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# Pregnant Women with Morbid Obesity: Pregnancy and Perinatal Outcomes

Ester Ortiz Murillo

*Received: 10 December 2017 Accepted: 3 January 2018 Published: 15 January 2018*

## Abstract

The aim of this study is to evaluate obstetric complications and perinatal outcomes in pregnant women with morbid obesity (BMI ? 40.0 kg/m²) compared to pregnant women with normal weight (BMI 18.5-24.9 kg/m²). It is a retrospective case-control study undertaken by the Department of Obstetrics at Hospital Universitario Doctor Peset, Valencia (Spain) between May 2008 and July 2016. A total of 50 patients were included in each study group. Morbidly obese pregnant patients had a higher rate of nulliparity (P = 0.03), chronic hypertension (P = 0.008), preeclampsia (P = 0.03), gestational diabetes (P = 0.013) and delivery by caesarean section (P = 0.04) compared to control patients with normal weight. A closer monitoring of morbidly obese pregnant women is recommended to prevent, reduce and properly handle the complications that may arise during pregnancy, both for the mother and the fetus.

***Index terms***— obesity, morbid obesity, pregnancy complications, maternal outcomes, perinatal outcomes.

## 1 Introduction

here is an increase in obesity in developed countries, multifactorial in origin, which combines the lack of physical exercise, changes in diet composition and increased caloric intake. Although overweight is an increasingly important global health problem, the lack of motivation to face it more decisively in daily clinical practice is worrying.

The World Health Organization defines normal weight, overweight, obesity and morbid obesity as body mass index (BMI) of 18.5 to 24.9; 25 to 29.9; 30 to 39.9 and 40 or higher, respectively.

Spain is not an exception in this trend, but rather the opposite. Obesity in our country is reaching more worrying figures and comparative studies with other countries around place us at the forefront, with overall prevalence figures, both in children and adults, of around 25% **??**Finucane et al. 1980). According to the latest National Health Survey of Spain published in 2012, the main results highlight the continuous rise in obesity, affecting 17% of the adult population **??**INE 2013).

The prevalence of obesity in women of reproductive age and pregnant women varies widely depending on the definition, the year and the characteristics of the study population, but it has increased in line with an increased prevalence of obesity in the general population. This alarming increase has made that more than a fifth of the European women who become pregnant in developed countries enter the clinical category of obesity (WHO 2014; Basterra-Gortari et al. 2011).

Obesity in women can negatively affect the course of pregnancy, with complications for both the mother and the fetus. The main aim of our study is to evaluate obstetric complications and perinatal outcomes in patients with morbid obesity (BMI ? 40.0 kg/m²) controlled in the Obstetric Unit of Hospital Universitario Dr. Peset in Valencia, Spain.

Its secondary objective is to compare the results obtained in morbidly obese patients with a control group of pregnant women with normal weight (BMI 18.5-24.9 kg/m²) controlled in the same Hospital Unit.

# 2 II.

# 3 Materials and Methods

This is an observational and retrospective casecontrol study in which obstetrical complications and perinatal outcomes in patients with morbid obesity (BMI ? 40.0 kg/m²) were evaluated and compared with those in patients with normal weight (BMI 18.5 to 24.9 kg/m²) in the time period between May 2008 and July 2016.

In the case group, patients with singleton pregnancies, controlled in our High Risk Obstetric Unit and who met the criteria for morbid obesity -defined as BMI ? 40 kg/m² according to the World H ealth Organization (WHO) -were included.

The control group was made of patients with singleton pregnancies and normal weight (BMI 18.5-24.9 kg/m²) controlled in the same Hospital Unit during the same period.

The maternal characteristics included and compared between two groups age, parity, BMI, pregestational diabetes and chronic hypertension. The analyzed maternal outcomes included preeclampsia, gestational diabetes, spontaneous onset of labour versus induced labour, mode of delivery, postpartum hemorrhage and venous thromboembolism. As neonatal outcomes, gestational age at birth, prematurity (defined as gestational age less than 37 weeks), weight at birth, Apgar score at one minute and five minutes after birth and umbilical cord blood pH were included.

