Obesity Facts

Review Article

Obes Facts
DOI: 10.1159/000546449

Received: March 7, 2025
Accepted: May 13, 2025
Published online: June 21, 2025

EASO Position Statement: Women with Obesity across the Reproductive Life – Fertility, Preconception, Pregnancy, Postpartum, and Breastfeeding

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Keywords
Obesity · Woman · Fertility · Preconception · Pregnancy · Postpartum · Breastfeeding

Abstract
Background: Obesity management in women presents distinct challenges across their lifespan. However, there is limited evidence or recommendations focused solely on women living with obesity. ***Summary:*** This European Association for the Study of Obesity (EASO) position statement is based on an expert comprehensive review and summary of the available scientific evidence on women living with obesity. It aims to guide the health and medical assessment of these women during their reproductive life (fertility, preconception, pregnancy, postpartum, and breastfeeding). ***Key Messages:*** 1. To better diagnose obesity in women beyond BMI, the use of at least one additional anthropometric measure, like waist-to-height ratio (WHtR), is strongly recommended. When available, the use of bioelectrical impedance vector analysis is encouraged. 2. Women with obesity should be offered obesity management counseling and psychological support. 3. Obesity can negatively impact fertility; weight loss of 5–10% over 6 months improves fertility. 4. In women with Polycystic Ovary Syndrome (PCOS), treatment with metformin and GLP-1 receptor agonists or surgery can be considered. 5. Current recommendations for pregestational obesity suggest a gestational weight gain (GWG) of 5–9 kg. Lower GWG targets should be considered, particularly for class II or III obesity. 6. There is limited clinical data on the safety and efficacy of obesity medication during pregnancy or lactation. 7. All pregnant women with obesity should be offered prenatal screening for fetal anomalies, with discussion of the potential

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limitations of diagnostic tests and additional growth ultrasounds offered on an individual basis. 8. All pregnant women with a BMI ≥30 kg/m2 should be screened for gestational diabetes in early pregnancy. Measures to prevent preeclampsia should be taken and the need for thromboprophylaxis assessed. 9. Intrapartum fetal surveillance is recommended during active labor. 10. Postpartum weight management is needed to mitigate the risk of adverse outcomes for the mother and for subsequent pregnancies. The assessment of appropriate contraceptive methods during the postpartum and breastfeeding period is crucial.

Introduction

Obesity, also known as adiposity-based chronic disease, is a chronic, relapsing, multifactorial disease that involves an increased accumulation of body fat and an adipose tissue dysfunction [1, 2]. Women are disproportionately affected by this disease and carry the burden over to the next generation, contributing to the global burden of obesity [3].

The traditional focus on weight control in women with obesity, often oversimplifies a complex, chronic disease. While weight is a measurable factor, shifting the terminology towards "obesity management" acknowledges the multifaceted nature of the condition. This approach in women's health encompasses not only weight, but also the metabolic, hormonal, and genetic components contributing to obesity, paving the way for more comprehensive and patient-centered care.

Obesity management in women presents distinct challenges across their lifespan. However, there is limited evidence or recommendations focused solely on women living with obesity.

This European Association for the Study of Obesity (EASO) position statement is based on an expert comprehensive review and summary of the available scientific evidence on women living with obesity. It aims to guide the health and medical assessment of these women during their reproductive life (fertility, preconception, pregnancy, postpartum, and breastfeeding).

General Considerations

Diagnosis of Obesity in Women

- While body mass index (BMI) is traditionally used for obesity/adiposity-based chronic disease diagnosis, it is strongly recommended that the assessment of obesity in women during fertility and preconception stages should also include at least one of the additional anthropometric measures (Table 1) like waist circumference, waist-to-hip ratio, or waist-to-height ratio (WHtR) [4, 5]. WHtR is also effective in assessing adiposity and cardiometabolic risk [6–8].
- When available, it is strongly recommended to use advanced tools to diagnose adiposity in women, that take in consideration hydration and fat mass percentage like the Bioelectrical impedance vector analysis (BIVA). BIVA is a valuable tool for monitoring body composition changes in women with obesity, especially tracking shifts in fat mass and fat-free mass, and fluid levels. In patients who have undergone bariatric surgery, BIVA has demonstrated its ability to track body composition changes before and after surgery, showing reductions in both fat and fat-free mass [9]. Similarly, BIVA has been effective in identifying fluid overload in women with class III obesity [10]. Additionally, BIVA can identify individuals with sarcopenic obesity, characterized by low muscle mass and high fat mass, thus facilitating targeted interventions [11].

Key Messages

- To better diagnose obesity in women beyond BMI, the use of at least one additional anthropometric measure, like waist-to-height ratio (WHtR), is strongly recommended.
- When available, the use of BIVA is encouraged for diagnosis and follow-up.

Counseling, Communication, and Ethical Considerations

- Healthcare professionals should consider the individual views and needs of the women with obesity and adapt their language appropriately [16]. They should always use person-first language, such as "woman living with obesity." This emphasizes the individual while also acknowledging obesity as a chronic disease.
- During their training, healthcare professionals should be provided with the skills needed to care for patients with obesity [17].
- Healthcare professionals have an ethical responsibility to provide care to all women with obesity who fall within their scope of practice [17].
- During routine consultations and preconception consultations, healthcare providers should offer comprehensive guidance on obesity management and lifestyle modifications including nutrition, exercise, sleep hygiene, adequate hydration, and reduction in sedentary activities. This proactive approach empowers women to make informed decisions and improve their reproductive health trajectory [16, 18, 19].

