Pregnancy following Bariatric Surgery

Guideline information

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Summary of document:
This guideline will outline specific care pathways, screening, advice regarding supplementation and medications for pregnant people following bariatric surgery aiding clinicians to provide excellent quality of care.

Scope:
A guide for all health professionals who provide care to those who are pregnant and have a history of bariatric surgery in the last 2 years.

To be read in conjunction with:
Welsh Institute Metabolic & Obesity Surgery (WIMOS) Management of Patients Becoming Pregnant After Metabolic-Bariatric Surgery: A Guide for Health Care Professionals. Included as an addendum in this guideline.

Faculty of Sexual and Reproductive Health (FSRH). 2019 Clinical Guideline: Overweight, Obesity and Contraception (April 2019) available at: FSRH Clinical Guideline: Overweight, Obesity and Contraception (April 2019) - Faculty of Sexual and Reproductive Healthcare – opens in new tab

NICE. Public health guideline [PH27] Published: 28 July 2010 Weight management before, during and after pregnancy Overview | Weight management before, during and after pregnancy | Guidance | NICE NICE guideline CG189 Obesity: identification, assessment and management. NICE guideline CG189 (2014, updated 2023) – opens in new tab

RCOG: Care of Women with Obesity in Pregnancy (Green-top Guideline No. 72) 2018Care of Women with Obesity in Pregnancy (Green-top Guideline No. 72) | RCOG – opens in new tab

Biochemical Monitoring post bariatric surgery
https://nhswales365.sharepoint.com/sites/HDD_Pathology/_layouts/15/viewer.aspx?sourcedoc={123586ae-cdf0-4ac2-a2e6-f2a83bde7572} – opens in new tab

666 - Hyperemesis and Nausea and Vomiting in Pregnancy Guideline (sharepoint.com) – opens in new tab

622 - Management of Obesity During Pregnancy Guideline (sharepoint.com) – opens in new tab

1218 - Guideline for Pre-Existing Diabetes in Pregnancy (sharepoint.com) – opens in new tab

Patient information:
Include links to Patient Information Library

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Keywords
Obesity, Bariatric Surgery, Pregnancy, Malabsorption, Malnutrition

Glossary of terms
GDM - Gestational Diabetes Mellitus
IUGR - Intrauterine Growth Restriction
LARC - Long-acting Reversible Contraception
MBS - Metabolic Bariatric Surgery
MR - Modified Release
SGA - Small for Gestational Age
WIMOS - Welsh Institute for Metabolic and Obesity Surgery

Contents

Scope

This guideline provides information for all Health Professionals who provide care to those people who are pregnant or wish to become pregnant and have previously undergone bariatric surgery.

Aim

The purpose of this guideline is to provide evidence-based recommendations on the optimal care and nutritional management in pregnancy after bariatric surgery.

Approximately 80% of patients who undergo bariatric surgery are women, many of whom are of child-bearing age (Shawe et al., 2019). As bariatric surgery has been shown to improve fertility, pregnancies after bariatric surgery are becoming increasingly common (Khan et al., 2013).

With increasing numbers of women becoming pregnant following bariatric surgery, it is important for clinicians to recognise the risks posed during pregnancy as timely recognition is associated with reduced risk of adverse maternal and fetal outcomes.

Although rare, maternal bariatric post-operative complications can occur during pregnancy and pose risks to the mother and the fetus, causing poor maternal health in pregnancy, fetal anomalies, fetal growth restriction, and pregnancy loss. In extreme cases maternal death can occur (Maggard et al., 2008).

The purpose of this guideline is to provide evidence-based recommendations on the optimal care and nutritional management in pregnancy after bariatric surgery.

Objectives

The aim of this document will be achieved by the following objectives:

- Provide information and guidance on additional testing and surveillance for malnutrition.
- Provide guidance on recommended vitamin and mineral supplementation and dietary requirements required in pregnancy following weight loss surgery.
- Pathway for gestational diabetes screening following bariatric surgery. This will include type of testing and times of testing.
- Antenatal care including fetal growth surveillance, appointment schedule, referral pathway to additional services, and when and how to seek advice from specialist weight management services.
- Provide information and guidance on common medications used in pregnancy that might be impacted by malabsorption due to bariatric surgery.

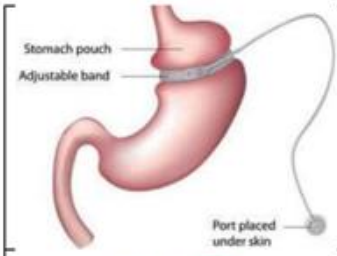
Background

The prevalence of obesity in the general population in the UK has significantly increased since the early 1990's, rising from 15% of the population in 1993 to 28% in 2019 (Baker, 2022). As a result, the prevalence of obesity in pregnancy has also increased, with almost one in five pregnant women having a BMI ≥30 kg/m^2 at booking (Denison et al., 2018). Bariatric surgery is becoming increasingly common. According to NICE guidelines, bariatric surgery may be offered to patients with class III obesity (BMI ≥40 kg/m^2) where lifestyle and/or medications have been ineffective at achieving weight reduction; or class II obesity (BMI 35–40 kg/m^2) with associated co-morbidities (NICE, 2014 Obesity: identification, assessment and management).

Bariatric surgery may be restrictive, aiming to reduce calorie intake by reducing gastric capacity, and/or malabsorptive. Restrictive procedures include laparoscopic adjustable gastric banding (LAGB) and laparoscopic sleeve gastrectomy. Laparoscopic Roux-en-Y gastric bypass (RYGB) is both a restrictive and malabsorptive procedure (see diagram on next page).

Whilst Metabolic Bariatric Surgery (MBS) is available on the NHS through designated pathways, many people are choosing to undergo bariatric surgery through private companies either in the UK, or more commonly, abroad where the costs are significantly less (Mahase, 2024). Approximately 80% of patients who undergo bariatric surgery are women, many of whom are of child-bearing age (Shawe et al., 2019). As bariatric surgery has been shown to improve fertility, pregnancies after bariatric surgery are becoming increasingly common (Khan et al., 2013). In Wales, those undergoing NHS funded MBS are referred to and cared for by The Welsh Institute for Metabolic and Obesity Surgery (WIMOS) Recent WIMOS data has suggested a 79% increase in privately funded bariatric surgery (2022-23). With these increasing numbers of women becoming pregnant following bariatric surgery, it is important for clinicians to recognise the risks posed during pregnancy, as timely recognition is associated with reduced risk of adverse maternal and fetal outcomes.

