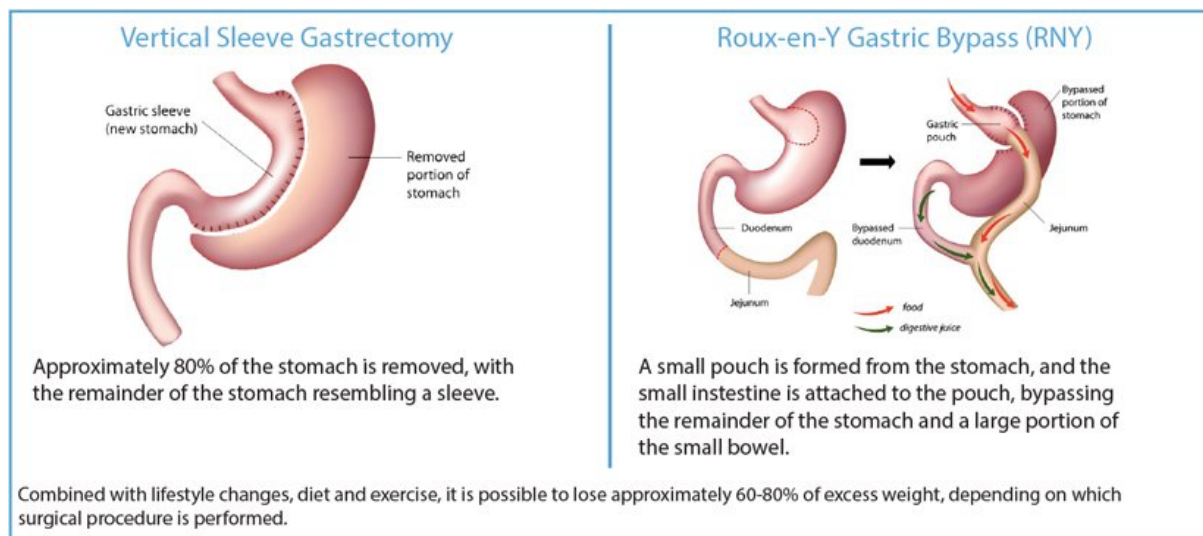


## Pregnancy and Breastfeeding following bariatric surgery.

### What is bariatric surgery?

When other weight loss attempts have failed, bariatric surgery (BS) offers a successful alternative for weight loss (1). More commonly known as 'weight-loss surgery', BS involves making changes to your digestive system to help you lose weight (2). In recent years, the two most commonly performed bariatric procedures are the sleeve gastrectomy (SG) and the Roux-en-Y gastric bypass (RYGB) (3). The laparoscopic adjustable gastric banding procedure has become much less common due to several intolerable adverse effects, high rates of re-operation and poor long-term efficacy (3,4). Surgeons originally designed these procedures to cause mechanical restriction and therefore reduce total calories consumed, however patients reported that their reduction in food consumption was due to reaching satiation faster during a meal, and feeling less hungry overall (5). Consequently, research has shown that BS also influences food intake by causing major changes in hunger and satiety hormones, changes in food preferences, and a reduction in nutrient absorption (5,6). Since BS operations are most commonly performed during women's reproductive years, the number of pregnant women with prior bariatric surgery is increasing (1).



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### Pregnancy following bariatric surgery

Due to the positive effect on weight loss, women who undergo BS experience significantly improved hormone balance and improved fertility (7). It is therefore important that women of childbearing age who undergo BS are informed of this increase in fertility as it is recommended that following BS, pregnancy should be delayed by at least 12–18 months (7,8). This is primarily due to the rapid and major weight loss and nutritional insufficiencies post BS which may lead to adverse pregnancy outcomes (7). However, even though BS before pregnancy improves obesity-related problems for the mother, it also reduces the absorption of micronutrients that are needed for healthy foetal development (9). In fact,

women who conceive within 12 months of their BS have a higher risk of inadequate gestational weight gain compared to women who conceive after 12-18 months (7). Therefore, delaying pregnancy enables identification and correction of nutritional insufficiencies that may not be initially evident and allows women to achieve their full weight-loss goals prior pregnancy.