- Primary care services should support women of childbearing age with obesity management before pregnancy and should measure and record BMI with at least one additional anthropometric measure annually [16].
- Women with obesity benefit from specific behavioral strategies to decrease caloric intake and increase physical activity. They should be encouraged to consider enrolling in structured obesity management programs [20, 21].

Psychological Support

- Healthcare professionals should be mindful of the physiological stigma attached to overweight or obesity conversations.
- Women with obesity are at an increased risk of mental health disorders. Healthcare professionals should provide psychological support across all phases of their life.
- Healthcare professionals should screen for anxiety, depression, eating disorders, and make referrals for further assistance when appropriate at all stages of a woman's life [16].
- The language used to discuss weight loss should be positive and inclusive, so as to not further the stress of decreased fertility, pregnancy, or postpartum. The patient's permission should be taken prior to making any further referrals concerning their mental health.
- The practice of routinely monitoring weight during pregnancy may inadvertently exacerbate stigma and stress for women with obesity. Healthcare providers should be particularly sensitive to this potential impact.
- During pregnancy discussions should be based on gestational weight gain rather than absolute weight, to avoid weight stigma and encourage positive interactions.

Key Messages

- To reference obesity in women, use person-first language ("woman with obesity").
- Women with obesity should be offered obesity management counseling and psychological support across all phases of their reproductive life (fertility, preconception, pregnancy, postpartum).

Fertility

Effect of Obesity on Fertility in Women

- The effect of BMI on female fertility has been extensively studied. Women with overweight (BMI 25.0–29.9 kg/m^2) and obesity (BMI ≥30 kg/m^2) have a linear decline in spontaneous pregnancy rates with increasing BMI, corrected for possible related factors, women with a BMI >29 kg/m^2 had a 4% lower pregnancy rate per kg/m^2 increase; BMI, in addition to other adverse effects on their overall health [22].
- Women with obesity undergo changes in their hypothalamic-pituitary-ovarian axis and frequently suffer from irregular menstruation, leading to anovulation and infertility. Adipose tissue acts as an independent endocrine organ, secreting adipokines that interfere with oocyte differentiation and maturation [23].
- Obesity in women is frequently associated with significant societal bias, contributing to elevated stress levels across personal, social, and professional domains. Furthermore, the pursuit of fertility treatments often imposes a substantial financial and emotional burden, further compounded by societal expectations emphasizing natural conception. This confluence of factors can strain marital relationships, leading to feelings of isolation, anxiety, and depression [24].
- Polycystic ovary syndrome (PCOS) is one of the most common disorders impacting fertility in women. While PCOS can be associated with a normal BMI, clinicians should pay special attention to women with PCOS presenting with obesity [25].
- Women with obesity may have issues with their fertility despite normal ovulatory function and regular menstrual cycles and also the risk of miscarriages is higher [26]. Obesity management and weight loss have shown to improve fecundity, suggesting that the effect of obesity on fertility is likely reversible [27].
- A normal BMI (18.5–25 kg/m^2) is associated with highest fertility rates and hence aiming towards a normal BMI is desirable for fecundity in women with overweight or obesity [28]. However, keeping a realistic target is more important for women desiring fertility. There is evidence to support a weight loss of 5–10% over 6 months to help restore ovulation and pregnancy in 55–100% of the women [29].

Key Messages

- Obesity can negatively impact fertility, despite normal menstrual cycles.
- Weight loss of 5–10% over 6 months improves ovulation and fertility outcomes.

Polycystic Ovary Syndrome

- PCOS is the most common endocrine condition in young women, it affects 10–13% of women of reproductive age with a noted higher prevalence in

Table 1. Diagnosis of obesity in women

Index	Cut-off points
Body mass index (BMI), kg/m^2	• Underweight: <18.5 • Normal weight: 18.5–24.9 • Overweight: 25–29.9 • Obesity class I: ≥30 • Obesity class II: ≥35–39.9 • Obesity class III: ≥40 [12] These classifications for BMI have been adopted for White, Hispanic, and Black individuals. For Asian individuals: • Underweight: <17.5 • Normal weight: 17.5–22.9 • Overweight: 23–27.9 • Obesity: ≥28 [7, 12, 13]
Waist circumference (WC), cm	Abdominal obesity according to ethnicity [14, 15]: • European woman: ≥80 cm • Caucasian woman: ≥80 cm • American woman: ≥88 cm • Canada woman: ≥88 cm • Asians and Japanese women: ≥80 cm • Chinese women: ≥80 cm • Middle East, Mediterranean women: ≥80 cm • Sub-Saharan African: ≥80 cm
Waist-to-height ratio (WHtR)	≥0.5: increased risk of obesity-related diseases [6] ≥0.6: severe risk of obesity-related disease
Waist-to-hip ratio (WHR)	≥0.85: increased risk of obesity-related diseases [1, 13]
Body fat percentage (PBF)	Underweight: <20 Normal: 20–29.9 Overweight: 30–35 Obesity: ≥35% [7]

certain ethnic groups, such as South East Asians [30]. Significantly, 35–50% of women diagnosed with PCOS have overweight or obesity [31].