The analysis of the data and the results were obtained by using the statistical software SPSS version 20 and Microsoft Excel 2007. For both groups descriptive statistics were used. The variables are expressed in percentages and means ± standard error. The statistical significance tests used were the Chisquare and Fisher's exact test for dichotomous qualitative variables and the Student t for continuous variables. For quantitative variables, multiple regression models were used. In all cases, statistically significant differences were considered when $p < 0.05$.

The study was approved by the Ethics Committee for Ethics in Clinical Research of the hospital. Informed consent was obtained from all the participants and the confidentiality of all of them was maintained.

# 4 III.

# 5 Results

A total of 50 patients were included in both study groups.

The demographic characteristics of both groups are shown in Table 1. Within the group of morbidly obese patients, the mean age was 30.95 years and the mean BMI 43.36 kg/m² (40-58). In the group of patients with normal weight, the average age was 29.76 years (22)(23)(24)(25)(26)(27)(28)(29)(30)(31) **??**32) **??**33) **??**34) **??**35) **??**36) **??**37) **??**38) **??**39) **??**40) **??**41) and the average BMI 22.27 kg/m² (20-24.9). The morbidly obese patients had a higher rate of nulliparity (P = 0.03) and chronic hypertension (P = 0.008) than patients with normal weight. Neither statistically significant differences in the previous mode of delivery (caesarean section or vaginal) nor a history of pregestational diabetes were found.

Maternal outcomes were obtained by univariate analysis and are shown in Table 2. In the group of morbidly obese patients, higher rates of preeclampsia (P = 0.03), gestational diabetes (P = 0.013) and delivery by caesarean section (P = 0.04) were recorded compared to control patients with normal weight. There were no differences in the onset of labour and in the occurrence of postpartum venous thromboembolism between the two study groups. However, there were more cases of postpartum hemorrhage in obese patients than in the group of patients with normal weight (14% vs 4%), but this difference did not reach statistical significance. Perinatal outcomes of the study are shown in Table 3. In our study, no statistically significant differences in terms of perinatal outcomes were found compared to those obtained in the group of patients with normal weight. IV.

# 6 Discussion

Overweight and obesity among pregnant women have recently become a worldwide problem.

Obesity during pregnancy is associated with many maternal and perinatal risks. The appearance of these risks is proportional to the degree of obesity presented by the patient (Torloni et al. 2009; Scott-Pillai et al. 2013; Blomberg et al. 2013). Managing these problems and potentially reduce their risks is currently a challenge for specialists in Obstetrics (Gunatilake et al.

# 7 2011).

In our review, morbidly obese patients (BMI ? 40.0 kg/m²) had higher nulliparity (40%) and chronic hypertension (20%) rates than control patients with normal weight. However no significant data regarding pregestational diabetes were found. These data are consistent with the study published by Crane et al (Crane et al. 2013), where pregnant women with extreme obesity (BMI ? 50 kg /m²) presented higher nulliparity (59.2%), chronic hypertension (7%) and pregestational diabetes (5.6%) rates than the control patients with normal weight.

According to our figures, from the total of our obese pregnant patients, 10 (20%) had preeclampsia, 12 (24%) gestational diabetes and 22 (44%) delivered by caesarean section. 4 (8%) out of the obese pregnant women who developed preeclampsia during pregnancy, suffered already from chronic hypertension at the beginning of the study. These data are similar to those obtained in other studies (Crane et al. 2013; **??**eisset al. 2004).

According to the literature reviewed, pregnant women with obesity (BMI ? 30.0 kg/m² have a higher prevalence of gestational diabetes (Ehrenberg et al. 2002 **??** Gross et al.1980), higher rates of hypertensive disorders of pregnancy **??**Robinson et al. 2005 We are aware of the limitations of our study. On the one hand, because of the retrospective nature of our research; on the other hand, because of the small sample size of the study group (N=50). This could explain the lack of statistical significance in most of the variables studied.

