Sultanate of Oman
Ministry of Health
The Royal Hospital
Department of Obstetrics and Gynecology

Code: OBG-CLN-GUD-56-Vers.3.0

Effective Date: 21/01/2024
Target Review Date: 31/01/2027

Title: Obesity with pregnancy

1.0 Introduction

1.1 Obesity is a complex multifactorial disease. In 2023, female obesity prevalence for Oman was 40.9 %.[1] One third of women delivering in Royal Hospital are obese.[2]Ob pregnancy is now one of the most important challenges in obstetric care.

1.2 **Definition** - Obesity is defined as the body mass index > 30.BMI is weight in kilograms divided by height in meters squared (kg/m2).

1.**3 Complications for obese women during pregnancy:**

Antenatal:	**Intrapartum:**	**Postpartum**
Miscarriage	More Induction of labour, prolonged labour and failure to progress	postpartum haemorrhage
Gestational diabetes	Higher Rate of instrumental delivery, caesarean section	Delayed wound healing
Pre-eclampsia	Shoulder dystocia	Increased rates of wound infection
Difficult screening for structural anomalies	Difficult fetal heart rate monitoring	Greater likelihood of needing support with breastfeeding establishment and continuation
Abnormalities in fetal growth	Difficulties with labour analgesia	Postnatal depression
Preterm labor.	Failure of TOLAC .	Long term neonatal consequences: infant weight gain, obesity
Thromboembolism events Obstructive sleep apnoea Carpal tunnel syndrome . Maternal death		

Difficulties with labour analgesia / anaesthesia
General anaesthesia • Difficulty maintaining an adequate airway • Increased risk of need for ICU care post operatively

2.0 Antenatal Management of obesity with pregnancy

All women should have their booking BMI noted /calculated and categorized according to WHO. This is to be repeated in third trimester to plan arrangements for Labour. I pressure using appropriate sized cuff should be taken at booking.

3.0 Maternal BMI is categorized by the World Health Organization (WHO) as follows:

BMI class	**BMI (weight in Kg/ (height in metre)^2**
Under weight	<18.5
Normal weight	18.5 – 24.9
Overweight	25- 29.9
Obese Class 1	30-34.9
Obese Class 2	35-39.9
Obese Class 3	>=40

4.0 Diet

- Folic acid 5 mg supplementation to be continued till the end of first trimester.
- Pre-pregnancy BMI is inversely associated with serum Vitamin D concentrations among pregnant women, therefore obese women are at increased risk of Vitamin D deficiency. There is no conclusive evidence on the benefits of maternal vitamin D supplementation on pregnancy outcomes, however supplementation in women who vitamin D deficient may be beneficial for long term maternal health.[3,8]
- Subclinical 25(OH) D deficiency may be prevalent amongst Omani women[4]. In view of the high prevalence of Vit D deficiency in Omani women[5], Vit D 400IU to b supplemented from 12 weeks till the end of pregnancy. (Available in pharmacy as Calcium 600mg +Vitamin D 400 IU tablets).
- Women should be advised about healthy diet and appropriate exercise during pregnancy in order to prevent excessive weight gain and gestational diabetes. Consultat Dietician early in the pregnancy is advisable.
- Anti-obesity and weight loss drugs are not recommended for use in pregnancy.

5.0 Vaccination

- Vaccinations should be recommended to obese women as per standard antenatal care. Influenza vaccination is strongly recommended for obese women during pregna

6.0 Information and counselling

- Obese pregnant women should be informed about her increased risk of preeclampsia, gestational diabetes and fetal macrosomia
- She should be aware of poor ultrasound visualization of fetus leading toinadequate screening for congenital anomalies due to obese abdominal wall and consequent difficulties in fetal surveillance.
- She should be also informed about the potential for difficulty with intra-partum fetal monitoring, anaesthesia and caesarean section and the need to prioritise the safe mother at all times
- Regular exercise in pregnancy may reduce some medical risks related to obesity [6]

7.0 Expectation of weight gain

BMI (kg/m2) (WHO)	Classification	Singleton pregnancy total weight gain range	Rates of weight gain in 2nd and 3rd Trimester per week
<18.5	Underweight	12.5 to 18 kg	0.51 (0.44- 0.58)
18.5-24.9	Normal	11.5-16kg	0.42 (0.35- 0.50)
25- 29.9	Overweight	7-11.5kg	0.28 (0.23-0.33)
>30	Obese (All Classes)	5-9.1kg	0.22 (0.17-0.27)

Institute of Medicine Antenatal surveillance [7]