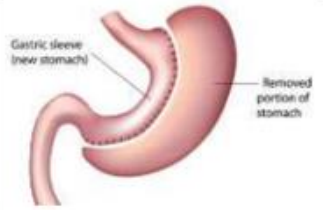
Diagrams of procedures undertaken



1. Gastric band (Restrictive):

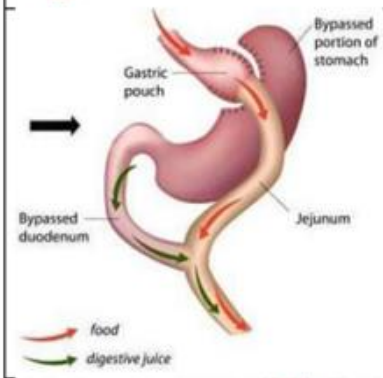
Adjustable band around stomach to create a smaller stomach pouch.

- In pregnancy may need band adjustments for appropriate weight gain and fetal health
- Hyperemesis may be pathological and caused by an internal hernia or band slip



2. Sleeve gastrectomy (Restrictive):

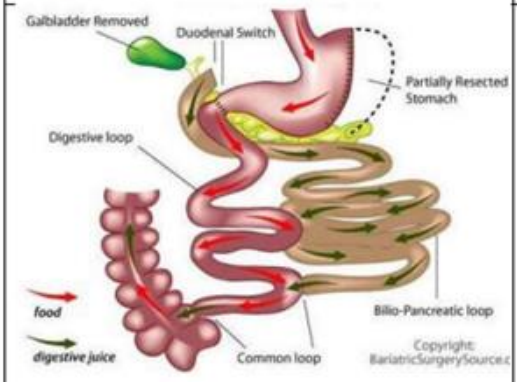
A large part of the stomach is removed so it is much smaller than before.



3. Roux-en-Y gastric bypass (RYGB or RNY, Restrictive + Malabsorptive):

Surgical staples are used to create a small stomach pouch, which is connected to the small intestines, bypassing most of the stomach and the duodenum

- Risk of dumping syndrome (OGTT not suitable)
- Risk of nutritional deficiencies: e.g. iron, calcium fat-soluble vitamins (e.g. A, D, E) – usually absorbed in the duodenum. Also risks of protein zinc and vitamin B12/ thiamine deficiencies



4. Biliopancreatic diversion with duodenal switch (BPD/DS, Restrictive + Malabsorptive):

Sleeve gastrectomy + bypasses the majority of the small intestine

- Higher surgical risks and risks of nutritional deficiencies (protein, vitamin, minerals).
- Risk of dumping syndrome (OGTT not suitable)

Images from Bariatric Surgery Source website: https://www.bariatric-surgery-source.com/types-of-bariatric-surgery.html#procedure

Maternal Risks
Although rare, maternal bariatric post-operative complications can occur during pregnancy and include (Maggard et al., 2008):

- Malabsorption syndromes
- Gastric dumping
- Bowel obstruction due to internal herniation
- Anastomotic ulceration and breakdown
- Gastric band slippage and migration
- Gastric band leakage

Fetal risks include:

- Small for gestational age (SGA) and intrauterine growth restriction
- Preterm birth
- Congenital abnormalities
- Perinatal mortality

In the MBRRACE 2020 report, two women who died had perforations of their bowel at the site of the anastomosis from a gastric bypass (Knight et al., 2020). Correct diagnosis can be difficult as the symptoms of epigastric pain and vomiting can be common in pregnant women. However, a careful history and examination must be carried out for any woman attending with abdominal pain and a history of bariatric surgery (Khan et al, 2013). The purpose of this guideline is to provide evidence-based recommendations on the optimal care and nutritional management in pregnancy after bariatric surgery.

Pre-pregnancy Care

Timing of pregnancy - optimising preconception care.

Bariatric surgery is now an essential option for the treatment of obesity and its associated comorbidities. Many patients presenting for surgery will have pre-existing low blood vitamin concentrations and all bariatric surgical procedures compromise nutrition to varying extents and have the potential to cause clinically significant micronutrient deficiencies. Therefore, pregnancy following MBS should be planned with input from their medical professional or GP responsible for monitoring any nutrient deficiencies. A minimum waiting period of 12–18 months after bariatric surgery is recommended before attempting pregnancy. This interval between surgery and pregnancy will facilitate stabilisation of body weight and allow the correct identification and treatment of any possible nutritional deficiencies that may not be evident during the first months (Denison et al., 2018). Ideally, micronutrient serum levels should be optimised 3-6 months prior to conception (see guidance from WIMOS guidance included in this Policy featured below).

Following MBS, some oral contraceptives are not effective with some types of surgery. Women should be advised that the effectiveness of oral contraception, including oral emergency contraception, could be reduced by bariatric surgery. Both gastric bypass and sleeve gastrectomy alter the anatomical structure of the gastrointestinal tract which can affect the absorption of oral contraceptives. Effectiveness could be further decreased by postoperative complications such as long-term diarrhoea and/or vomiting.

Non-oral contraceptives have been studied in only small numbers of women following bariatric surgery but appear to be safe and effective. (FSRH)

The use of long-acting reversible contraception (LARC) should be encouraged and offered as first line following bariatric surgery (UKMEC).

Included in the category of LARC are:

- Copper intrauterine devices
- Progestogen-only intrauterine systems
- Progestogen-only injectable contraceptives
- Progestogen-only subdermal implants.

The sole use of barrier methods and user-dependent methods of contraception may not be the most appropriate choice given the relatively high typical-use failure rates of these methods. (FSRH)

Women can be signposted to the sexual health service or GP for further advice on their contraceptive options.

Women /people trying for a baby following MBS should be advised to take Folic acid 5mg once daily to prevent neural tube defects and pregnancy specific vitamins as standard A-Z multivitamins are unsuitable for pregnancy because of the type of vitamin A they contain (is usually retinol).

