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Overweight and obesity among young women in Poland - the problem of infertility and prenatal complications

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Key words

Overweight; obesity; pregnancy; infertility

Summary

Overweight and obesity in young population is currently one of a highest importance problems in family practice. Among the examined young women in local community BMI over 25 kg/m², defined as overweight, concerned 34 patients, which is 25% of the examined group, and obesity (BMI over 30 kg/m²) concerned 10 women, which is 7% of the study group. The influence of the woman's excessive body weight affects the pregnancy at every stage of reproduction. Obesity causes problems with pregnancy, numerous complications of pregnancy, hinders childbirth and postpartum period.

Introduction - Definition of overweight and obesity according to WHO

According to the World Health Organization (WHO), since 1957, the percentage of people affected by obesity in the world has tripled, and less people die each year due to malnutrition than due to overweight and obesity and their complications.

These disturbing facts show the scale of the problem that the excessive body mass of the population. The statistics on children, youth and young adults are particularly worrying. Overweight and obesity in these age groups brings with it huge health and economic consequences in the world.

The most popular tool for assessing the nutritional status is the body mass index -BMI. It is calculated on the basis of the quotient of body mass in kilograms to the square of the body height in meters.

$$BMI = \frac{\text{masa ciała [kg]}}{\text{wzrost [m]}^2}$$

According to the WHO definition overweight is defined as BMI above 25 kg/m², while obesity occurs when this index exceeds 30 kg/m². We divide obesity into 3 stages: I stage of obesity is the BMI range of 30.0-34,99 kg/m², II stage, also called clinical obesity BMI 35.00-39,99 kg/m² and extreme obesity, i.e. obesity III stage when the BMI exceeds 40 kg/m².

The BMI index is not a perfect indicator, especially athletes with high muscle mass may be incorrectly qualified as people with excessive body mass. Despite the imperfections of the method, it is the most popular and the easiest indicator for the approximate assessment of nutritional status. [1]

The role of the family doctor

The family doctor as a "first contact" doctor plays an important role in the promotion of a healthy lifestyle as well as early diagnosis and recognition of obesity among his patients. One of the basic duties of family medicine in Poland are health balances carried out among children and adolescents. This is an opportunity to evaluate nutritional status of the young patient and to conduct education in this area. The last obligatory examination among youth is conducted among students of the last year of high school aged 18-19. Young adults are usually rare patients at their GPs, and the vast majority of visits take place during the infectious season, when the doctor does not have adequate conditions for anthropometric examination and conversation about the lifestyle. Young people who are overweight are not often aware of the consequences of their excessive body weight, and report to the doctor only with complications of obesity. Women, in whom obesity can cause problems with both pregnancy and obstetric problems can feel the negative impact of obesity much faster than men. [2]

The scale of the problem in the local community

To assess the scale of the problem in the local community, a BMI analysis was conducted among young women aged 18-19 who are patients of one of the outpatient clinics in the West Pomeranian Voivodeship. In 2017, examination of 133 students of the last year of upper-secondary school were carried out. Among the examined women BMI over 25 kg/m², defined as overweight, concerned 34 patients, which is 25% of the examined group, and obesity (BMI over 30 kg/m²) concerned 10 women, which is 7% of the study group.

Obesity and infertility in women

The influence of the woman's excessive body weight affects the pregnancy at every stage of reproduction. Obesity causes problems with pregnancy, numerous complications of pregnancy, hinders childbirth and postpartum period. [3] The Nurses Health Study showed that in women aged 18, BMI > 25 kg/m² significantly increases the risk of menstrual and ovulation disorders, ie a lower chance of pregnancy in comparison to the peers with a normal body weight. [4]

Infertility in women with excessive body weight is associated with endocrine disorders: decreased FSH and LH secretion, reduced secretion of progesterone by the corpus luteum, insulin resistance and hyperinsulinemia. Hyperandrogenemia occurs by reducing the synthesis of SHBG protein binding sex steroids, and increased ovarian production of androgens. In addition, there is a negative effect of hyperlepinemia on the ovarian function which disturbs the menstrual cycle. This is manifested by irregular menstruation and the occurrence of anovulatory cycles. Weight reduction by 5-10% significantly improves the number of ovulatory cycles and thus the woman's fertility.