- Women with PCOS struggle with oligomenorrhea, anovulatory infertility, hyperandrogenism, and co-morbidities like impaired glucose tolerance, dyslipidemia, and insulin resistance. They also have a higher chance of developing diabetes mellitus, obstructive sleep apnea (OSA), cardiovascular disease, endometrial, ovarian, and breast cancer compared to women without PCOS [29].
- PCOS can have a negative impact on body image, and women should be screened for depression using regionally validated screening tools. Women with PCOS should also be screened for eating disorders, regardless of weight status [30].
- Women with PCOS are at increased risk of complications in pregnancy including gestational diabetes mellitus (GDM), preeclampsia, and risk of preterm delivery. It is recommended to have preconceptional obesity management and optimization of BMI, blood pressure, and an oral glucose tolerance test [30].
- Lifestyle interventions can help restore ovulatory cycles and improve metabolic risk and is the first-line intervention [29].

Dietary Interventions

- Dietary modifications are the mainstay of modifying the metabolic dysregulations in women with PCOS.
- Mediterranean diet (MD) high in extra virgin olive oil, fish, vegetables, legumes, fruits, nuts, whole grains, has been shown to have anti-inflammatory and antioxidant effects reducing inflammatory processes and adiponectin levels [32].
- Low carbohydrate diets, with recommendations to use complex carbohydrates may reduce postprandial insulin excursions, and insulin resistance thereby improving symptoms of PCOS and fertility rates [33].

- Ketogenic diets (defined as a low daily carbohydrate intake below 50 grams per day) have also been noted to result in significant improvements in reproductive hormone levels [34].

Exercise

- Adolescents should engage in 60 min of moderate to vigorous activity per day, including resistance training to have beneficial effects on strengthening muscle and building bone. Adults should avoid being sedentary, and aim for minimum 75–150 min/week of vigorous aerobic activity or 150–300 min/week of moderate-intensity exercise, plus muscle strengthening exercises on 2 non-consecutive days of the week [30]. No specific exercise has been shown to be superior to others for PCOS [35].

Pharmacological Treatment

- Pharmacotherapy could be considered in addition to lifestyle interventions, however, long-term use, side effects, and the need for contraception should be discussed with the patient since there is potential for weight regain after discontinuation of these medications [30].
- Metformin should be considered in adults with PCOS with BMI >25 kg/m^2 and adolescents at risk of PCOS or with PCOS with irregular cycles. It is suggested to be started at 500 mg once daily, and increased every 1–2 weeks, with suggested maximum daily dose 2.5 g in adults and 2 g in adolescents [30]. In women with PCOS, metformin helped reduce body weight and abdominal fat, improve hirsutism by reducing serum testosterone levels, improved insulin resistance, and regularizing menstrual cycles [36].
- In addition to hypocaloric diet, weekly GLP-1 analogs like Dulaglutide have also shown benefit in reducing visceral adiposity and metabolic profiles in randomized controlled trials in women with obesity and PCOS [37]. Semaglutide has shown benefit in women who have been unresponsive to lifestyle interventions [38]. Liraglutide in combination with lifestyle interventions and metformin resulted in significant weight loss in women with obesity and PCOS [39].
- Tirzepatide, a dual GLP-1 and gastric inhibitory peptide (GIP) receptor agonist, has shown improvement in weight reduction and insulin sensitivity, which are the two major problems in PCOS and can be a potential treatment for PCOS [40].

Metabolic Bariatric Surgery

- Metabolic surgery (MBS) should be considered according to general population guidelines in women with PCOS. It is imperative to discuss effective contraception due to rapid restoration of fertility with weight loss, and to continue it until a stable weight is achieved to avoid risk of growth restriction, prematurity, or pregnancy complications [30].
- MBS was more effective than medical care for the induction of spontaneous ovulation in women with PCOS, obesity, and oligomenorrhea or amenorrhea [41].

Key Messages

- PCOS is the most common cause of anovulatory infertility, and obesity exacerbates the reproductive complications of PCOS.
- Women with PCOS and infertility are at an elevated risk for pregnancy complications, including GDM and preeclampsia.
- Lifestyle modifications, including diet and exercise, are crucial for managing PCOS.
- Metformin and GLP-1 receptor agonists can be considered as adjuncts to lifestyle interventions, particularly for women with elevated BMI and those struggling with metabolic dysregulation.
- Metabolic bariatric surgery may be an option for women with PCOS and severe obesity. Effective contraception is important following MBS due to the rapid restoration of fertility following weight loss and should be maintained until stable weight is achieved.

Preconception

Obesity at preconception is an important predictor of maternal and neonatal health outcomes [42, 43]. International guidelines agree that optimal control of body weight should begin before pregnancy [20, 44]. Therefore, an integrated approach to addressing maternal obesity should begin during the preconception period (shown in Fig. 1).