Antenatal care

All women who have undergone MBS should have their pregnancy managed by a consultant obstetrician. Those who have undergone MBS abroad are at greater risk of nutritional complications. This is due to the lack of follow-up nutritional care (BMOSS 2024). These women/birthing people should have an urgent referral to an obstetric consultant and if there is a suspicion of malnutrition then an urgent referral to the dietitian should be made to ensure nutritional needs are being met, supplementations are commenced and screening bloods to be undertaken at the earliest opportunity (please see WIMOS guidelines below).

All Care should be individualised but should include:

- Consideration for early use of anti-emetics.
- Referral to dietetics if malnutrition is identified (Urgent referral if malnutrition is suspected, patient undergoing hyperemesis gravidarum, or dumping syndrome is suspected (please see section on nutritional management.
- Referral to specialist services (as outlined in the WIMOS guideline) if gastric band slippage is suspected.
- Diabetic screening regardless of current BMI due to possible reversed type 2 diabetes (see section on diabetes screening below.
- Appropriate use of modified release (MR) medications. Those who have undergone gastric bypass and sleeve gastrectomy may not absorb the medications fully due to the altered anatomical structure of the gastrointestinal tract. Those women/ birthing persons who have undergone a gastric band procedure should not be affected in the same way and can absorb MR medications. BOMSS guidance on medications post-bariatric surgery for GPs https://bomss.org/bomss-guidance-on-medications-post-bariatric-surgery-for-gps/ is a good resource for seeing how medications can be affected by Bariatric surgery.
- Fetal growth surveillance should be undertaken from 28 weeks' gestation with USS. Fetal growth should be measured with a 3-4 weekly interval until birth, regardless of BMI due to risks of SGA/IUGR and congenital anomalies. If problems with fetal growth or development is suspected, then the relevant additional guidelines (either All-Wales or local Health Board) should

be used accordingly and a referral to Fetal Medicine Unit in Cardiff should be considered following a discussion with the FM team.

- Postnatal contraception should be considered and discussed with the service user from 28 weeks' gestation. The choice of contraception should be guided by service user's choice with mindfulness that gastric bypass and sleeve gastrectomy procedures can affect the absorption of oral contraceptives containing an oestrogen component and will not be effective. Long-acting reversible contraception should be explained, encouraged and offered as a first-line choice. Intra-uterine devices for contraception can be inserted following a vaginal birth or following planned and unplanned caesarean births.

Nausea/Vomiting

Nausea and vomiting early on in pregnancy ('morning sickness') is very common. MBS may compound this issue. Diet and lifestyle modifications to help manage these symptoms should be given much the same as those who have had not had MBS i.e. avoiding foods/smells causing nausea, dry foods may be better tolerated, little and often plain foods, cold rather than hot, trial ginger, drink plenty of fluids. They should liaise with their obstetric team on whether anti-emetics may be appropriate.

As with any pregnant women, should they not be passing sufficient urine or unable to keep food or fluids down for 24 hours or feel severely weak, dizzy or faint they should call their obstetric team, GP or 111.

Thiamine 300mg daily with vitamin B complex should be prescribed if prolonged vomiting occurs. Intravenous supplementation may be required if this is not possible. If they have likely suffered long-term insufficient nutrient intake, the reintroduction of macronutrients should take place gradually and preferably in an inpatient setting with close monitoring of electrolytes due to a risk of refeeding syndrome.

Diabetes Screening

Pregnant women with a history of MBS without pre-existing diabetes should be routinely screened for gestational diabetes.

Patients who have had gastric bypass surgery (excluding gastric band) should not be offered an OGTT. Instead, it is advised to refer to the diabetes team for a week of CBG testing after the dating scan, but < 16 weeks' gestation. If levels are not consistent with gestational diabetes mellitus, then another week of CBG should be repeated between 24-28 weeks' gestation.

If there is a history of diabetes, or screening is positive for diabetes then a referral to the dietetics team should be made at the earliest opportunity. For further information please refer to the HDUHB 'Diabetes in Pregnancy' guideline.

Gestational Weight Gain

Weight should be discussed and monitored with a sensitive approach. Many patients have a complex history with associated psychological challenges. An understanding of their weight history is therefore recommended.

There is no known specific guidelines for gestational weight gain during pregnancy in women who have undergone MBS. Few studies that have focused on this suggest women who have undergone MBS gain less weight during pregnancy than those without surgery, particularly in the first 18 months.

Due to correlation between insufficient weight gain and adverse neonatal outcomes, international consensus recommendations suggest women who have undergone MBS adhere to Institute of Medicine guidelines. These are:

For a BMI Less than 18.5:

- Range of total weight gain: 28-40lbs
- Weight gain rate during 2nd & 3rd trimester: 1lb/wk

For a BMI 18.5-24.9:

- Range of total weight gain: 25-35lbs
- Weight gain rate during 2nd & 3rd trimester: 1lb/wk

For a BMI 25-29.9:

- Range of total weight gain: 15-25lbs
- Weight gain rate during 2nd & 3rd trimester: 0.6lb/wk

For a BMI over 30:

- Range of total weight gain: 11-20lbs
- Weight gain rate during 2nd & 3rd trimester: 0.5lb/wk

Patients should be counselled to avoid weight loss. For those in the first 12 months after MBS, weight loss is likely to still be experienced due to metabolic effects but should be limited with a focus on the need for fetal growth and development.

Nutritional Management and Referral

The medical /midwifery team should Provide post Bariatric patients who become pregnant with first line dietary information produced by Nutrition and Dietetics which covers the following: -

- Healthy eating in pregnancy
- Foods to avoid
- Supplementation
- Managing mild/moderate symptoms (e.g. vomiting, dumping syndrome)

This information is accessible via the Following link:

Dietary Advice during Pregnancy following weight loss surger - June 24 .docx (sharepoint.com) . This is also included in the appendices below.

For patients with Vomiting or Hyperemesis it is essential that the medical/obstetric team and more serious causes such as band slippage, bowel obstruction, gallstones ruled out, assess the patient.

In cases of severe and persistent vomiting and weight loss there should be consideration regarding hospital admission to avoid complications such as thiamine deficiency and Wernicke's Encephalopathy.

Current Recommendations for Micronutrient Supplementation post bariatric surgery and pregnancy which should be carried out by the GP (General Practitioner) or organised as part of routine antenatal care are as follows.

Please refer to Prescribing information to support Primary care management of patients following bariatric surgery (Feb 2024) or contact the Hywel Dda Medicines Optimisation Pharmacy team.

