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Pregnant Woman with Obesity: How to Diagnose and Treat Obesity During Pregnancy? A Review of Current Guidelines and Scientific Data

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ABSTRACT

The aim of this article is to analyze the issue of obesity during pregnancy as a significant health challenge for both the mother and the developing fetus. Maternal obesity is associated with numerous health complications, including gestational diabetes and an increased risk of delivery interventions. The paper emphasizes the importance of proper diagnostics, nutritional

education, and treatment in the care process for obese pregnant women. Current guidelines regarding weight gain during pregnancy and the role of an interdisciplinary team in minimizing the risk of complications are also discussed. An analysis of available studies and literature allows for a multifaceted approach to this issue.

Keywords

adult obesity, diet in pregnancy

Introduction

Obesity during pregnancy is a significant clinical issue, affecting 15–20% of pregnant women in developed countries according to the latest epidemiological data[1]. A pregnant woman with obesity requires special medical supervision due to the increased risk of complications for both the mother and the developing fetus. Scientific studies indicate a substantial rise in the prevalence of this condition over the past decade[2].

Comprehensive care for a pregnant patient with obesity includes systematic monitoring of weight gain, screening for gestational hypertension and gestational diabetes. Special attention must also be given to assessing the risk of fetal macrosomia and the potential need for a cesarean section. Proper diagnostic and therapeutic management, combined with a well-balanced diet, forms the foundation of effective pregnancy care in patients with obesity[1,2].

Definition and Classification of Obesity During Pregnancy

The classification of obesity during pregnancy is based on the body mass index (BMI) determined prior to the first prenatal visit or during the first trimester[3].

Body Mass Index (BMI) as a Diagnostic Criterion

BMI is the primary diagnostic tool used to assess the degree of obesity; however, its application is limited to the pre-pregnancy period or the first trimester, when body weight has not yet undergone significant changes. A preconception BMI value above 26.1 indicates an excess energy intake relative to the body's needs[4].

Degrees of Obesity During Pregnancy

According to international classification standards, the following degrees of obesity are distinguished, as described in Table 1.

Table 1. Obesity — Classification by Degree

Degree of Obesity	Overweight	Class I	Class II	Class III
BMI (kg/m²)	25-29,9	30,0-34,9	35,0-39,9	≥40,0

[4,1]

The recommended weight gain during pregnancy depends on the pre-pregnancy BMI. For women with obesity (BMI >30 kg/m²), the recommended weight gain is 5-9 kg. Recent studies suggest that for women with morbid obesity (BMI >40), maintaining a minimal weight gain or no weight gain at all may be more beneficial[3,5].

Epidemiology of Obesity Among Pregnant Women

The prevalence of obesity among pregnant women shows significant geographical differences. In the United States, approximately 34% of women of reproductive age have a BMI between 30 and 40 kg/m², and 7% have morbid obesity (BMI ≥ 40). In Europe, the situation is equally concerning, with around 50% of the population being overweight and 30% suffering from obesity[1].

In Poland, the obesity problem affects 10-20% of pregnant women. Notably, women starting pregnancy with overweight typically have an average body weight about 15 kg higher than women with normal weight, while women with obesity have an average weight nearly 30 kg higher[2,3]. Particularly alarming is the fact that for about 20 years, the percentage of women with obesity of reproductive age has remained at around 10%, but it is expected that this rate will increase over the next decade due to the rising prevalence of obesity among children and adolescents[1].

Complications of Obesity During Pregnancy

Complications associated with obesity during pregnancy present a significant challenge for modern perinatology. Clinical studies indicate a significantly increased risk of a range of complications for both the mother and the fetus[5,6].

Maternal Complications

Obesity in pregnancy is associated with an increased risk of metabolic and cardiovascular disorders. In patients with a BMI >30 kg/m², there is a higher incidence of gestational diabetes and pregnancy-induced hypertension. Particularly significant is the fact that obese women face a significantly elevated risk of developing preeclampsia, which can lead to serious complications[7,8].

