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Published in the Slovak Republic
European Journal of Medicine
Has been issued since 2013.
ISSN: 2308-6513
E-ISSN: 2310-3434
2017, 5(1): 11-16

DOI: 10.13187/ejm.2017.1.11
www.ejournal5.com



Effects of Obesity on Labour

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Abstract

The article focuses on effects of obesity on labour. The aim of the retrospective study was to reveal, if obesity has impact on duration of pregnancy and the means of conducting labour. Altogether, 960 obstetric documentary, which fulfilled our classification criteria. We have found out that a woman's BMI influences the type of labour and its mechanism. We recommend to monitor weight gain in pregnancy and to focus on educational program concerning weight reduction in the pre-conception period.

Keywords: obesity, BMI, type of labour, mechanism of labour.

1. Introduction and relevance

Obesity/adiposity is, according to WHO, abnormal or exceeding storage of fat in organism, which can endanger or damage health. Obesity in adults is diagnosed using **body mass index** (BMI), which serves as an index of life prognosis and level of risk of complications (Béder, 2005; Češka, 2010; WHO, 2013a; WHO, 2013b).

Effect of adiposity is linked to serious chronic diseases, which reduce overall quality of life and bring about higher risk of a premature death (Kiňová, 2013). Obesity afflicts also women in the fertile age and affects their fertility – increases a risk of sterility; the women do not have regular menstruation, which increases risk of contraception failure, unplanned pregnancy, and increased risk of miscarriage (Zera, 2011). Prevention before pregnancy significantly lower obstetrical and neonatal morbidity, therefore it is recommended to monitor weight gain (Oteng-Ntim, 2013).

Furber (2013) recommends in obese pregnant women a weight gain during pregnancy not higher than 5.0 – 9.1 kilograms. Losing weight is not recommended during pregnancy. As several studies suggest, risks connected with losing weight lowered incidence of preeclampsia, however, some of them show that in such cases, more frequently hypotrophic newborns are born. Thus, it is necessary to determine exact values of lowering weight in obese pregnant women, which are going to be safe.

Obesity during pregnancy is linked to a whole group of adverse foetomaternal complications and may be a real risk factor of maternal morbidity and mortality (Iyoke, 2013). Obesity is related to gestational diabetes mellitus (GDM), foetal macrosomy, excess joint stress, preeclampsia and thromboembolic, complications in labour, higher incidence of Caesarean sections (Oteng-Ntim, 2013; Čech, 2006). Excessive weight gain is connected with gestation complications like

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hypertension, diabetes, preeclampsia, foetal macrosomy. In case of preeclampsia and hypertension it was proved, that these women have a higher risk of hypertension and heart diseases in older age (Thorsdottir, 2002). Higher incidence of thromboembolic increases risk of pregnancy termination with a Caesarean section, as well as perinatal morbidity and mortality (Oteng-Ntima, 2013).

Zera (2011) states that identification of obesity before conception enables proper counselling within gravidity preparation.

According to Kaplan-Sturk (2013), obese women are considered high risk. They have a higher risk of dystocia during labour, and higher risk of a Caesarean section. They surprisingly stressed a point that obese women with BMI over 30 kg/m², who are otherwise healthy and have normal course of pregnancy, delivered vaginally more often than women whose BMI was under 30 kg/m².

Bogaerts (2014) in his study states that during the first stage of labour obese women suffer from insufficient contractions of uterus. Arrowsmith (2011) claims that obesity brings about prolonged gravidity that contributes to more frequent induction of labour. Link between obesity and prolonged pregnancy is associated with uterine inaction or suppressed activity of myometrium.

Higher insulin resistance during pregnancy increases levels of circulating glucose and other nutrients, which pose predisposition to neonatal macrosomy and later to child obesity (Herring, 2011). Macrosomy may cause complicated vaginal labour and it is associated with higher frequency of Caesarean section. After vaginal delivery of a macrosomy foetus a risk of uterine atony increases (Oteng-Ntim, 2013).

2. Materials and methods

The main aim was to evaluate the degree of overweight and obesity effect on the date and course of labour in conditions of Slovak health service.

The retrospective study was conducted at University Hospital in Bratislava – Ružinov at II. Gynaecology-obstetrics clinic. The research was approved by the chief consultant of the medical centre. We analysed data from obstetric documentary of women in labour hospitalized in the obstetrics department from January 1st 2012 to June 30th 2012. The women in labour had to fulfil the following criteria: obstetric documentary was completely processed, the women gave birth to 1 live foetus in the maternity hospital and had normal prenatal care. These conditions were followed by 960 women in labour. In the next step, the women were divided, according to the latest BMI classification (WHO, 2013d), into 2 groups:

Group 1 consisted of women with pre-obesity and obesity before pregnancy (BMI \geq 25 kg/m²) – 204 women in labour (21.25 %)

Group 2, as a control group, consisted of women with normal weight and underweight before pregnancy (BMI \leq 24.9 kg/m²) – 756 women in labour (78.75 %).

For comparison of the results, we used pivot tables, odds ratio, chi – square test, Fisher exact test, Wilcoxon test, Monte Carlo test and rank test. The relations of explored variables were significant, the level of significance $p < 0.05$.