Referral to Nutrition and Dietetics

Women and Birthing persons who are already taking supplements, are not symptomatic, and do not have signs of malnutrition, can be managed by the GP/ Obstetrician as outlined in this guidance.

The following concerns should prompt a referral to nutrition and Dietetics

- Symptoms of Dumping Syndrome (a group of symptoms characterised by symptoms such as diarrhoea, nausea and feeling faint or lightheaded after a meal caused by rapid gastric emptying.
- Reactive Hypoglycaemia
- Inability to meet protein requirements
- Ongoing and persistent vomiting that is affecting nutritional intake
- Intrauterine growth retstriction /baby is small for gestational age associated with poor maternal nutritional intake
- Ongoing unintentional weight loss

Please refer to Dietetics using the following link community.dietitians.hdd@wales.nhs.uk

Useful Contact Numbers

Department of Nutrition and Dietetics Glan Gwilli Hospital (Carmarthen) 01267 227067
Department of Nutrition and Dietetics Prince Phillip Hospital (Llanelli) 01554 783152
Department of Nutrition and Dietetics Withybush Hospital (Haverfordwest) 01437773357. Milford Haven Health centre 01437 774334
Department of Nutrition and Dietetics Bronglais Hospital (Aberystwyth) 01970 635730

Dumping Syndrome

Symptoms of 'early' dumping syndrome are common after MBS. They often occur within 1 hour of eating most often after eating rapidly absorbed carbohydrates. Typical symptoms include dizziness, flushing, palpitations and diarrhoea. If this is suspected, it is recommended to:

- Reduce consumption of rapidly absorbed carbohydrates (aim for low GI).
- Avoid liquids 30 minutes before and after eating to slow gastric emptying.
- Eat slowly and chew well, the '20-20-20' technique is often recommended following MBS. This involves:
    - Bite the size of a 20 pence piece (smaller cutlery can help)
    - Chew 20 times or more (until puree consistency)
    - Pause between each mouthful e.g. at least 20 seconds
    - Stop eating after 20 minutes
- Avoid caffeinated beverages
- Avoid alcohol (contraindicated throughout pregnancy)

'Late Dumping' (or Postprandial Hyperinsulinaemic Hypoglycaemia) can also occur 2-4 hours after eating. Although this is less common it can be serious. It should be considered in those with neuroglycopenic signs including dizziness or loss of consciousness in parallel with biochemical evidence of hypoglycaemia. Management of late dumping requires more careful manipulation of diet:

low GI foods, small and frequent intake, carbohydrates mixed with protein. Consider referral to your local endocrinology team for further management.

Supplementation

Supplementation	Amount	Frequency	Other information
A-Z multivitamin and Minerals (such as Forceval®) which contains: • Copper • Zinc • Selenium	1 capsule/ tablet 2mg 15mg 50 mcg	Per day	should be pregnancy specific which does not contain retinol
Folic Acid	5mg	Daily until 13/40	Ideally, to be taken 12/52 prior to conception
Iron	18mg (AGB) 45-60 mg (AGB & RYGB)		• Adjust to maintain ferritin within normal levels • Forceval® provides 12mg contribution iron out of 45-60mg, adjust to maintain ferritin within normal levels
Thiamine	>12mg is recommended by US guidelines but no UK supplement provides this		N.B. **Where prolonged vomiting occurs, thiamine 300mg daily with vitamin B complex should be prescribed. Intravenous supplementation may be required if oral administration is not possible.**
Vit B12 (via IM injections)	1mg	3 monthly	
Vitamin D	1000 I.U./ 25mcg	Daily	To maintain concentration of ≥75nmol/L with a serum PTH within normal limits Consider VIT D postnatally if BF.
Calcium	1200-1500 mg Including diet	In divided doses	Often a combined calcium and vitamin D tablet x 2/day can achieve these
Vitamin E	15mg	Daily	Forceval® achieves 10mg
Beta-carotene (Vit A)	5000 IU		Vit A deficiency is rare See WIMOS recommendations before prescribing

Blood Monitoring

The table below lists the tests that should be requested at relevant time points. 1st trimester screening should be undertaken at first contact especially if no preconception screening has been undertaken. Second and third trimester screening would ideally be at weeks 15 and 24 weeks respectively (dependent on 1st trimester screening). The number and types of blood tubes required are listed (in the correct order of draw) and specimens should reach the laboratory within 2 or 4 hours as stated. Clinical details inputted onto the Welsh Portal electronic request form or paper request form should state "post bariatric monitoring" and "preconception", "trimester x" or "breastfeeding" as appropriate. Searching in Request Sets in WCP will bring up profiles for the appropriate test sets.

	Pre-pregnancy		**During Pregnancy**		**Postnatal** whilst breastfeeding	
Test	3 monthly	6 monthly	<12+6/40 earliest opportunity	2nd & 3rd Trimester 13-23+6 & >24+ weeks	3 monthly	6 monthly
FBC	Y	Y	Y	Y	Y	Y
Ferritin	Y	Y	Y	Y	Y	Y
Transferrin saturation	Y	Y	Y	Y	Y	Y
Folate	Y	Y	Y	Y	Y	Y
B12	Y	Y	Y	Y	Y	Y
Vitamin A	Y	Y	Y	Y	Y	Y
Bone (Ca, PO4, protein, albumin)		Y	Y	Y	Y	Y
Magnesium		Y	Y	Y	Y	Y
Vitamin D		Y	Y	Y	Y	Y
PTH		Y	Y	Y	Y	Y
Clotting screen & INR		Y	Y	Y		Y
UE		Y	Y	Y		Y
LFT		Y	Y	Y		Y
Vitamin E		Y	Y			Y
Zinc		Y	Y			Y
Copper		Y	Y			Y
Selenium		Y	Y			Y
Number of Bottles required						
Yellow top SST	1	2	2	2	2	2
Light blue top sodium citrate		1	1	1		1
Purple top EDTA	1	2	2	2	2	2
Green top lithium heparin*	1	1	1	1	1	1
Dark blue top trace element		1	1			1
Time to reach laboratory (hours)	4	2	2	4	4	2

*Light sensitive

Please see note on next page re serum levels in pregnancy

NOTE***: During pregnancy, serum levels of micronutrients can decrease as a result of expanding maternal blood volume and increasing fetus demands. See link below as a resource to guide on adjusted lab values.***

Perinatology.com: Reference ranges for lab values during pregnancy. Available at:Normal Reference Ranges and Laboratory Values In Pregnancy (perinatology.com)

Postnatal Care

- Gastric bypass surgery is regarded as a relative contraindication to NSAIDS in the postnatal period (Knight et al., 2020).
- Follow up with a dietitian can help to ensure they follow a healthy diet and can guide future weight loss.
- Women should be advised that the effectiveness of oral contraception could be reduced by bariatric surgery. The use of LARC should be encouraged and offered as first line (please see pre-pregnancy guidance above). Women and birthing persons should be offered LARC following the birth of their baby, prior to discharge from the maternity ward. Those who decline or are undecided, should be given barrier method contraception and be signposted to the sexual health service for further advice on their contraceptive options.