The main maternal complications associated with obesity include pregnancy-induced hypertension, which occurs in 40% of cases with a BMI >40, gestational diabetes, venous thrombosis, urinary and reproductive tract infections, and sleep-disordered breathing[9,10].

Fetal Complications

Maternal obesity has a significant impact on fetal development. Studies indicate an increased risk of congenital abnormalities, particularly in the nervous and cardiovascular systems[2,4]. In fetuses of obese mothers, the complications described in Table 2 are observed.

Table 2. Fetal Complications

Type of Complication	Fetal Macrosomia	Neural Tube Defects	Heart Defects
Incidence	2-3 times more common than in mothers with normal weight	50% increased risk	Significantly increased risk

[2]

Perinatal Complications

The perinatal period in pregnant women with obesity is characterized by an increased risk of complications. Statistics indicate that the rate of cesarean sections in these women is nearly twice as high compared to pregnant women with normal body weight. Over 40% of patients with a BMI >40 require labor induction, compared to 26% of patients with normal body weight[2,11].

Of particular concern is the increased risk of perinatal hemorrhage, difficulties in performing regional anesthesia, complications in wound healing after surgery, and wound infections. Each of these factors can significantly affect the course of pregnancy and delivery, and thus requires special attention and appropriate medical supervision[2,7,11].

Imaging diagnostics in pregnant women with obesity are significantly more difficult, which may lead to delayed detection of potential abnormalities. Difficulties in assessing fetal movements and performing ultrasound examinations may result in a later diagnosis of fetal well-being issues[2,7,11].

Obesity Diagnosis During Pregnancy

Early diagnosis of obesity during pregnancy requires a comprehensive approach, considering both standard anthropometric parameters as well as advanced biochemical and imaging tests. Precise monitoring of the health status of pregnant women with obesity is crucial for minimizing the risk of complications[2,5].

Biochemical Tests

When planning preconceptional diagnostics for women with obesity, a series of tests should be performed, tailored to potential metabolic and health disorders[2].

In the case of diagnosing carbohydrate intolerance, an oral glucose tolerance test (OGTT) is recommended; however, for women who have undergone bariatric surgery, it is advised to assess the glycemic profile instead. In case of abnormalities, intensive treatment for carbohydrate intolerance should be initiated, including pharmacological therapy (e.g., using GLP-1 receptor agonists), dietary modification, and increased physical activity[2,12].

Gestational diabetes diagnosed for the first time during pregnancy can take various forms depending on the severity of carbohydrate intolerance. It includes gestational diabetes, which meets the general criteria for diagnosing diabetes, and gestational diabetes mellitus (GDM), diagnosed based on at least one abnormal result from the OGTT (oral glucose tolerance test)[13,14].

Women at higher risk include those over the age of 35, those who are overweight (BMI >27 kg/m² before pregnancy), with a history of large newborns (>4 kg), intrauterine death, or gestational diabetes in a previous pregnancy. For diagnosis, every pregnant woman should have her fasting blood glucose tested during the first visit, and between the 24th and 28th weeks of pregnancy, an OGTT test using 75 g of glucose should be performed. It is crucial to detect at least one abnormal value: fasting blood glucose (5.1–6.9 mmol/l), after 1 hour (≥10 mmol/l), or after 2 hours (8.5–11.0 mmol/l). In case of gestational diabetes diagnosis, the patient should be referred to a specialized center, and appropriate monitoring should be implemented, even after delivery, due to the increased risk of developing type 2 diabetes[13,14,15,16].

Thyroid function is assessed by measuring TSH levels, especially when the value exceeds 2.5 mIU/ml. In such cases, additional measurements of FT4, FT3, and anti-TPO antibodies (possibly anti-TG) are recommended. Based on the results, hormonal treatment may be suggested, and the patient should be referred to an endocrinologist for further diagnostics[17].

An accurate diagnosis of thyroid dysfunction during pregnancy requires consideration of the specific hormonal changes that occur during this period. Elevated levels of human chorionic gonadotropin (hCG) in the first trimester can temporarily lower TSH levels and increase free thyroxine (FT4) and triiodothyronine (FT3) concentrations, which may sometimes require differentiation from thyrotoxicosis. Additionally, changes in thyroid hormone metabolism, increased iodine excretion in urine, and heightened activity of placental enzymes that metabolize thyroid hormones can influence laboratory test results[17,18].