V.

# 8 Conclusion

Pregnant women with morbid obesity (BMI ? 40.0 kg/m²) present a higher risk of maternal and perinatal complications. Therefore, further development and the elaboration of programs from the preconception period are recommended. This should be done in specialized units that value individual needs and the risk factors of each patient in order to prevent, reduce properly handle the complications that may arise for both mother and fetus. [1]

macrosomia (Bianco et al. 1998), shoulder dystocia, stillbirth (Chu et al. 2007) and neonatal death (Kristensen et al. 2005).
A 2010 publication of the Royal College of Obstetricians and Gynaecologists (RCOG) gathers the rate of complications associated with obesity during pregnancy and includes: hypertensive disorders (OR 3.3, 95% CI 2.7-3.9), venous thromboembolism (OR 9.7, 95% CI 3.1-30.8), gestational diabetes (OR 2.4, 95% CI 2.2-2.7), elective caesarean section (OR 2.1, 95% CI 1.9-2.3), emergency caesarean section (OR 2.0, 95% CI 1.2-3.5), postpartum hemorrhage (OR 2.3, 95% CI 2.1-2.6), surgical wound infection (OR 2.2, 95% CI 1.0-2.6), congenital malformations (OR 1.6, 95% CI 1.0-2.5), prematurity (OR 1.2, 95% CI 1.1-1.4), macrosomia (OR 2.4, 95% CI 2.2-2.5), shoulder dystocia (OR 2.9, 95% CI 1.4-5.8), neonatal admission (OR 1.5, 95% CI 1.1-2.3), stillbirth (OR 2.1, 95% CI 1.5-2.7) and neonatal death (OR 2.6, 95% CI 1.2-5.8) (RCOG 2010).

Figure 1:

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**1**

| Characteristics | Pregnant women with normal weight (n=50)? | | Pregnant women with |
|---|---|---|---|
| Age (years) | 29.76 | | 30.95 |
| BMI (kg/m²) | 22.27 | | 43.36 |
| Parity | Nulliparous | 23 (46) | Nulliparous 2 ( |
| | Prev. caesarean section | 16 (32) | Prev. caesarean sectio |
| | Prev. vaginal delivery | 10 (20) | Prev. vaginal de- 1 livery ( |
| Pregestational diabetes | 1 (2) | | 5 (10) |
| Chronic hypertension | 1 (2) | | 10 (20) |

Abbreviations: BMI, Body Mass Index; NS, Not Significant.
? Mean values ± standard deviations or percentage (%).
? BMI 20.0-24.9 kg/m².
? BMI ?40 kg/m².

Figure 2: Table 1 :

**2**

| Results | Pregnant women with normal weight (n=50)? | | Pregnant women wit |
|---|---|---|---|
| Preeclampsia | 2 (4) | | 10 (20) |
| Gestational diabetes | 3 (6) | | 12 (24) |
| Onset of labour | Spontaneous | 27 (54) | Spontaneous 1 ( |
| | Induced | 23 (46) | Induced 3 ( |
| Delivery | Vaginal | 36 (72) | Vaginal 2 ( |
| | Caesarean section | 14 (28) | Caesarean section 22 |
| Postpartum hemorrhage | 2 (4) | | 7 (14) |
| Venous tromboembolism | 0 | | 0 |

Abbreviations: BMI, Body Mass Index; NS, Not Significant.
? Mean values ± deviations or percentage (%).
? BMI 20.0-24.9 kg/m².
? BMI ?40 kg/m².