Auditable Standards

- Women who have had bariatric surgery receive Consultant led care
- Screening for Gestational Diabetes
- Monitoring of maternal bloods through pregnancy as per guidance
- Supplements prescribed as per guidance

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Appendix 1 – Patient Information Dietary Advice

GIG CYMRU NHS WALES
Bwrdd Iechyd Prifysgol Hywel Dda University Health Board

Dietary Advice during Pregnancy following bariatric / weight loss surgery

Congratulations on your pregnancy. It is recommended that when you become pregnant after bariatric surgery you are monitored closely by your midwife / GP (General Practitioner) /Obstetrician. You may require more specialist support with your nutrition during pregnancy; this will be determined by the team supporting you.

This Guidance has been produced by the Nutrition and Dietetic service to provide you with some advice on the following: -

- Eating well during your pregnancy
- Foods to Avoid
- Supplementation advice
- Dealing with common problems e.g. morning sickness.
- Considerations specific to pregnancy following bariatric surgery

Dietary Advice during Pregnancy

Protein

Aim for 60-80g / day from a variety of foods
It is important to include adequate protein in your diet. Include two portions of meat, fish (please note foods to avoid section) eggs or pulses or Nuts / seeds and three portions of dairy products or plant based dairy alternatives a day e.g. milk, cheese, and yoghurts, calcium fortified milk substitute

The table below shows a list of example foods that contain high amounts of protein. Other foods including cereals contain smaller amounts of protein. You can use the list below to work out how much protein you are eating.

Carbohydrate
Include a portion of carbohydrate at each meal. Choose a slow-release carbohydrate as they help to satisfy you and stop swings in your blood sugar. Examples include porridge, muesli, Weetabix, shredded wheat, new potatoes, jacket potatoes, wholemeal /granary bread /pitta breads, basmati rice or whole-wheat pasta.

For further information the British Dietetic Association have produced a useful guide available at https://www.bds.uk.com/resource/glycaemic-index.html.

If you have had a gastric / stomach by-pass and are vulnerable to ‘dumping syndrome’ (symptoms of nausea, feeling faint or dizzy after food) remember to check food labels for sugar content and aim for less than 5g of sugar per 100g portion. You should also request a referral via your Midwife / obstetric team to Nutrition and Dietetics

Food	Protein	Protein Content
Milk skimmed and semi skimmed	200ml	7g
Dried milk powder	20g	7g
Soya milk	200ml	6g
Low fat Greek yoghurt	150g small pot	7g
Hard cheese e.g. cheddar	25g (matchbox size)	6g
Low fat cottage cheese	75g	10g
Eggs	2 large	16g
Red meat, lean cooked	75g	22g
Ham	75g	14g
Chicken thigh (cooked)	75g	19g
Chicken breast	75g	23g
Tinned mackerel drained)	75g	15g
Tinned tuna (drained)	75g	18g
Cod cooked	75g	18g
Prawns cooked	75g	12g
Butter Bean cooked	200g	12g
Baked Beans	200g	10g
Lentils cooked	100g	8g
Quorn mince	75g	8g
Nuts	25g	5g

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Iron

If you are low in iron, you will get very tired. Your midwife will check your iron levels and advise you if your levels are low. Make sure your diet includes good sources of iron, for example, lean red meat, green leafy vegetables, dried fruits (watch sugar levels) nuts, well cooked eggs, and fortified breakfast cereals. To aid absorption of iron into your bloodstream take iron rich foods with a source of vitamin C e.g. citrus fruits, green leafy vegetables, berries, or diluted fruit juice.

Calcium

Calcium is important for the growth and development of baby's bones. In the last 3 months of pregnancy try to have 4 portions of milk products daily, if you don't use dairy products make sure your dairy alternative is calcium fortified. If you have been advised to take a calcium tablet, continue to take it. A portion of dairy is 200mls milk, 1 pot (150g) yogurt, 30g cheese, 200mls of fortified plant based 'milk alternative'.

Folic Acid

Folic acid (Folate) is important for pregnancy as it can help prevent birth defects known as neural tube defects, which can cause conditions such as Spina Bifida. In addition to taking your folic acid supplement every day it is worth boosting your intake with folate rich foods such as green leafy vegetables, brown rice and breakfast cereals and bread that have been fortified with folic acid. Most people will have a daily requirement of 400mcg. This is usually included in the pregnancy multivitamins. Some women/ birthing people will require a higher dose of folic acid 5mg per day (those with type 1 or 2 diabetes, taking anti-epileptic medications, those with a BMI >30 kg^2 m, as well as those who have undergone weight loss surgery). This higher dose is only available on prescription from your GP.

Vitamin D

Vitamin D helps your body to absorb calcium and help's with the baby's development. Food sources of Vitamin D include oily fish, fortified margarine, and fortified breakfast cereals. The best source of vitamin D is from summer sun and exposure of just few minutes each day can top up your levels, being careful not to burn from the sun. 10 mcg is normally included in pregnancy multivitamins.

These foods should be avoided due to risks to the baby

Raw seafood such as oysters, sushi

Cheeses with a white ‘mouldy 'rind e.g. Brie or camembert and blue veined cheese e.g. stilton

Raw or uncooked meat or poultry.

Liver and liver products (Pate, liver sausage)

Shark, marlin, swordfish – avoid as they contain high levels of mercury.