8.0 Watch for complications during antenatal visits

8.**1 Hypertension**

- An appropriate size of arm cuff should be used for blood pressure measurements -Appendix 1
- Aspirin 150 mg OD at bedtime should be started from 12 weeks till birth of the baby for women with additional Risk factor for pre-eclampsia. Even though literature subject is controversial, **in women with G6PD deficiency, it is safer to administer Aspirin 75mgOD** to avoid haemolytic complications.
    - First pregnancy,
    - Previous pre-eclampsia,
    - Interval of >/=10 years since last baby,
    - Age>40 years,
    - Family history of pre-eclampsia,
    - Booking diastolic BP >/=80mmHg,
    - Booking proteinuria >/=1+ on more than one occasion or >/Urine PCR >30mg/dl,
    - Multiple pregnancy
    - Underlying medical conditions such as antiphospholipid antibodies or pre-existing hypertension, renal disease or diabetes
- Women with a booking BMI >/=35 & no additional risk factor
    - Monitoring for preeclampsia at 3-4 weekly intervals between 24 and 32 weeks gestation,
    - Two -3 weekly intervals from 32 weeks to delivery
- Women with a booking BMI >/=35 with one additional risk factor for preeclampsia should have weekly monitoring of Blood pressure

8.**2 Gestational diabetes**

- Early glucose tolerance testing (GTT) testing (2 hour 75g oral glucose tolerance test),
- Repeat at 28 weeks if the first test is normal

8.3 Congenital / chromosomal anomalies

- USS to detect fetal structural anomalies is to be done at 20 – 22 weeks ,
- may be repeated after 2 – 4 weeks for cardiac anomaly.
- Results of screening for trisomy with Non-invasive Prenatal Testing(NIPT) may be less effective for obese pregnant women[9]

9.0 Growth monitoring

- Incidence of Small for Gestation Age fetus is higher in obese women (13-19 % vs 11% in general population).
- Maternal obesity can make clinical assessment of fetal growth difficult and at risk of missing IUGR.
- Women with BMI> 35Kg/m^2should have serial assessment of foetal size by USS
- Ultrasound assessments of fetal growth, despite its limitations, can provide a more accurate assessment

10.0 Thromboprophylaxis

10.1 Indications of Antenatal Thromboprophylaxis – to be started at booking or any gestation (1^{st}, 2^{nd} or 3^{rd}trimester) as assessed as per VTE guideline

10.2 Indications for postpartum Prophylaxis - Postnatal risk assessment should be made.

Please refer to VTE guideline

10.3 **Recommended dosages**

Weight in Kg	**Enoxaparin**	**Dalteparin**	**Tinzaparin 75IU/Kg/day**
<50	20mg/day	2500IU/day	3500IU/day
50-90	40mg/day	5000IU/day	4000IU/day
91-130	60 mg / day	7500 IU/day	7000 IU/day
131-170	80 mg/ day	10000 IU/day	9000 IU/day
>170	0.6 mg/kg/day	75 units/kg/day	1. nits/kg/day

11.0 Planning labour and delivery

11.1 BMI above 40

Pregnant women with a booking BMI >/=40 may be advised an antenatal consultation with an obstetric anaesthetist, so that potential difficulties with venous access, regional or general anaesthesia can be identified and labour epidural analgesia can be discussed.

11.2 Induction of labour

In the absence of other co morbidities, elective induction of labour at term in obese women may reduce the chance of caesarean birth without increasing the risk of adverse outcomes; the option of induction should be discussed with each woman on an individual basis.Where macrosomia is suspected, induction of labour may be considered.

However, a low threshold for IOL at term may be appropriate because of the increased risk of stillbirth.[10]

11.3 Intrapartum monitoring

If BMI 30–40 kg/m2 and pregnancy is otherwise uncomplicated, there is no specific requirement for continuous fetal monitoring[10]

11.4 Women whose BMI >/= 40 women or whose weight exceeds 120kg in labour

- Delivery suite registrar to be informed on admission
- Duty anaesthetist covering labour ward to be informed
- Operating theatre staff should be alerted
- Continuous midwifery care
- Measures to prevent pressure sore
- Venous access established early in labour
- Save serum
- Continuous intra-partum care, Foetal scalp electrode placement if needed as external fetal heart monitoring can be difficult.
- Risk of shoulder dystocia to be anticipated
- An early epidural may be advisable depending on clinical scenario.
- Active management of third stage of labour as there is increased risk of PPH in those with BMI > 30.
- Thromboprophylaxis as per guideline.

12.**0 Vaginal Birth after Caesarean in obese Women**

- VBAC less likely to succeed as compared to normal women

BMI Kg/m^2	Successrate of VBAC
<29	80%
> 29	54- 68%
Weight >136 Kg	1. – 15 %

- Fivefold higher incidence of scar dehiscence uterine rupture during trial of labour (2.1% in obese women vs 0.4% normal weight women).
- Neonatal injury (7.2% in obese women vs 3.8% normal weight women)

- Emergency caesarean section associated with an increased risk of
  - Serious maternal morbidity because of anaesthetic difficulties
  - Operative difficulties

13.0 Caesarean delivery in obese women

- In morbid obese women an additional experienced assistant to be present during surgical procedure.

- Prophylactic antibiotics to be given(cefazolin 2g I/V if weight less than 120 Kg and 3g I/V if weight more than 120Kg in adults with normal renal function) (see ap -2)
- Long procedure greater than 2 drug half-lives (>4 hours for cefazolin from time of dose), administer additional intraoperative dose of the same antibiotic[12]
- Excessive blood loss >1,500 ml, administer additional intraoperative dose of the same antibiotic[12]
- Suturing of sub cutaneous layer if thickness more than 2 cm
- Awareness regarding possibility of PPH, wound infection, endometritis

Weight in Kg	Incidence of infection
90 – 130 Kg	17.8%
>130 Kg	>50 %

14.0 Postnatal advice

- Advice and support during antenatal and postnatal period regarding the benefits, initiation and maintenance of breast feeding.
- Advice regarding weight reduction.
- Referral to weight management services .
- Even if not GDM follow up in LHC regarding development of diabetes and long term risks of obesity.