It has been observed that BMI > 30 reduces the effectiveness of reproduction techniques. It is believed that this is due to a smaller increase in follicles during stimulation to IVF (extracorporeal fertilization) with a reduced amount of embryo implantation, which consequently reduces the number of pregnancies obtained by this method. [3]

Obesity in pregnancy - complications

Obesity in pregnancy involves the risk of numerous complications for both the mother and the fetus / newborn. This is due to numerous changes in pregnant metabolism. Compared with a woman of normal body weight, obese women have increased levels of triglycerides, decreased HDL, increased fasting blood glucose and fasting and post-stimulated insulin.

Hyperinsulinemia, dyslipidemia and insulin resistance negatively affect the pregnant woman's cardiovascular system. Increased oxygen demand increases circulation volume, cardiac output and left ventricular preload. [5] It is believed that every fat gain by 100g in a pregnant woman is associated with an increase in stroke volume by 30-50 ml/min. Increased vascular resistance may result in cardiac output loss and left ventricular overload, and as a consequence [4] the left ventricular wall thickness, ventricular septum defect and left atrial enlargement increase. Obese pregnant women are more likely to have gestational hypertension, sinus tachycardia [5], and myocardial conductivity and contractility are impaired. [4]

There is also a negative effect of excessive body weight on the respiratory system. Abdominal fat as well as accumulated around the ribs and diaphragm causes reduced thoracic susceptibility, leading to restriction-type ventilation disorders. Functional storage capacity (FRC), spare expiratory volume (ERV) and a reduction in FEV1 to FVC ratio are reduced. [5]

Prenatal complications

Gestational diabetes (GDM-gestational diabetes mellitus) - accounts for over 90% of all cases of diabetes in pregnancy [6]. It is caused primarily by insulin resistance and hyperinsulinism, but also by an increased number of proinflammatory cytokines in obese patients. It affects about 2-9% of pregnancies, and the most important risk factor for its occurrence is excessive body weight. Tarloni et al. Showed that an increase in BMI by 1kg per m² increases the incidence of GDM by 0.92%. [5] Due to the asymptomatic course of gestational diabetes, screening tests for GDM are of great importance. It has been found that even a small hyperglycemia during pregnancy increases the risk of obstetric complications and negatively affects the child's development. There are no glycemic values that pathologically affect fetal development, however, it is known that the risk increases already in the limit values of normoglycemia, i.e. lower than that accepted for the diagnosis of diabetes. Crucial is also the period of pregnancy in which carbohydrate metabolism

disorders occur, the period of organogenesis is of particular importance, where hyperglycemia correlates with an increase in congenital fetal defects. [6]

Pregnancy hypertension and pre-eclampsia - occurs in 5-10% of pregnant women and is one of the main causes of maternal deaths and neonatal deaths. It is estimated that gestational hypertension is more than 4 times more common and pre-eclampsia is three times more common in obese than in women with normal body mass. [5] Self-monitoring is recommended if higher blood pressure is suspected. The drug of choice is metyldopa. [7]

Venous thromboembolism (VTE) - the incidence in the pregnancy is higher than in the general population, and obesity significantly increases its risk. [5] 40% of cases of pregnant VTE occur in the first trimester, in particular, pregnancies resulting from in vitro fertilization. However, the greatest risk of pulmonary embolism is in the postpartum period and remains the main direct cause of death in this period. Additional risk factors besides obesity are the age of a woman over 35 years, thrombophilia, hypertension, diabetes, surgical delivery. [8]

Conclusions

Overweight and obesity in young women population is currently of a highest importance among patients problems in family practice. Due to the lack of tendency for spontaneous resolution of obesity and even its progressive character, young women should be able to monitor the antropometric parameters, educate in the risk of excessive body weight and mobilize to lead a healthy lifestyle. These activities are aimed at improving their quality of life, improving fertility, and reducing the risk associated with pregnancy complications of obesity.

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