mind the aforementioned risk of mild to moderate iodine deficiency,<sup>19</sup> which may be mitigated in part with supplementation.

## In summary

**Dietitians have a role in communicating the need for good food hygiene and which foods need to be avoided for food safety. The energy and micronutrient need in pregnancy are complex and, frequently, supplementation and individual assessment is needed to facilitate the best pregnancy outcomes. Women with pre-existing medical conditions will benefit from pre-conception nutrition counselling, especially when high dose supplementation needs to be initiated.**

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