Several observational studies have found that BS prior to pregnancy was associated with increased risk of some adverse perinatal outcomes (9). Meta-analysis identified a that women post BS, experienced significant increase in odds of perinatal mortality, congenital anomalies, small for gestational age babies, preterm birth, and neonatal intensive care unit admission (1,9,10). This was mostly seen in malabsorptive types of surgery, which suggests a link with nutrition (9). Therefore, women of reproductive age undergoing BS are considered a high-risk group and require specialised preconception and antenatal nutritional support to achieve the best outcomes for both mothers and babies (9,11). Research has also highlighted the importance of increased foetal and glucose monitoring for this cohort, throughout pregnancy (9).

In the pre-conception period, or at the first antenatal visit, women should have their full blood count, ferritin, iron, vitamin B12, folate, thiamine, calcium, and vitamin D checked, with repeat testing at least once per trimester and during the postnatal period if breastfeeding (7). It is also recommended that obstetrician management should be complemented with a multidisciplinary approach of bariatric dieticians, bariatric medical practitioners and bariatric surgeons (1,7,9).

The type and dosage of supplementation needed differs depending on what BS procedure was done, however for the SG and RYGB, it is recommended that all pre-conception/pregnant/breastfeeding women take multivitamin and mineral tablets including iron, folic acid, thiamine, selenium, zinc, copper and vitamin C, elemental calcium, vitamin B12, iodine and vitamin D (1,7,9). Supplementation of the fat soluble vitamins A, E and K are considered optional depending on their level (1,7,9).

If oral supplementation is inadequate or difficult to achieve, for example in cases of severe vomiting or decreased oral intake, then parenteral supplementation of certain micronutrients, such as thiamine and vitamin B complexes, and iron should be considered (12,13). However, it has been shown that compliance of long term multivitamin supplementation is suboptimal following BS, despite recommendations that all patients should have micronutrient supplementation after BS (7,9). This further emphasises the importance of good and regular nutritional follow-ups.

Nonetheless, there is increasing evidence suggesting that bariatric surgery drastically improves overall pregnancy outcomes and that has several significant benefits on pregnancy (1,7,9,12,13). Due to the positive effect on weight loss, women who go through BS before pregnancy experience a lower risk of macrosomia and pregnancy metabolic complications when compared with obese women who had not undergone surgery (7,9,14). This includes a significant reduction in gestational diabetes and preeclampsia (7,9,14).

Women who enter pregnancy at an obese weight also have an increased rate of birthing complications, the need for induction of labour, prolonged labour, caesarean sections and prolonged hospital stay post-delivery (15–17). Therefore, since BS results in weight loss, the risk of pregnancy complications related to obesity are significantly reduced.

### Breastfeeding after bariatric surgery

Limited research shows that breast milk after bariatric surgery is adequate in nutrients and no long-term effects on mothers and their babies were reported in cases studies when nutrient deficiencies were corrected (18). This suggests that issues related to breastfeeding post BS occur when nutrient deficiencies are present, which further emphasises the importance of follow-up nutrition counselling. A recent systematic review suggests that breastfeeding after bariatric surgery should be recommended along with monitoring and micronutrient supplementation. However, additional research and increased sample sizes are needed to further examine the relationship between breastfeeding and BS (18).

### Summary of important points

- After bariatric surgery, women should undergo close monitoring for nutritional insufficiencies before, during and after pregnancy, especially if breastfeeding.
- Following bariatric surgery, pregnancy should be delayed by at least 12–18 months due to adverse pregnancy outcomes associated with rapid weight loss.
- Pregnancy after bariatric surgery is associated with reduced macrosomia, pre-eclampsia and gestational diabetes risk.
- Personalized nutritional counselling care during post bariatric pregnancy improved nutrient intake of mothers and may reduce the risk of small for gestational age babies.
- Women should undergo in-depth dietary assessments and emphasis needs to be made on supplementation adherence, to prevent micronutrient deficiencies.
- A multi-disciplinary team should be involved in the management of these high-risk women.

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