Figure 3: Table 2 :

**3**

| Results | Pregnant women with normal weight (n=50)? | Pregnant women with normal obesity (n=50)? | P value |
|---|---|---|---|
| Gestational age > 37 weeks | 49 (98) | 48 (96) | NS |
| Gestational age < 37 weeks | 1 (2) | 2 (4) | NS |
| Weight after birth (g) | 3668±158 | 3880±191 | NS |
| Weight after birth > 4000g | 4 (8) | 8 (16) | NS |
| Weight after birth < 2500g | 2 (4) | 4 (8) | NS |
| Apgar < 7 (1 minut) | 1 | | |

Figure 4: Table 3 :

Year 2018
; O'Brien et al. 2003; Gaillard et al. 2011) and a higher rate of induction and failure of labour induction (Denison et al.2008; Wolfe et al. 2011) than the general obstetric population. In our study, a total of 7 patients (14%) had postpartum hemorrhage, all managed by conservative measures. 3 Global Journal of Medical Research Volume XVIII Issue III Version I ( D D D D )

Figure 5:

# .1 Acknowledgement

The authors extend their appreciation to JJT for the statistical analysis.

# .2 Declaration of Interest

The authors declare no conflict of interest. The authors are the only responsible for the content and the writing of the paper.

# .3 Funding

This study was undertaken without specific financial support.

[Gaillard et al. ()] 'Associations of maternal obesity with blood pressure and the risks of gestational hypertensive disorders. The Generation R Study'. R Gaillard , E A Steegers , A Hofman , V W Jaddoe . *Journal of Hypertension* 2011. 29 p. 937.

[Drife ()] 'Confidential Enquiry into Maternal and Child Health, Why Mothers Die'. J Drife . *Journal of Royal College of Physicians Edinburgh* 2005. 2000-2002. 35 p. .

[Bhattacharya et al. ()] 'Effect of Body Mass Index on pregnancy outcomes in nulliparous women delivering singleton babies'. S Bhattacharya , D M Campbell , W A Liston , S Bhattacharya . *BMC Public Health* 2007. 7 (1) p. 168.

[Basterra-Gortari et al. ()] 'Increasing Trend in the Prevalence of Morbid Obesity in Spain: From 1.8 to 6.1 per Thousand in 14 Years'. F J Basterra-Gortari , J J Beunza , M Bes-Rastrollo , E Toledo , M García-López , M A Martínez-Gonzalez . *Revista Española Cardiología* 2011. 64 p. .

[Agha et al. ()] 'Interventions to reduce and prevent obesity in pre-conceptual and pregnant women: a systematic review and metaanalysis'. M Agha , R A Agha , J Sandell . *Plos One* 2014. 9 (5) p. e95132.

[Rcog ()] *Management of Women with Obesity in Pregnancy Guideline. London: Royal College of Obstetricians and Gynaecologistis*, Rcog . 2010.

[Crane et al. ()] 'Maternal and perinatal outcomes of extreme obesity in pregnancy'. Jmg Crane , P Murphy , L Burrage , D Hutchens . *Journal of Obstetrics and Gynaecology Canada* 2013. 35 (7) p. .

[Aune et al. ()] 'Maternal body mass index and the risk of fetal death, stillbirth, and infant death: a systematic review and meta-analysis'. D Aune , O D Saugstad , T Henriksen , S Tonstad . *JAMA* 2014. 311 p. 1536.

[O'brien et al. ()] 'Maternal body mass index and the risk of preeclampsia: a systematic overview'. T E O'brien , J G Ray , W S Chan . *Epidemiology* 2003. 2005. 14 p. 368.

[Sebire et al. ()] 'Maternal obesity and pregnancy outcome: a study of 287, 213 pregnancies in London'. N J Sebire , M Jolly , J P Harris , J Wadsworth , M Joffe . *International Journal of Obesity* 2001. 25 (8) p. .

[Chu et al. ()] 'Maternal obesity and risk of stillbirth: a metaanalysis'. S Y Chu , S Y Kim , J Lau , C H Schmid , P M Dietz . *American Journal of Obstetrics and Gynecology* 2007. 197 (3) p. .

[Denison et al. ()] 'Maternal obesity, length of gestation, risk of postdates pregnancy and spontaneous onset of labour at term'. F C Denison , J Price , C Graham . *BJOG* 2008. 115 p. 720.

[Blomberg ()] 'Maternal obesity, mode of delivery, and neonatal outcome'. M Blomberg . *Obstetrics and Gynecology* 2013. 122 p. 50.