Assessment of Comorbidities

- Weight loss and management of obesity comorbidities before pregnancy has been shown to be the most effective intervention to prevent anovulatory infertility, pregnancy related complications and improve medical comorbidities in women with obesity and should be encouraged [45, 46].
- Screening for comorbidities in women with obesity at preconception may include diabetes screening and blood pressure measurement, assessment of renal function (proteinuria and serum creatinine), liver function tests, lipid profile (cholesterol and triglycerides), thyroid stimulating hormone, electrocardiogram, and pulmonary function tests if respiratory concerns are present. Additionally, screening for OSA and an echocardiogram to evaluate cardiac function may be warranted in specific cases (e.g., history of chronic hypertension of ≥5 years). Referral to specialists may be necessary based on initial screening results [19].

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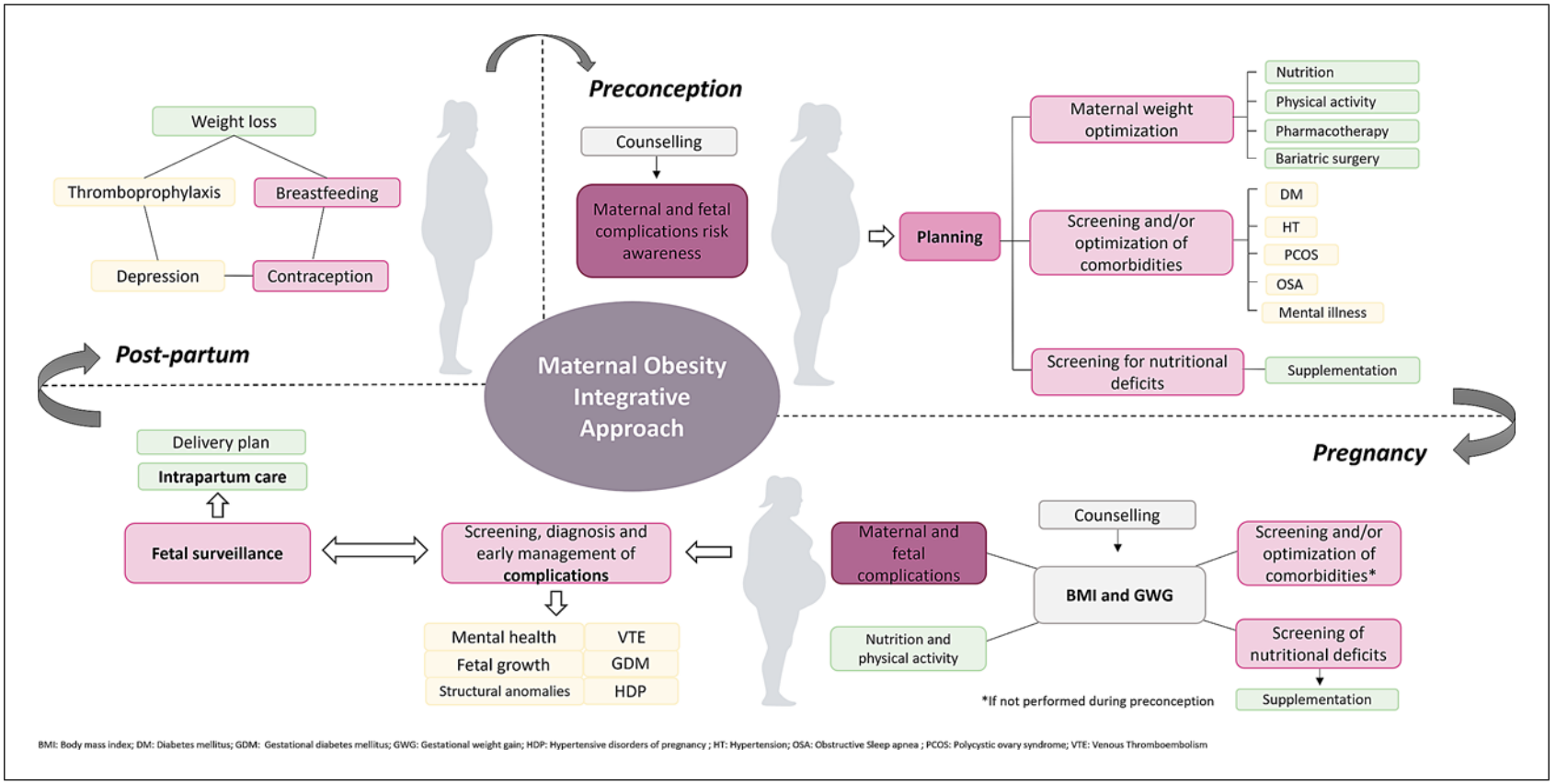

Fig. 1. Maternal obesity integrative approach.

- Physical examination should thoroughly assess adipose tissue distribution, cardiorespiratory function, and signs of venous thromboembolism, hernias, pressure wounds, or intertriginous infection [19].

Weight Management

- Preconception body mass index (BMI) can impact postpartum weight retention [47]. Prepregnancy weight reduction with lifestyle interventions, pharmacotherapy or bariatric surgery has shown to improve pregnancy outcomes [48, 49].
- The evidence suggests that a 5–10% loss of total body weight over a 6-month period is a realistic and achievable goal during preconception and yields significant health benefits [46]. Weight management strategies could include dietary, exercise, medical, and surgical approaches [16, 19].