3. Results

Characteristics of the study group (Table 1)

The studied group consisted of 960 patients (n=960). Average age of the para was 30, 99 year (SD = 4,801). Average height was 166,85 cm (SD = 6,167). Average weight before pregnancy was 62,793 kg (SD = 11,9269) and in time of labour 77,3125 kg. Average BMI before pregnancy was 22,5248 kg/m² in time of labour 27,7419 kg/m². From the overall number of the patients the pre-pregnancy BMI was within normal limits in 79, 2%, 15, 5% was preobese and 5, 3% had obesity.

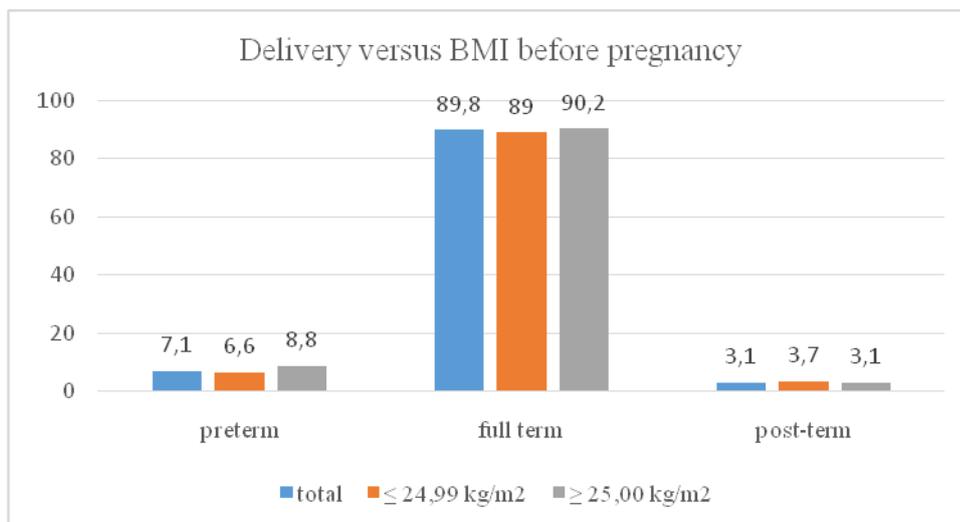
Table 1. Demographic data (960 patients)

	N	Minimum	Maximum	Mean	Std. Deviation
Age	960	18	47	30.99	4.801
Height	960	142	187	166.85	6.167
Weight before pregnancy	960	42.0	126.0	62.793	11.9269
BMI before pregnancy	960	15.43	46.10	22.5248	3.93556
Weight at delivery	960	49.00	146.00	77.3125	12.83197
BMI at delivery	960	18.73	51.73	27.7419	4.18047
Valid N (listwise)	960				

Does obesity effect the term of delivery?

We supposed that women with the BMI $\geq 25,00$ kg/m² gives birth before and after the term more often than women with the BMI $\leq 24,99$ kg/m². In the studied group 89,9% of the patients gave birth at term, 7,1% gave birth before the term and 3,1% after the term (Figure 1). Thereafter we analysed solely preterm and post term deliveries in overall number 98. Correlation between the BMI before pregnancy and the type of delivery was confirms using the Fisher's exact test ($p = 0,029$).

Concerning the effect of the BMI on the risk of pre- or –post-term delivery find out that BMI influences the type of the delivery (OR = 0,198). The risk of the preterm delivery is lower OR (CI95%) = 0,712 (0,571 – 0,899). Based on the above data we conclude, that type of the deliver correlates with the BMI before pregnancy. Using the Mann-Whitney test we analysed the significance in case of the comparison of the delivery type and the age – results without statistical significance.

**Fig. 1.** Correlation between the type of the delivery and BMI before pregnancy

Does obesity affect the mean of pregnancy termination?

We supposed that women with the BMI $\geq 25,00$ kg/m² have operative delivery more common than women with the BMI $\leq 24,99$ kg/m². Regardless of the ante-conception- BMI, the most common mean of delivery was vaginal delivery (n = 594). Operative delivery (n = 366) consisted of the caesarean section, forceps and vacuum extraction (Figure 2). Chi-square test was used for the analysis. We found out, that BMI before conception effects the mechanism of the labour ($p = 0,004$). If we focus on the impact of the BMI on the labour mechanism we find out, that BMI decreases the number of operative deliveries OR (CI 95%) = 0,761 (0,639 – 0,907). By using the Mann-Whitney test we studied the significance of the influence of age on the delivery mechanism. Results were significant (0,043) which means that age effects if the delivery will be carried out by vaginal or operative mechanism.