Reference values for TSH, FT3, and FT4 should be adjusted according to the specific trimesters of pregnancy, as using general norms may lead to incorrect diagnoses. Significant changes also include the increased concentration of thyroid-binding proteins (e.g., TBG), associated with elevated estrogen levels, and a reduction in the clearance of these proteins. In clinical practice, interpreting results can also be challenging in the case of isolated hypothyroxinemia during the second and third trimesters[17,18,19].

Due to these complex hormonal changes and the influence of medications such as heparin and glucocorticoids, a precise diagnostic approach is necessary. This approach must take into account the dynamics of physiological changes during pregnancy, helping to avoid incorrect diagnoses and unnecessary therapy[19].

Table 3. Reference values for TSH, FT4, and FT3 for each trimester of pregnancy.

Parameter	1st Trimester	2nd Trimester	3rd Trimester
TSH [mIU/l]	0,01–2,32	0,1–2,35	0,1–2,65
FT4 [pmol/l]	11,6–20,96	10,64–18,12	9,15–15,88
FT3 [pmol/l]	3,71–6,62	3,52–5,89	3,08–5,42

[19]

In the diagnosis of lipid disorders, it is important to assess the levels of triglycerides and cholesterol along with its fractions. In the case of elevated values, dietary modifications, increased physical activity, and pharmacological treatment should be initiated according to the recommendations of a cardiologist[2,8].

Cardiovascular diagnostics should include home blood pressure monitoring and heart function assessment using ECG and echocardiography. In justified cases, a cardiology consultation, modification of pharmacotherapy, and discontinuation of certain medications, such as angiotensin-converting enzyme inhibitors or sartans, in favor of alternative treatment methods should be considered[2,12].

For evaluating the function of other organs, tests such as measuring transaminase levels, creatinine, glomerular filtration rate (GFR), and urinalysis are recommended. If abnormalities are detected, consulting a specialist is necessary[2,3].

To detect deficiencies in vitamins, macro- and micronutrients, it is recommended to perform blood morphology tests and measure levels of ferritin, folic acid, vitamins B12, and D. If deficiencies are found, they should be corrected through appropriate supplementation, such as taking 800 µg of folic acid daily as a prevention for neural tube defects[2,3].

Such comprehensive diagnostics allow for better preparation of a woman with obesity for pregnancy and minimize potential health risks.

Weight Gain Control

During pregnancy, the energy demand increases only slightly, reaching about 10% more in the last months compared to the pre-pregnancy period. In women with obesity, a low weight gain reduces the risk of gestational diabetes, preeclampsia, the need for cesarean delivery, and excessive birth weight of the newborn. For this group of women with obesity, the total weight gain during pregnancy should not exceed 7 kg[2,20].

Table 3. Recommended Weight Gain Based on Pre-pregnancy BMI

BMI Category	Underweight (<18.5)	Normal Weight (18.5-24.9)	Overweight (25.0-29.9)	Obesity (>30.0)
Recommended Weight Gain (kg)	12.5-18.0	11.5-16.0	7.0-11.5	5.0-9.0

[21]

For patients with a BMI of 35-39, a weight gain not exceeding 4 kg is recommended. For those with a BMI >40, it is advised to maintain a stable weight or slightly reduce it under strict specialist supervision [2,21].

Treatment

Treatment for pregnant women with obesity should take a multidimensional approach, combining an individually tailored diet and regular physical activity. The diet should be designed to ensure adequate intake of nutrients while limiting excessive calorie consumption, which helps control weight gain. At the same time, moderate physical activity, adapted to the pregnant woman's health status and capabilities, contributes to improving insulin sensitivity and reducing the risk of gestational diabetes and hypertension. Pharmacotherapy can only be used in justified cases, according to specialist recommendations, and should complement, not replace, the treatment, as many medications are not approved for use in pregnant women [21,22,23].