Pharmacological Interventions

- Pharmacological interventions for weight management in preconception require open communication to consider the balance between risks and benefits, especially concerning the timing of conception. Due to safety concerns, these medications are generally not recommended during pregnancy or when actively trying to conceive [46]. Some, such as phentermine-topiramate, are even associated with a 3-fold risk of malformations and fetal growth retardation [50]. Topiramate also induces hormone metabolism compromising contraceptive efficacy and therefore IUD is the recommended form of contraception [50].
- Until more clinical evidence is available, for safety reasons in the preconception period, it is recommended to follow the indications of the summary of product characteristics of drugs. If a woman wishes to actively seek to conceive, medications should be discontinued. Drugs with long half-lives, such as semaglutide [51] and tirzepatide [52] should be discontinued 8 and 4 weeks prior to conception, respectively.

Metabolic Surgery

- Women at reproductive age who have undergone MBS should use a highly effective method of contraception for the period of active weight loss [21].
- A minimum of 12–18 months after bariatric surgery is recommended before attempting pregnancy to allow stabilization of body weight, identification of any possible micronutrient or macronutrient deficiencies and restore the nutritional status that may have gone unnoticed during the initial months after surgery [18, 21].
- Bariatric surgery may provide superior obstetric outcomes for women with class III obesity compared to lifestyle interventions, including a decreased prevalence of GDM, hypertensive disorders in pregnancy, macrosomia, and birth defects. However, women and physicians should be aware of the potential risks of maternal nutritional deficiencies and small-for-gestational-age newborns following bariatric surgery [18]. The impact of surgery on preterm birth and cesarean section (CS) rates remains unclear and require further investigation to establish causality and long-term effects on both mother and child.

Folate Supplementation

- Folate supplementation at preconception is recommended for women with obesity. Due to an increased risk of neural tube defects in neonates, supplementation should begin 3 months prior to conception, with a minimum of 0.4 mg/day of folic acid, and up to 5 mg/day for high-risk women [16, 18, 19].
- For women with prior bariatric surgery, a dose of 0.8 mg/day of folic acid at preconception is recommended starting at least 4 weeks prior to conception and to be continued at least until the end of the first trimester of pregnancy [21].

Vitamin D Supplementation

- Despite the high prevalence of vitamin D deficiency in women with obesity, there is no sufficient evidence supporting routine vitamin D supplementation to improve maternal and offspring outcomes [18].

Key Messages

- Obesity significantly increases the risks of infertility and adverse maternal and neonatal outcomes during pregnancy. Therefore, preconception obesity management is very important.
- Comprehensive screening is essential to assess and manage obesity-related comorbidities at preconception. This screening should include evaluation of glycemic control, blood pressure, and renal, liver, and cardiovascular function.
- Weight management strategies should be individualized and may include dietary modifications, exercise, and, in certain cases, pharmacological or surgical interventions as required.
- If a woman wishes to become pregnant, medications to treat obesity should be discontinued prior to conception.
- Women of reproductive age who have undergone MBS should use reliable contraception during the weight loss phase. It is recommended to avoid pregnancy for the first 12–18 months following MBS.
- Preconception folate supplementation is essential for women with obesity to reduce the risk of neural tube defects. Higher doses should be considered in high-risk cases.

Pregnancy

Gestational Weight Control Recommendations

- All pregnant women should have a height, weight and BMI measured, and documented in their antenatal record at first antenatal visit, ideally before 10–12 weeks gestation [53].
- Gestational weight gain (GWG) should be monitored by rechecking weight at each antenatal visit and at least once in each trimester [53].
- For women with obesity, a GWG limit of 5–9 kg has been recommended [54]. However, some current GWG guidelines may be too liberal for obesity class II and III, as better outcomes are predicted with lower weight gain [55].
- Although studies on optimal GWG have yielded varying results, a trend toward recommending lower weight gain, especially for women with overweight or obesity, is emerging and requires further research [55, 56].
- Inadequate obesity or weight management should be discouraged during pregnancy [54, 57].
- More studies are needed regarding the optimal GWG, particularly ones that take in consideration ethnicity [58].

Key Messages

- Assess weight, height, and BMI at the first prenatal visit and continue monitoring weight throughout pregnancy.
- Current recommendations for women with pregestational obesity suggest a GWG of 5–9 kg. However, lower GWG targets should be considered, particularly for those with class II or III obesity.

Nutrition and Exercise Recommendations during Pregnancy

- Antenatal structured diet and physical activity-based lifestyle interventions should be advised and provided by health professionals since they are associated with reduced GWG and lower risk of adverse maternal and neonatal outcomes [16, 46, 59].
- An individualized dietetic advice plan by a trained professional should be provided early in the pregnancy where possible [18, 53].
- Obesity has been recognized as a risk factor for several nutrient deficiencies, including certain fat-soluble vitamins and folate [60]. Pregnant women with obesity should take 0.4–5 mg/day of folic acid at least until the end of the first trimester [16, 18].
- Although vitamin D3 supplementation is effective in improving the vitamin D sufficiency status in pregnant women with obesity, there is a lack of strong evidence on its effects on pregnancy outcomes [61, 62].
- Women who have undergone MBS require additional screening for vitamin and mineral deficiencies. They should be referenced to a dietician for advice on nutritional needs, and adequate vitamin supplementation is recommended [16, 46].
- Multivitamin supplements containing preformed vitamin A (retinol) should be avoided due to the risk of teratogenicity [63]. Conversely, if supplementation is needed, supplementation with provitamin A (beta-carotene) may be considered, and its intake should be managed appropriately to maintain normal physiological vitamin A concentrations [64].
- Women with uncomplicated pregnancies should be encouraged to engage in an exercise program of moderate-intensity aerobic and strength-condition exercises for at least 20–30 min per day on most or all days of the week [65].
- Pregnant women who were sedentary before pregnancy should start with low-intensity, short periods of exercise and gradually increase the period or intensity of exercise as they are able [65].