Eat no more than 4 medium size cans (140g) tuna or two fresh tuna steaks per week due to harmful levels of mercury

Raw or lightly cooked eggs that are produced under the British Lion Code of Practice are safe to be consumed

Alcohol

Supplement Advice

Multivitamin and Mineral supplement

Your normal multivitamin and mineral are not suitable for pregnancy. Unless you are taking Forceval you need to switch to a pregnancy preparation e.g. Healthy Start pregnancy vitamins, Sanatogen Mother to be, Pregnacare, or Centrium pregnancy care. Your supplement needs to be taken as per the recommended dose, and throughout pregnancy and whilst breastfeeding.

Folic Acid Supplement

If you are planning to have a baby, then it is recommended that you take a folic acid tablet per day pre-conceptually and up until the 12th week of pregnancy. Because you have had bariatric surgery, you need to ask your GP (General Practitioner) to prescribe **5mg of folic acid per day.**

Vitamin A

DO NOT take Vitamin A supplements or any tablet that contains vitamin A (retinol). Too much can harm your baby. This includes cod liver oil tablets

Calcium and Vitamin D supplement (Gastric bypass or sleeve only)

Pregnant and breastfeeding women are advised to take a supplement of 10mcg per day of Vitamin D. You can carry on with your calcium and vitamin D supplement which should include 100mg of calcium and 20mcg of vitamin D per day. If you have been advised to take a higher dose of vitamin D due to low blood levels of Vitamin D, follow that advice.

Iron supplement (specifically for patients who have had a Gastric bypass or Gastric sleeve only)
Post surgery you should be prescribed an iron supplement to supplement your dietary iron intake. You can continue to do this in pregnancy. There may be a need to increase your iron supplements whilst pregnant based on your blood results, but your GP/Consultant or midwife will discuss this with you if necessary.

Vitamin B12 Injections only)
If you have had a gastric sleeve or bypass you should be prescribed 3 monthly vitamin B12 injections. You should continue with your vitamin B12 injections every 2-3 months if already prescribed If you are not prescribed Vitamin b12 injections please consult with your GP/Consultant

Bariatric Surgery Considerations

Weight changes during pregnancy
It is not advisable to lose weight during your pregnancy but if you have fallen pregnant within the first 12 months following bariatric surgery this may occur. If you continue to lose weight and are concerned, please discuss this with your GP/midwife or consultant as this may warrant further support.

You may find that you gain weight during your pregnancy; this is normal. However, gaining too much weight gain during pregnancy can pose health risks to you and your baby. Some women find the change in body shape hard to deal with after they have lost a considerable amount of weight. It is important that you talk to your midwife if you have these concerns.

For Patients with a Gastric Band
If you have had a gastric band, you may need an alteration of your band inflation to ensure that you are not becoming overly tight and too restrictive with your diet. Speak to your GP or midwife if you are concerned.

Morning Sickness
This is common in the first trimester of pregnancy and is due to hormonal and metabolic changes. It can occur at any time during the day.

The following may help

- Take care to maintain your fluid level to ensure that you do not get dehydrated. Sipping fluids throughout the day is useful.
- Wear comfortable clothes without a tight waistband
- Eat cold meats, this can help if the smell of cooked meat makes you feel sick
- Try to eat something like dry toast or a plain biscuit when you first get up.
- Carbohydrates and plain foods are often more tolerable. Crackers, crisp breads etc are helpful in stabilising your blood sugar and reducing nausea.
- Try peppermint tea or ginger tea

When to seek further advice

If you are experiencing severe or prolonged nausea, vomiting and weight loss please seek advice from your Midwife /GP as a matter of urgency as you may need further guidance /support.

Gestational Diabetes Test (Oral Glucose Tolerance Test OGTT)

If you have had a gastric bypass and experiencing dumping syndrome (symptroms of feeling dizzy, faint, nausea or diarrhoea shortly after food) this test is not appropriate for you. Please inform your midwife, obstetrician; alternative screening methods for gestational diabetes should be considered

Further information and Resources

NHS Pregnancy Information: https://www.nhs.uk/Pregnancy

Useful Contact Numbers

Department of Nutrition and Dietetics Glan Gwilli Hospital (Carmarthen) 01267 227067
Department of Nutrition and Dietetics Prince Phillip Hospital (Llanelli) 01554 783152
Department of Nutrition and Dietetics Withybush Hospital (Haverfordwest) 01437773357. Milford Haven Health centre 01437 774334
Department of Nutrition and Dietetics Bronglais Hospital (Aberystwyth) 01970 635730

Nutrition & Dietetics Referral Form

URGENT referral for Pregnancy < 18 months following bariatric surgery

The minimum information required to refer a patient is contained on this form. Please complete all the required information otherwise the referral may be sent back to you, which can lead to a delay in the patient being seen

PATIENT ADDRESS:		
NHS NUMBER:	**TITLE:**	
SURNAME:	**DATE OF BIRTH:**	**TEL:**
FIRST NAME:	**EDD: LMP**	**EDD: USS**
NAME OF REFERRER:	**Referred to ANC: GGH /WGH/ BGH**	
REFERRER DESIGNATION:	**Initial ANC appointment date:**	
REFERRER TEL:	**DATE OF REFERRAL:**	
Date of bariatric surgery **NHS☐ / Private ☐** **Name and address of Hospital:** **Follow up care: Y ☐ / N ☐**	**Type of surgery: ☐ Restrictive: Gastric band, sleeve gastrectomy** **☐ Malabsorptive: Roux-en-Y gastric bypass,** **bilio-pancreatic diversion with duodenal switch BPD/DS)**	
MEDICAL (including mental health and previous obstetric history):		
H/O Diabetes: Current☐ / Previous☐ / None☐:	**GDM☐**	**TYPE II☐**
Current Medications:	**Current Vitamins:**	
PATIENT WEIGHT (kg)**:**	**PATIENT HEIGHT** (m)**:**	
BMI (kg/m)**:**	**Pre-Surgery Weight (approx):**	

SEND COMPLETED REFERRALS TO THE APPROPRIATE LOCALITY

Management of Patients Becoming Pregnant After Metabolic-Bariatric Surgery

A Guide for Health Care Professionals

This guide contains advice on points to consider in the management of patients who become pregnant after metabolic-bariatric surgery.

This includes nutritional advice, monitoring and supplementation and when to refer to the Welsh Institute of Metabolic and Obesity Surgery team (WIMOS).

This is a guide only, individualised care should always be considered.