Supplementation of vitamins and microelements

Supplementation during pregnancy should be tailored to the individual needs of the patient. According to current guidelines from the Polish Society of Gynecologists and Obstetricians (PTGiP), supplementation plays a key role. Basic supplementation recommendations for pregnant women include taking folic acid in doses of 0.4–0.8 mg per day during the first trimester, and then 0.6–0.8 mg per day in the following stages of pregnancy[2,12]. The recommended dose of vitamin D is 1500–2000 IU per day, but for obese patients, it may be increased to 4000 IU per day. Additionally, it is advised to consume at least 200 mg of DHA daily and 30–60 mg of iron per day in case of confirmed deficiency. Iodine should be supplemented at 150–200 μg per day unless the patient has thyroid disorders. These recommendations aim to ensure proper fetal development and protect the health of the mother during pregnancy[2,12,23].

Patients with pathological obesity require special interdisciplinary supervision, including care from an obstetrician, midwife, dietitian, endocrinologist, diabetologist, and psychologist. Regular monitoring of biochemical parameters allows for appropriate modification of supplementation based on needs[2,12].

Dietary management

Proper dietary management for an obese pregnant woman requires systematic monitoring and an individualized therapeutic approach. Interdisciplinary care, involving collaboration between the obstetrician, dietitian, and endocrinologist, is the foundation of effective pregnancy management for patients with obesity[9,23].

A balanced, varied diet plays a crucial role in the health of pregnant women and the proper development of their children. During pregnancy, the caloric requirement increases only by 250–300 kcal per day compared to the pre-pregnancy period, highlighting the importance of choosing high-quality food products. Regular meal consumption supports the mother's well-being, proper weight gain, and optimal fetal development[9,21,23].

The diet should be based on vegetables and fruits as sources of vitamins, minerals, carbohydrates, and fiber. It is recommended to consume 4–5 servings of vegetables daily, preferring those rich in folates and polyphenols (e.g., kale, parsley), and 1–2 servings of fruits with lower sugar content, preferably in a less ripe form. Cereal products should be whole grain, such as buckwheat, brown rice, or whole-grain pasta, which can also provide "resistant starch," supporting blood sugar control[2,9,23].

Protein in the diet should come from both animal products (e.g., lean meat, fish, fermented dairy products) and plant-based sources, such as lentils, beans, or soy, with 40% of the protein being plant-based. Fats should be of high quality, with a higher proportion of omega-3 fatty acids compared to omega-6. It is recommended to use olive oil, rapeseed oil, avocado, nuts, and fatty marine fish, such as sardines or mackerel[2,9].

Foods high in saturated fats and energy-dense, nutrient-poor foods, including sweets and snacks, should be limited. It is also important to avoid trans fats and consume butter in moderation. The recommended fluid intake is 2–2.5 liters per day, with the option to supplement with weak teas or coffee (up to 200 mg of caffeine daily)[2,9,12].

Such a diet supports the health of both the mother and the child, while minimizing the risk of complications related to pregnancy, especially in women with overweight or obesity[2,9].

Pharmacotherapy

Pharmacotherapy for obesity during the periconceptional period and pregnancy requires special caution and an individualized therapeutic approach. Modern medicine offers a variety of treatment options, but their use must be carefully considered in terms of safety for the developing fetus[2,29].

Indications for Pharmacotherapy in the General Population

Pharmacological treatment of obesity is indicated for patients with a BMI ≥30 kg/m² or BMI ≥27 kg/m² in the presence of at least one obesity-related comorbidity. Therapy should last a minimum of 3-6 months, ideally ≥12 months, and its effectiveness is confirmed by a reduction of the initial body weight by ≥5% during a 3-month period of taking the medication at the therapeutic dose[1,2,23].

Currently, in the European Union and Poland, there are registered medications that assist in the treatment of obesity (Table 4).