Key Messages

- Provide antenatal structured diet and exercise guidance to manage weight gain and minimize risks. Offer individualized dietary plans early in pregnancy.
- Ensure adequate folic acid intake and screen for and address nutritional deficiencies, particularly in women with prior weight loss surgery.

Pharmacological Recommendations during Pregnancy

- There is insufficient evidence to support the use of metformin for women with obesity in pregnancy to control GWG or for improving maternal and infant outcomes [66, 67].
- While preliminary clinical data suggest no increased risk of major birth defects or pregnancy loss with first-trimester GLP-1-RA exposure compared to diabetes or overweight/obesity, the current evidence base is insufficient to make a recommendation [68–72].

Key Messages

- There is insufficient evidence to recommend metformin for gestational weight control or outcomes in women with obesity.
- There is limited clinical data on the safety and efficacy of GLP-1 receptor agonists during pregnancy; until further clinical evidence is available, their use during pregnancy is not recommended.

Prophylaxis, Screening, and Management of Complications during Pregnancy

Counseling on Obesity and Pregnancy Outcomes

- Instead of focusing primarily on risks and placing undue strain, clinical practice guidelines (CPGs) should promote small, achievable changes that improve health and well-being for women with obesity.
- Pregnant women with obesity should receive clear, accessible information about the risks associated with obesity during pregnancy and be offered support to minimize them [16, 18].
- Screening and/or optimization of comorbidities should be performed in early pregnancy, but preferably during preconception [73].
- Pregnant women with obesity are at increased risk of several maternal complications during pregnancy and postpartum. Among these, GDM, gestational hypertension, preeclampsia, stillbirth, and postpartum weight retention carry the greatest relative risks.

Screening for Fetal Anomalies and Assessment of Fetal Size

- Women with obesity should be informed about their increased risk of structural anomalies (odds ratio [OR] of 1.87 for neural tube defects; OR of 1.30 for cardiovascular malformations) and the limitations of screening and diagnostic tests for these structural anomalies [16, 74].
- All women should be offered antenatal screening for chromosomal abnormalities. However, they should be advised that the risk of failure is increased in women with a higher BMI including for noninvasive prenatal testing [18, 73].
- Morphology ultrasound from 20 weeks may improve the diagnosis rate of congenital anomalies [73].
- Pregnant women with obesity should be offered additional serial ultrasounds to monitor fetal growth. The timing and frequency of these scans should be determined based on the overall clinical assessment [16, 18].

Key Messages

- Prenatal screening for fetal anomalies should be offered to all pregnant women with obesity.
- The potential limitations of diagnostic tests for fetal anomalies must be discussed.
- Additional growth ultrasounds should be offered to pregnant women living with obesity according to individual needs.

Screening for GDM

- All pregnant women with a BMI ≥30 kg/m^2 should be screened for GDM in early pregnancy [16]. Early pregnancy screening for glucose intolerance should also be based on risk factors, like known impaired glucose metabolism or previous GDM [46, 75].
- Women with a history of MBS before pregnancy should not perform oral glucose tolerance tests. Alternative testing such as home glucose monitoring for approximately 1 week during the 24–28 weeks of gestation should be suggested [45, 76].

Hypertensive Diseases of Pregnancy

- An appropriately sized cuff should be used for blood pressure measurements at all antenatal appointments [18].
- To help prevent preeclampsia, prophylactic low-dose acetylsalicylic acid is recommended for women with obesity who also have other moderate to high-risk factors, starting from early pregnancy [77].
- It is recommended to commence acetylsalicylic acid at 11–14 weeks of gestation for women with obesity and one or more high-risk factors (history of preeclampsia, multifetal gestation, chronic hypertension, type 1 or type 2 diabetes, renal disease, autoimmune disease). Or more than one moderate-risk factors (nulliparity, obesity, family history of preeclampsia, age 35 years or older, African American race, low socioeconomic status, personal history factors), at a dose of 150 mg daily at night until 36 weeks of gestation, when delivery occurs, or when preeclampsia is diagnosed [78, 79].

Thromboprophylaxis

- Clinicians should recognize that women with a BMI ≥30 kg/m^2 have a preexisting risk for developing venous thromboembolism during pregnancy [16].
- Risk assessment should be discussed, evaluated, and documented individually at the first antenatal visit, throughout pregnancy, during labor, and postpartum. Antenatal and postpartum thromboprophylaxis should be considered accordingly [80].
- Weight-based dosage for venous thromboembolism thromboprophylaxis may be considered rather than BMI-stratified dosage strategies in class III women with obesity [46].