Introduction:
A strong message should be given to women to postpone pregnancy until their weight has stabilised following metabolic-bariatric surgery (MBS), typically at least a year. Patients should also be advised to avoid oral contraception, instead favouring long-active methods such as IUD which are less affected by surgery.

Changes to gut anatomy and physiology following MBS introduce the potential for malnutrition. This increases the chances of adverse perinatal outcomes, such as small for gestational age, preterm birth, congenital abnormalities and perinatal mortality. Pregnancy soon after MBS may also increase the risk of maternal morbidity and/or mortality. Those who have undergone WBS less than 2 years are particularly at risk of complications and will require an urgent referral for obstetric review as soon as pregnancy is confirmed.

1. **Dietary Considerations:**

There is a lack of evidence-based dietary advice for pregnant women who have previously undergone MBS. A poor diet during pregnancy is not uncommon. Emphasis should be placed on monitoring diet quality and nutritional status, encouraging a healthy dietary pattern and lifestyle. The individual's motivations should be assessed and discussed as they may still be focused on achieving significant weight loss.

After MBS there is emphasis placed on prioritising lean protein sources, followed by fruit and vegetables, and lastly starchy carbohydrates. Patients should typically aim to consume at least 60g protein/day. Energy requirements should be individualised on the basis of pre-pregnancy BMI, gestational weight gain and activity level. Where significant weight gain is identified, energy dense foods should be limited. See section 5 for gestational weight gain.

Where abnormal glucose levels arise or glycaemic control deteriorates during pregnancy, similar to women without surgery who develop gestational diabetes, it is recommended to reduce intake of rapidly absorbed carbohydrates, substituting with protein and low glycaemic index (GI) alternatives. For more general information on the use of Low GI foods, the British Dietetics Association offer a handy 'Food Fact Sheet' on the subject. See references for link.

2. Diabetes:

Pregnant women with a history of MBS without pre-existing diabetes should be routinely screened for gestational diabetes within local antenatal/antenatal diabetes services. The form of testing will need to be individualised to the local practice of speciality teams. They may consider an oral glucose tolerance test, fasting glucose and HBA1c. However, there should be an awareness on the accuracy and tolerability (dumping) of oral glucose tolerance testing due to physiological changes following bariatric surgery.

Pregnant women with diabetes/prediabetes/remission of type two diabetes should be seen for pregnancy counselling and assessment by local antenatal/diabetes antenatal specialist services.

3. Dumping Syndrome:

Symptoms of 'early' dumping syndrome are common after MBS. They often occur within 1 hour of eating most often after eating rapidly absorbed carbohydrates. Typical symptoms include dizziness, flushing, palpitations and diarrhoea. If this is suspected, it is recommended to:

- Reduce consumption of rapidly absorbed carbohydrates (aim for low GI).
- Avoid liquids 30 minutes before and after eating to slow gastric emptying.
- Eat slowly and chew well, the '20-20-20' technique is often recommended following MBS. This involves:
    - Bite the size of a 20 pence piece (smaller cutlery can help)
    - Chew 20 times or more (until puree consistency)
    - Pause between each mouthful e.g. at least 20 seconds
    - Stop eating after 20 minutes
- Avoid caffeinated beverages
- Avoid alcohol (contraindicated throughout pregnancy)

'Late Dumping' (or Postprandial Hyperinsulinaemic Hypoglycaemia) can also occur 2-4 hours after eating. Although this is less common it can be serious. It should be considered in those with neuroglycopenic signs including dizziness or loss of consciousness in parallel with biochemical evidence of hypoglycaemia. Management of late dumping requires more careful manipulation of diet: low GI foods, small and frequent intake, carbohydrates mixed with protein. Consider referral to your local endocrinology team for further management.

4. Nutritional Supplementation:

Ideally, micronutrient serum levels should be optimised 3-6 months prior to conception. There is a lack of evidence on the optimal nutritional monitoring and supplementation for pregnant women after MBS but the guidance outlined below has been published based on data available. This guidance relates to patients who have undergone a Sleeve Gastrectomy, Gastric Band or Gastric Bypass. It is guidance only and individualised care should be considered:

- A daily A-Z multivitamin and mineral prior to conception and throughout pregnancy. Forceval (capsule) is usually a safe recommendation as vitamin A is not in the retinol form (avoid Forceval soluble form). It provides the recommended following:
    - Copper (2mg) .
    - Zinc (15mg).
    - Selenium (50mcg)

- In addition:
    - Folic acid (5mg) for those with BMI>30 during the 1st trimester
    - Iron (>18mg if Adjustable Gastric Band (AGB), 45- 60mg for Sleeve Gastrectomy (SG) or Roux en y Gastric Bypass (RYGB)) – adjust to maintain ferritin within normal limits. Note: Forceval capsule provides a 12mg contribution Iron (45-60mg) – adjust to maintain ferritin within normal limits
    - U.S. guidelines recommend Thiamine (>12mg) but no UK supplement provides this. Please see section 7.
    - Vitamin B12 IM injections at 1mg every 3 months
    - Supplement vitamin D (~1000IU) to maintain concentration of 75nmol/L or more with a serum PTH within normal limits.
    - Calcium 1200-1500mg in divided doses (including diet). Often a combined calcium and vitamin D tablet x 2/day can achieve these.

- Vitamin E (15mg). Forceval achieves 10mg
- US guidelines also recommend Beta-carotene (vitamin A, 5000IU). This is hard to achieve with UK supplementation & vitamin A deficiency is rare. We recommend be vigilant for deficiency symptoms e.g. night blindness.
- Review vitamin and mineral prescription and any other over the counter supplements to check none contain vitamin A in the retinol form
- See further references for vitamin K deficiency treatment

NOTE: Avoid vitamin A in the retinol form, which is potentially harmful in pregnancy.

NOTE: Where prolonged vomiting occurs, thiamine 300mg daily with vitamin B complex should be prescribed. Intravenous supplementation may be required if oral administration is not possible.