Table 4. Medications Registered for Obesity Treatment

Medication	Mechanism of Action	Main Indications
Liraglutide	Regulates glucose levels, increases satiety	BMI ≥30 or ≥27 with complications
Naltrexone/Bupropion	Affects the satiety center	BMI ≥30 or ≥27 with complications
Orlistat	Inhibits fat absorption	BMI ≥30 or ≥28 with risk factors
Tirzepatide	GLP-1 and GIP receptor agonist, affects satiety and glycemic control	BMI ≥30 or ≥27 with complications; type 2 diabetes

[2,23]

Safety of Medications During Pregnancy

All currently available anti-obesity medications are contraindicated during pregnancy and breastfeeding. Patients planning a pregnancy should discontinue pharmacotherapy with adequate lead time. The safety of using medications during the periconceptional period requires an individual assessment of benefits and risks by a team of specialists. A key safety aspect during pharmacotherapy is the necessity of using effective contraception to prevent an unplanned pregnancy during treatment. It is also important to regularly monitor biochemical

parameters, which allows for the assessment of therapy effectiveness and early detection of potential abnormalities. Particular attention should also be paid to possible side effects, with regular check-ups to promptly identify and minimize risks to the patient [2,12,23].

Surgical Treatment

Bariatric surgery is an effective method for treating morbid obesity in women of reproductive age. Studies show that around 70% of patients undergoing bariatric procedures are of reproductive age. Infertility is present in 25% of women seeking bariatric surgery [3,24]. Key recommendations regarding pregnancy after bariatric surgery include two main areas: appropriate timing of conception and monitoring during pregnancy. It is recommended to wait 12–18 months after the procedure, allowing for weight stabilization and correction of any nutritional deficiencies. The decision to attempt pregnancy should be made individually, considering the patient's health status and readiness. During pregnancy, it is crucial to regularly monitor vitamin and mineral levels, particularly for potential deficiencies in iron, vitamin B12, and folic acid. Additionally, fetal development should be systematically monitored to ensure optimal growth and prevent any potential complications [2,3,23,24].

Studies indicate that pregnancy after bariatric surgery can proceed without complications and result in the birth of a healthy child. There is a reduction in the risk of complications typically associated with obesity during pregnancy, such as gestational diabetes and hypertension. Patients who have undergone different types of bariatric surgeries, such as sleeve gastrectomy, gastric banding, or gastric bypass, require special attention. Each of these procedures comes with unique challenges regarding the maintenance of metabolic health and monitoring potential complications related to the weight loss process and changes in the functioning of the digestive system. Patients should remain under the care of a multidisciplinary team, including an obstetrician, bariatric surgeon, and dietitian [2,23,24].

Summary

Obesity during pregnancy is a complex clinical problem, and its prevalence is steadily increasing in the population of women of reproductive age. Epidemiological studies indicate significant risks for both the mother and the developing fetus, including an increased risk of metabolic, cardiovascular, and obstetric complications. Particularly concerning is the fact that complications related to pregnancy obesity can lead to long-term health consequences for the offspring.

Pre-pregnancy BMI and weight gain during pregnancy play a crucial role. Effective

management of pregnancy in patients with obesity requires close cooperation of an interdisciplinary team of specialists, including an obstetrician, endocrinologist, diabetologist, and dietitian. Systematic monitoring of biochemical parameters, proper dietary management, and individualized supplementation are the foundation of optimal prenatal care. Implementing appropriate preventive strategies and early identification of risk factors allow for the minimization of potential complications and optimization of obstetric outcomes.

Disclosure

Author's Contribution

All the work was prepared by students under the guidance of the instructor. The authors' contributions are as follows:

- Conceptualization: Handzlik Iwona, Myszkowska Barbara;
- Methodology: Handzlik Iwona, Zawada-Wiśniewska Patrycja;
- Data collection: Myszkowska Barbara, Zawada-Wiśniewska Patrycja;
- Formal analysis: Wieczór Radosław;
- Writing – original draft preparation: Handzlik Iwona;
- Writing – review and editing: Myszkowska Barbara, Zawada-Wiśniewska Patrycja;
- Supervision: Wieczór Radosław, Olejarczyk Agata.

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Data Availability Statement

Data supporting the reported results are available upon request and will be provided if necessary. If no such data were involved, this statement is excluded.

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Conflict of Interest Statement

The authors declare no conflicts of interest related to this publication.

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