Fetal Surveillance

- Due to the elevated risk of stillbirth associated with obesity, greater fetal surveillance is recommended in the third trimester [16].

- For women with prepregnancy BMI of 35.0–39.9 kg/m^2, weekly antenatal fetal surveillance may be considered beginning at 37 weeks of gestation. For women with prepregnancy BMI 40 kg/m^2 or greater, weekly antenatal fetal surveillance may be considered beginning at 34 weeks of gestation [54].

Key Messages

- All pregnant women with a BMI ≥30 kg/m^2 should be screened for glycemic abnormalities in early pregnancy.
- Acetylsalicylic acid is recommended commencing at 11–14 weeks of gestation for women with obesity who also have one or more high-risk factors, or more than one moderate-risk factors, at a dose of 150 mg to prevent preeclampsia.
- Thromboembolic risk assessment should be evaluated individually at the first antenatal visit, throughout pregnancy, labor, and postpartum.
- In pregnant women living with obesity, greater fetal surveillance is recommended in the third trimester and should be individualized.

Labor and Delivery

- Women with a BMI ≥40 kg/m^2 or OSA should be referred for antenatal anesthetic consultation and an anesthetic management plan for labor should be made and documented [46].
- The decision to undertake elective CS should be made by a multidisciplinary team, considering the woman's comorbidities, antenatal complications, and preferences [16].
- Induction of labor is recommended at 41+0 weeks of gestation for women with a BMI ≥35 kg/m^2 owing to increased risk of stillbirth. Consider elective induction at term if macrosomia is suspected [16].
- Intrapartum fetal surveillance is recommended during active labor. External fetal monitoring is recommended in women with BMI ≥35 kg/m^2 [16].
- Women with a BMI ≥30 kg/m^2 having a CS are at increased risk of wound infection and should receive prophylactic antibiotics at the time of surgery and may benefit from higher doses [16].
- Mechanical thromboprophylaxis is recommended for women with obesity having a CS. Early mobilization must be encouraged. Pharmacologic thromboprophylaxis should be considered on an individualized basis [16].

Key Messages

- There is no consensus on the best induction of labor protocol for women with obesity.
- Intrapartum fetal surveillance is recommended during active labor.
- Women with obesity are at increased risk of infection and thromboembolic events, especially after CS and should be managed accordingly.

Postpartum

Postpartum challenges are amplified for women with obesity due to the interplay of factors such as preexisting comorbidities, weight-related complications, potential surgical recovery (in cases of CS), and the demands of newborn care. Due to these and other factors including sleep disturbance, management of obesity is harder in the postpartum period. In addition, there is a tendency in women with obesity to develop abnormal fat distribution, specifically central obesity at the postpartum period [81].

Weight Management in Postpartum

- Postpartum weight management counseling is recommended to mitigate risks to the mother and for future pregnancies. This includes referral to behavioral interventions focused on improving healthy diet and exercise to promote healthier weight before subsequent pregnancies [21, 73].
- GWG is a predictor of postpartum weight retention. Compared to woman with normal GWG those with excessive GWG were 2.15 times [95% CI: 1.64, 2.82] more likely to be overweight postpartum and those with excessive GWG were 4.49 [95% CI: 3.42, 5.89] times more likely to have postpartum obesity [82]. Women with obesity should be offered further dietary and physical activity advice to support postpartum weight management [16].
- Inter-pregnancy weight loss is associated with reduced risks of stillbirth, hypertensive complications, and fetal macrosomia in subsequent pregnancies. Additionally, weight loss increases the likelihood of successful vaginal birth after cesarean delivery [16, 18]. Women should be provided and referred to behavioral counseling interventions focused on improving healthy diet and exercise in order to achieve a healthier weight before next pregnancy [46]. Also, pharmacotherapy or MBS can be considered as appropriate.

Postpartum Comorbidities

- Maternal obesity is linked to GDM, gestational hypertension, and preeclampsia. These can have long-term health implications postpartum [83, 84]. Women with obesity who have been diagnosed with these comorbidities or other pregnancy complications should have appropriate postnatal follow-up [16].
- Women with a history of GDM have a nearly 10-fold higher risk of developing type 2 diabetes (T2DM) [85, 86]. Women with a history of GDM should have lifelong screening for the development of T2DM or prediabetes every 1–3 years [86].

- Inter-pregnancy BMI changes significantly impact GDM [49]. A BMI increase ≥1 unit increased GDM risk (aOR 1.51, 95% CI 1.18–1.95), while a decrease ≥1 unit reduced it (aOR 0.51, 95% CI 0.31–0.85). Similarly, a >1 unit BMI increase elevated LGA risk (aOR 1.67, 95% CI 1.15–2.42). Notably, among women with obesity, a BMI decrease ≥1 unit significantly represents 67% lower odds of GDM compared to those who do not (aOR 0.33, 95% CI 0.12–0.88) [49].
- Following cesarean birth in women with obesity, postoperative thromboprophylaxis with unfractionated or low-molecular-weight heparin is recommended. This prophylaxis should be continued at least until the patient is fully ambulatory. Evidence supporting the routine use of thromboprophylaxis following vaginal birth has not been found [19].