5. Blood Test Monitoring:

Ideally check the following preconception, after surgery, every trimester in pregnancy, 3 months post-partum, and during lactation if breastfeeding with amendment to supplementation as necessary:

- Folate

- Vitamin B12
- Ferritin
- Transferrin saturation
- Full blood count
- Vitamin A – if unable to take then monitor for clinical signs of deficiency

The following is recommended to be checked every 6 months:

- Vitamin K & PIVKII if coagulation abnormal
- Vitamin D
- Bone profile
- PTH
- Magnesium
- Renal function
- Liver function
- Vitamin E
- Zinc
- Copper
- Selenium

NOTE: During pregnancy, serum levels of micronutrients can decrease as a result of expanding maternal blood volume and increasing foetus demands. See Further References for a resource to guide on adjusted lab values.

Perinatology.com: Reference ranges for lab values during pregnancy. Available at:Normal Reference Ranges and Laboratory Values In Pregnancy (perinatology.com)

6. Gestational Weight Gain:

Weight should be discussed and monitored with a sensitive approach. Many patients have a complex history with associated psychological challenges. An understanding of their weight history is therefore recommended.

There is no known specific guidelines for gestational weight gain during pregnancy in women who have undergone MBS. Few studies which have focused on this suggest women who have undergone MBS gain less weight during pregnancy than those without surgery, particularly in the first 18 months.

Due to correlation between insufficient weight gain and adverse neonatal outcomes, international consensus recommendations suggest women who have undergone MBS adhere to Institute of Medicine guidelines. These are:

For a BMI Less than 18.5:

- Range of total weight gain: 28-40lbs
- Weight gain rate during 2nd & 3rd trimester: 1lb/wk

For a BMI 18.5-24.9:

- Range of total weight gain: 25-35lbs
- Weight gain rate during 2nd & 3rd trimester: 1lb/wk

For a BMI 25-29.9:

- Range of total weight gain: 15-25lbs
- Weight gain rate during 2nd & 3rd trimester: 0.6lb/wk

For a BMI over 30:

- Range of total weight gain: 11-20lbs
- Weight gain rate during 2nd & 3rd trimester: 0.5lb/wk

Patients should be counselled to avoid weight loss. For those in the first 12 months after MBS, weight loss is likely to still be experienced due to metabolic effects but should be limited with a focus on the need for fetal growth and development.

7. Nausea/vomiting

Nausea and vomiting early on in pregnancy ('morning sickness') is very common. MBS may compound this issue. Diet and lifestyle modifications to help manage these symptoms should be given much the same as those who have had not had MBS i.e. avoiding foods/smells causing nausea, dry foods may be better tolerated, little and often plain foods, cold rather than hot, trial ginger, drink plenty of fluids. They should liaise with their obstetric team on whether antiemetics may be appropriate.

As with any pregnant women, those who are not be passing sufficient urine or unable to keep food or fluids down for 24 hours or feel severely weak, dizzy or faint they should call their obstetric team, GP or 111.

Thiamine 300mg daily with vitamin B complex should be prescribed if prolonged vomiting occurs. Intravenous supplementation may be required if this is not possible. If they have likely suffered long-term insufficient nutrient intake, the reintroduction of macronutrients should take place gradually and preferably in an inpatient setting with close monitoring of electrolytes due to a risk of refeeding syndrome.

8. Breastfeeding:

Limited data is available, but consensus is breastfeeding should be supported. Health benefits to breastfed infants by post-surgery mothers have been identified. Monitor maternal micronutrients during lactation as described to monitor for deficiencies which could contribute to adverse maternal or neonatal outcomes.

9. Emotional & Psychological Support

MBS is a life-changing operation which brings with it complex psychological challenges that can be difficult to process. Some individuals have a history of or pre-existing issues relating to body image with fear of weight regain. Combine this with hormone changes, psychological pressures and natural weight gain anticipated with pregnancy and you have an individual who may benefit from additional emotional and psychological support.

It is recommended adequate opportunity be given to discuss mental health and wellbeing in a secure and comfortable environment. Referral and signposting to the appropriate local health board and/or third-party services should be readily offered and the need for these discussions be considered into timescales for review.

10. Onward Referral

The first line route to specialist advice in pregnancy should be via the relevant specialty within the patient's Local Health Board, according to the involved system. In particular, the patient's (or the emergency) obstetric team should be contacted where any concern regarding the pregnancy or maternal health is identified.

Consider referral to endocrinology where gestational diabetes or postprandial hyper-insulinaemic hypoglycaemia are suspected. Chemical pathology and pharmacy can provide advice regarding parenteral or enteral micronutrient supplementation and administration. General surgery or gastroenterology may be appropriate for abdominal symptoms. Level 3 specialist weight management services exist in most health boards and may be able to offer support, please consult directly as practices differ.

Consider tertiary care referral to the Welsh Institute for Metabolic and Obesity Surgery (WIMOS) during pregnancy where patients are struggling with symptoms or conditions, despite implementation of the advice herein and/or relevant local specialist input,and are felt to warrant specific bariatric surgical review. Relevant symptoms may include:

- Sweating, dizziness or fainting after eating or drinking
- New difficulty swallowing
- Persistent excessive vomiting, not felt to be hyperemesis
- Abdominal pain felt by the obstetric team to be from a non-obstetric cause and not typical of gallstone disease
- Severe and refractory heartburn/ reflux/ night coughing despite dyspepsia medication
- Diarrhoea after eating or drinking

Note that there is no formal out of hours specialist bariatric cover. Emergency surgical input requests should be directed to the Local Health Board's general surgery service.

Consider a diagnosis of internal hernia in all patients who have undergone a gastric bypass procedure and experience severe, new onset abdominal pain. Internal hernia is more common during pregnancy, can be life-threatening, and requires emergency referral to the nearest general surgical team for investigation.

If the patient has a gastric band they should inform the organisation who placed it of their pregnancy as they will need band adjustment if regular vomiting and possibly as pregnancy develops. Gastric band slippage is more common during pregnancy and should be considered in patients with new or worsening swallowing difficulty. Refer to local general surgery team as an emergency if not tolerating oral fluids; contact WIMOS for urgent assessment where there is dysphagia, but fluids are tolerated.

Symptoms and complications of gallstones are more common during pregnancy. This includes biliary colic, cholecystitis, pancreatitis, and obstructing bile duct stones. Consider ultrasonography and/or referral to the general surgery team if a gallstone diagnosis is suspected.

Queries and referrals to WIMOS should be directed to:

Team Co-ordinator: 01792703573

Address: WIMOS Metabolic-Bariatric Surgery Team,

Morriston Hospital, Swansea, SA6 6NL

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