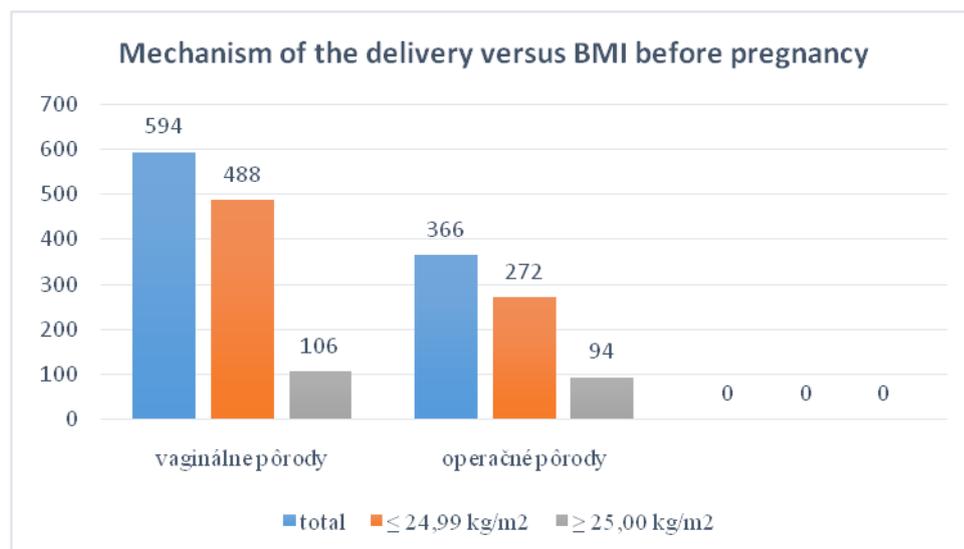


Fig. 2. Mechanism of the delivery and correlation to the BMI before pregnancy

4. Discussion

WHO (2013a; 2013b) reports that since 2000, the incidence of adult obesity has significantly increased. In Europe there are more than 50 % of women with BMI ≥ 25 kg/m², 23 % of which are obese (Herring, 2011). Obesity is constantly the subject of many discussions and experts contradict in significance of the impact of obesity in individual potential risk factors. In our research, we have focused on weight, BMI and age of women in labour, because these factors are considered to be some of the key ones associated with occurrence of complications. Despite a global increase of obesity in the population, in the study group monitored by us, as many as 79,2 % of women had a normal BMI before pregnancy. Although the result was surprisingly positive, in the group of women with preobesity and obesity, which were together 200, we found that obese women accounted for 20,8 %, so we are quite close to the European “standard”.

As stated by Cnattingius (2013), women who are overweight or obese have an increased risk of extreme preterm labour. However, Arrowsmith (2011) connects obesity with reduced activity of uterus, resulting in giving birth to children after the term of labour. With our results we are inclined to Cnattingius, whereby we have not followed extremely premature births, but generally births before completed 38th week of gestation.

Several studies have shown that in obese women the caesarean delivery is more frequent. To this conclusion inclined Ovesen (2011), Chu (2007). However, Kaplan-Sturk (2013) has shown that healthy women with BMI over 30 kg/m² are more often delivering vaginally. Vaginal delivery is much safer for the patient in terms of postpartum complications, reduced self-sufficiency after surgery, limited mobility, inability to care for their child after Caesarean section, the risk of surgical site infection and postpartum hemorrhage. We agree with the first statement that obese women are more often performed Caesarean section (27,2 %). However, preference of termination of pregnancy in women at risk follows the current trends of labor management in the world (Odent, 2014).

Studies describe in addition to obesity, especially the incidence of GDM, DM and hypertension. Surprising is the fact that in our research sample were 51 obese women and only two of them were treated for obesity.

As described in a study (Herring, 2010), the reason of such a result may be a fact that general practitioners, gynecologists, midwives and nurses do not pay much attention to BMI. It may also be an incorrect definition of overweight and obesity by professionals providing qualified care, but also the situation that experts do not perceive preobesity and adiposity as a disease and do not indicate examination of blood glucose within other samplings on pregnancy card around 8 weeks of gestation and between weeks 24. – 28. of gestation, when oral glucose tolerance test is performed.

5. Conclusion

Obesity and gravidity is associated with considerable risks for the mother and her child. These are particularly metabolic diseases such as DM, hypertension and mechanical diseases, mainly of orthopedic character. Obesity generally increases the morbidity and mortality of both mother and foetus. During pregnancy macrosomy can occur and thereby the more often performance of Caesarean section.

Women with overweight and obesity often do not perceive their weight as problematic, and therefore do not feel the need to do something with it. The diagnostics of overweight and obesity by the nursing and caring staff is also absent. There is evidence that moderate weight loss reduces the risks for both the mother and the child.

The aim of the research was to assess the extent of influence of preobesity and obesity on process of labour. After comparing our results with studies, some of them were confirmed in our study as well. The incidence of preobese and obese women was 20,8 %. These women were more often delivering preterm and by Caesarean section.

We concluded that a woman's BMI before pregnancy influences the type of labour and its mechanism.

On that basis, we would like to propose:

- determination of exact rates of weight loss in obese pregnant women to be safe; precise monitoring and evaluation of weight gain during pregnancy;
- nutritional consulting with classes of exercises that can be performed in preconception period and during pregnancy as part of specialized prenatal classes; completing a psychophysical preparing course for delivery – providing of concrete advice to reduce energy intake and exercises to increase physical activity.

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