Postpartum Contraception and Obesity

- Women with obesity should be counseled on the most appropriate form of postpartum contraception according to women's individual needs and preferences. [16].
- Information available indicates that Long-acting reversible contraceptives (LARCs), particularly intrauterine devices (IUDs) and contraceptive implants, are recommended as the safest and most effective contraceptive methods for women with obesity [87–89]. Combined hormonal contraceptives (e.g., pills, patches, rings), while effective, carry an increased risk of venous thromboembolism and may be less suitable compared to LARCs. Also, pro-gestin-only options, like the depot medroxyprogesterone acetate (DMPA) injection, can also be effective but may cause weight gain and other side effects [88, 89].

Breastfeeding and Obesity

Implications for the Mother

- Women with obesity have lower rates of breastfeeding initiation and shorter breastfeeding durations compared to normal-weight women [18, 21, 90–92]. This may be attributed to factors such as delayed onset of lactation, often associated with higher rates of CS and elevated progesterone levels in women with obesity [44, 91, 93].
- A study estimated the impact of perinatal weight change on obesity, weight gain, and development of obesity-related illnesses, 15 years after pregnancy. Results indicate that women who breastfed beyond 12 weeks and participated in postpartum aerobic exercise had lower BMI and reduced weight gain 15 years later [47].
- Given the established benefits of breastfeeding for both mother and infant, women with obesity should receive specialized counseling on these benefits and be provided with comprehensive antenatal and postnatal support to optimize breastfeeding initiation and maintenance [16, 19, 73].
- The best contraceptive methods for women with obesity during breastfeeding are intrauterine devices (IUDs) and contraceptive implants [94, 95].Progestin-only methods, such as the etonogestrel implant and levonorgestrel IUD, have not been shown to adversely affect breastfeeding [94, 96].
- Obesity medications are generally contraindicated during breastfeeding due to limited safety data and potential risks to the infant. Orlistat, Phentermine/Topiramate ER, Lorcaserin, Naltrexone/Bupropion, and Liraglutide are specifically advised against due to concerns regarding infant exposure and adverse effects [7, 97].
- Due to a lack of safety data and potential risks to infants, semaglutide and tirzepatide use is not recommended during lactation [51, 52, 98–100].

Implications for the Infant

- There is an inverse relationship between breastfeeding and childhood obesity. A World Health Organization (WHO) meta-analysis found that breastfeeding is protective against overweight and obesity with a 27% reduction in the odds of developing obesity compared to non-breastfed children. The protective effect is amplified with longer breastfeeding durations, particularly exclusive breastfeeding for at least 4 months [101], and persists into adulthood [102]. This association is likely multifactorial, including improved infant self-regulation of energy intake with breastfeeding [103, 104].

Conclusion

This EASO position statement provides a comprehensive overview of management of women with obesity across their reproductive life. Acknowledging the limitations of BMI as the sole diagnostic criterion of obesity, the use of at least one additional anthropometric measure, like waist-to-height ratio (WHtR), is strongly recommended. Also, the use of BIVA is encouraged for diagnosis and follow-up. Nutritional and exercise guidance should be provided to women throughout their lifespan.

Women with PCOS and infertility are at an elevated risk for pregnancy complications, including GDM and preeclampsia. However, weight loss, lifestyle interventions and

pharmacological or surgical treatment can significantly improve fertility outcomes.

Preconception care for women with obesity is critical. This care should include comprehensive screening for obesity-related comorbidities. Also, individualized weight management strategies should encompass lifestyle modifications, pharmacotherapy or surgery. Furthermore, preconception folate supplementation is essential to mitigate the risk of neural tube defects.

During pregnancy, weight monitoring, appropriate GWG guidance, and structured lifestyle interventions are crucial. Nutritional deficiencies should be addressed, with particular attention to women with prior weight loss surgery. Current evidence does not support routine use of metformin or GLP-1 RAs for GWG control.

Postpartum care should address weight management, potential complications, and contraception needs. Breastfeeding should be strongly encouraged, with comprehensive support provided to women with obesity to optimize initiation and duration.

Further research is needed to address existing evidence gaps and optimize care for women with obesity across their reproductive life.

Conflict of Interest Statement

EH conflicts of interest include grants, lecture fees and consulting: Finnish Heart Association, Finnish Diabetes Association, Exeltis, Novartis, Orion Pharma, Merck, Gedeon Richter, Eli Lilly, Boehringer Ingelheim, Vivus, and NovoNordisk. The authors F.F.-A., N.A., D.R.-M., M.P.M., S.G.S., B.M. and A.C. have no conflicts of interest to declare.

Funding Sources

This study was not supported by any sponsor or funder.

Author Contributions

F.F.-A., N.A., D.R.-M., M.P.M., E.H., S.G.S., B.M., and A.C. contributed to the conception, critically and exhaustively review the intellectual content, design of the review, agreed to be accountable for all aspects of the work and ensured that questions relating to the accuracy or integrity of any part of the work were appropriately investigated, and approved the final version the version to be published. F.F.-A., N.A., D.M., and M.P.M. conducted the literature search and data extraction. D.M. and M.P.M. created Figure 1. F.F.-A. prepared the draft of the manuscripts.

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