

Research

Body Mass Index Trends in Women Who Undergo External Cephalic Version in a Tertiary Hospital in Spain

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Received: Jul 6th, 2021; Revised: Jul 16th, 2021; Accepted: Jul 20th, 2021; Published: Jul 24th, 2021

Citation: Sánchez-Romero J, Gallego-Pozuelo RM, Sánchez-Ferrer ML, Nieto-Díaz A. Body mass index trends in women who undergo external cephalic version in a tertiary hospital in Spain. *Gyne and Obste Open A Open J.* 2021; 2(1): 43-47. doi: [10.33169/gyne.Obste.GAOOAJ-2-111](https://doi.org/10.33169/gyne.Obste.GAOOAJ-2-111)

ABSTRACT

The global epidemic of obesity also affects pregnant women. External cephalic version is a procedure for achieving a cephalic presentation. Obesity has been associated with lower rates of ECV success. The main objective of this article is to analyze the trends in BMI in pregnant women who underwent ECV. A descriptive retrospective analysis of ECV performed in Hospital Clínico Universitario Virgen de la Arrixaca in Murcia (Spain) between 1st of January of 2014 and 31st of December 2018 has been carried out. 417 patients were recruited. The mean maternal BMI was 25.5 kg/m² at 36 week's gestation. If BMI is categorized, 2.6% (N=11) of the patients had a BMI below 18.5 kg/m², 51.1% (N=213) had a BMI between 18.5-24.9 kg/m², 30.9% (N=129) of the patients had a BMI between 25-29.9 kg/m² and 14.0% (N=64) had a BMI above 30 kg/m². Mean maternal BMI had statistically significant changes between 2014 and 2018 (p<0.001). Maternal BMI has increased over the years in patients who undergo ECV. In patients who undergo ECV, maternal BMI should be related to socio-economic inequalities and social behavior in future researches. It should be also associated with maternal BMI of pregnant women who undergo ECV with ECV success rate and with the type of delivery of those pregnancies.

Keywords: External Cephalic Version; Body Mass Index; Pregnant; Obstetrics; Obesity; Overweight.

Abbreviations

ECV: External Cephalic Version; BMI: Body Mass Index.

INTRODUCTION

The global epidemic of obesity also affects pregnant women.¹ Obesity is defined as a Body Mass Index (BMI) above 30 Kg/m². Obesity has been associated with an increased risk of miscarriage, gestational diabetes, preeclampsia, abnormal labor, or cesarean section, among other problems, during pregnancy.^{2,3} For the newborn, there is also an increased risk of congenital malformations and admission to a neonatal care unit.⁴ Children from obese mothers who were exposed to metabolic dysfunctions in utero are prone to have metabolic diseases in the long term.⁵ so there is a global consensus in the recommendation of adequate diet pat-

terns and physical activity practice to maintain a healthy weight status during pregnancy.⁶

A breech presentation occurs in 3-4% of all pregnant women at term.⁷ Since the publication of the Term Breech Trial in 2000⁸ which demonstrated excess neo-natal mortality as a consequence of breech vaginal delivery, cesarean delivery rates have risen alarmingly.⁹

External cephalic version (ECV) is a procedure for modifying the fetal position and achieving a cephalic presentation. The objective of the ECV is to offer an opportunity for cephalic delivery to occur which, as widely known, is safer than breech or cesarean section. The

use of an external cephalic version in breech presentation, according to WHO,¹⁰ certainly reduces the incidence of cesarean section, which is of special interest in those units where vaginal breech delivery is not a common practice.

ECV is usually performed before the active labor period begins. Factors associated with a higher ECV success rate include:^{11,12} multiparity, a transverse presentation, black race, posterior placenta, amniotic fluid index higher than 10 cm.

However, ECV is not an innocuous procedure and may present¹³ intraversion complications such as premature rupture of membranes, vaginal bleeding, transitory changes of fetal heart rate, cord prolapse, abruptio placentae even stillbirth.

Several reports have associated obesity with lower rates of ECV success.¹⁴⁻¹⁶ Obese pregnant women who have a successful ECV may require a cesarean delivery for labor dystocia or other maternal or fetal indications.^{17,18} Women with obesity undergoing a cesarean delivery have an increased risk for wound infection, a larger amount of blood loss, and longer operative time.^{19,20} Vaginal delivery in obese women is associated with lower morbidity compared with cesarean delivery.

Certain interventions have been related to helping in ECV¹¹ such as tocolysis or analgesia. Ritodrine has been reported as a safe tocolytic agent and the drug that improves the most ECV success rate. Other tocolytic agents studied in ECV are nifedipine, atosiban, nitroglycerine, or others β -agonist.⁷

About analgesia in ECV, some interventions have been analyzed such as systemic opioids or spinal anesthesia. Spinal anesthesia techniques improve the ECV success rate and pain after the procedure

The main objective of this article is to analyze the trends in BMI in pregnant women who underwent ECV. A secondary objective is to describe obstetrics characteristics of pregnant women who underwent ECV.