15.0 Management of pregnancy following Bariatric surgery

- A minimum waiting period of 12- 18 months is recommended before attempting pregnancy to allow stabilisation of body weight and to identify any existing nutritior deficiencies

- Women with bariatric surgery should have nutritional screening and dietician referral in pregnancy

16.0 References

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Appendix - 1

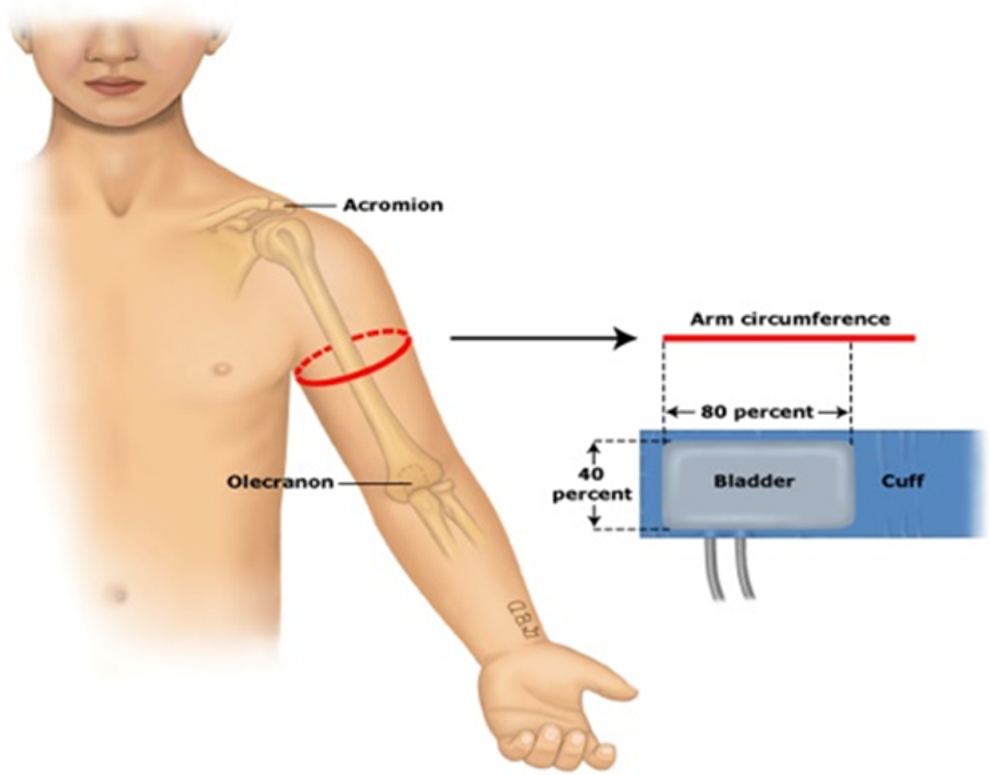

TABLE 3

Recommended Cuff Sizes for Accurate Measurement of Blood Pressure

PATIENT	*RECOMMENDED CUFF SIZE*
Adults (by arm circumference)	
22 to 26 cm	12 × 22 cm (small adult)
27 to 34 cm	16 × 30 cm (adult)
35 to 44 cm	16 × 36 cm (large adult)
45 to 52 cm	16 × 42 cm (adult thigh)

Information from Pickering TG, Hall JE, Appel LJ, Falkner BE, Graves J, Hill MN, et al.; Subcommittee of Professional and Public Education of the American Heart Association Council on High Blood Pressure Research. Recommendations for blood pressure measurement in humans and experimental animals. Part 1: blood pressure measurement in humans. Hypertension 2005;45:142–61.

Appendix – 2

Publishing organisation	Year updated	Agent	Dose	Weight-adjusted dose
Australian Therapeutic Guidelines	2019	cefazolin	2g	3gif more than 120 Kg
		Clindamycin Gentamicin	600 mg 2 mg/kg	
RANZCOG	Due for review	Cefazolin	1 g	2 g >100 kg
ACOG	2018	Cefazolin	1 g	2–3 g if >80 kg or BMI kg/m^2
		Clindamycin Gentamicin	900 mg 5 mg/kg	
NICE	2019	Refers to local formulary		
RCOG Green Top guideline 72	2018	Not specified		
BNF	2019	Cefuroxime	1.5 g	No adjustment specified
		Clindamycin	No dose given	
Royal Hospital Portal	**2018**	**cefazolin**	**2gm(<120Kg)**	**>/=120Kg 3 gms**

Infection control Guidelines (Gulf Health Council, Centre for Infection control)				
		Clindamycin **Gentamicin**	**900mg** **5mg/Kg**	

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