[Robinson et al.] 'Maternal outcomes in pregnancies complicated by obesity'. H E Robinson , C M O'connell , K S Joseph , N L Mcleod . *Obstetrics and Gynecology* 106 p. 1357.

[Stothard et al. ()] 'Maternal overweight and obesity and the risk of congenital anomalies: a systematic review and meta-analysis'. S A Stothard , P W Tennant , R Bell , Rankinj . *JAMA* 2009. 301 p. 636.

[Vahratian et al. ()] 'Maternal prepregnancy overweight and obesity and the pattern of labor progression in term nulliparous women'. A Vahratian , J Zhang , J F Troendle , D A Savitz , A M Siega-Riz . *Obstetrics and Gynecology* 2004. 104 p. . (Pt 1)

[Larsena et al. ()] 'Maternal smoking, obesity, and risk of venous thromboembolism during pregnancy and the puerperium: A population-based nested casecontrol study'. T B Larsena , H T Sørensenb , M Gislumb , S P Johnsen . *Thrombosis Research* 2007. 120 (4) p. .

[Finucane et al. ()] 'National, regional, and global trends in body-mass index since 1980: systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants'. M M Finucane , G A Stevens , M J Cowan , G Danaei , J K Lin , C J Paciorek . *Lancet* 2011. 377 p. .

[Gunatilake and Perlow ()] 'Obesity and pregnancy: clinical management of the obese gravida'. R P Gunatilake , J H Perlow . *American Journal of Obstetrics and Gynecology* 2011. 204 p. 106.

[Gross et al. ()] 'Obesity in pregnancy: risks and outcome'. T Gross , R J Sokol , K C King . *Obstetrics and Gynecology* 1980. 56 p. 446.

[Weiss et al. ()] 'Obesity, obstetric complications and cesarean delivery rate: A population-based screening study'. J L Weiss , F D Malone , D Emig . *American Journal of Obstetrics and Gynecology* 2004. 190 p. .

[Bianco et al. ()] 'Pregnancy outcome and weight gain recommendations for the morbidly obese woman'. A T Bianco , S W Smilen , Y Davis , S Lopez , R Lapinski . *Obstetrics and Gynecology* 1998. 91 (1) p. .

[Torloni et al. ()] 'Prepregnancy BMI and the risk of gestational diabetes: a systematic review of the literature with meta-analysis'. M R Torloni , A P Betrán , B L Horta . *Obesity Reviews* 2009. 10 p. 194.

[Kristensen et al. ()] 'Prepregnancy weight and the risk of stillbirth and neonatal death'. J Kristensen , M Vestergaard , K Wisborg , U Kesmodel , N J Secher . *BJOG* 2005. 112 (4) p. .

[Ehrenberg et al. ()] 'Prevalence of maternal obesity in an urban center'. H M Ehrenberg , L Dierker , C Milluzzi , B M Mercer . *American Journal of Obstetrics and Gynecology* 2002. 187 p. 1189.

[Wolfe et al. ()] 'The effect of maternal obesity on the rate of failed induction of labor'. K B Wolfe , R A Rossi , C R Warshak . *American Journal of Obstetrics and Gynecology* 2011. 205 p. e1.

[Scott-Pillai et al. ()] 'The impact of body mass index on and neonatal outcomes: a retrospective study in a UK obstetric population'. R Scott-Pillai , D Spence , C R Cardwell . *BJOG* 2013. 2004-2011. 120 p. 932.

[Nuthalapaty and Rouse ()] *The impact of obesity on female fertility and pregnancy*, F S Nuthalapaty , D J Rouse . 2016. UpToDate.

[Wahabi et al. ()] 'The independent effects of maternal obesity and gestational diabetes on the pregnancy outcomes'. H A Wahabi , A A Fayed , R A Alzeidan , A A Mandil . *BMC Endocrine Disordes* 2014. 13 p. 47.

[WHO Global Database on Body Mass Index. World Health Organization ()] *WHO Global Database on Body Mass Index. World Health Organization*, 2014.