MATERIALS AND METHODS

A descriptive retrospective analysis of ECV performed in Hospital Clínico Universitario Virgen de la Arrixaca in Murcia (Spain) between 1st of January of 2014 and 31st of December of 2018 has been carried out. The ECV were performed by two of the four experienced obstetricians of the Maternal-Fetal Unit in the obstetric operating room with the presence of an anesthetist and a midwife.

Data were collected during the ultrasonography evaluation in 36 week's gestation at the consult.

Table 2. BMI of External Cephalic Version patients. %: Relative frequency. (N): Absolute frequency. CI 95%: confidence interval 95%.

	2014		2015		2016		2017		2018		All	
	Mean/ %(N)	CI95%	Mean/ %(N)	CI 95%	Mean/ %(N)	CI 95%	Mean/ %(N)	CI 95%	Mean/ %(N)	CI 95%	Mean/ %(N)	CI 95%
BMI (Kg/m2)	24,4	23.5-25.3	25.0	24.0-25.9	24.1	22.3-25.8	27.5	26.3-28.7	26.3	25.3-27.3	25.5	25.0-26.0
BMI												
<18.5	1,1%(1)	0.1-4.9	3,9%(4)	1.3-9.1	5,3%(3)	1.5-13.4	1,2%(1)	0.1-5.5	2,4%(2)	0.5-7.6	2,6%(11)	1.4-4.5
18.5-25	65,6%(61)	55.6-74.7	56,9%(58)	47.2-66.2	59,6%(34)	46.7-71.6	30,1%(25)	21.1-40.5	42,7%(35)	32.4-53.5	51,1%(213)	46.3-55.9
25-30	24,7%(23)	16.8-34.2	24,5%(25)	17.0-33.5	24,6%(14)	14.8-36.8	44,6%(37)	34.2-55.3	36,6%(30)	26.8-47.3	30,9%(129)	26.6-35.5
>30	8,6%(8)	4.2-15.6	14,7%(15)	8.9-22.5	10,5%(6)	4.5-20.4	24,1%(20)	15.9-34.1	18,3%(15)	11.1-27.7	15,3%(64)	12.1-19.0

In our hospital, ECV is offered to every week pregnant with non-cephalic presentation and no absolute contraindication for vaginal delivery. ECV was offered to every pregnant woman with non-cephalic presentation and no absolute contraindication for vaginal delivery. Women were deemed ineligible to undergo ECV in cases of severe pre-eclampsia, recent vaginal bleeding, confirmed rupture of membranes, and when an absolute indication for cesarean section was identified (eg placenta previa).

Before the procedure, an ultrasonography evaluation for study fetal position, fetal biometry, amniotic fluid, and placental position is performed. ECV is carried out around 37 week's gestation.

Chi-square and ANOVA analysis is performed with SPSS 25.0 (IBM© Software).

RESULTS

417 patients were recruited between the 1st of January of 2014 and the 31st of December of 2018. The mean age was 33.0 years (Table 1). 55.2% of the patients were nulliparous. Only 22 patients (5.3%) had a previous cesarean section. The mean maternal BMI was 25.5 kg/m² at 36 week's gestation. If BMI is categorized, 2.6% (N=11) of the patients had a BMI below 18.5 kg/m², 51.1% (N=213) had a BMI between 18.5-24.9 kg/m², 30.9% (N=129) of the patients had a BMI between 25-29.9 kg/m² and 14.0% (N=64) had a BMI above 30 kg/m². Mean maternal BMI had statistically significant changes between 2014 and 2018 (p<0.001).

Table 1. Characteristics of External Cephalic Version patients. %: Relative frequency. (N): Absolute frequency. CI 95%: confidence interval 95%.

	Mean/%(N)	CI 95%
Age (years)	33	32.5-33.5
Gestational age at ECV (weeks)	37.4%	37.3-37.4
Previous vaginal delivery	44.8%(187)	40.1-49.6%
Previous cesarean section	5.3%(22)	3.4-7.7%
Intraversion complication	7.4%(31)	4.9-10%

The ECV were performed in 37+3 weeks gestation, as an average. Intraversion complications occurred in 7.4% (N=31) of the procedures (Table 1): 17 fetal bradycardia during more than 6 minutes (3.7%), 12 vaginal bleeding (2.6%), 1 preterm rupture of the membranes during the following 24 hours (0.2%) y 1 cord prolapse (0.2%). No newborns were hospitalized in neonatal unit care neither neonatal ICU.

In 2014, 93 pregnant women were recruited (Table 2 and Figures 1, 2). The mean maternal BMI was 24.4 kg/m². When maternal

BMI is categorized, 1.1% (N=1) of the patients had a BMI below 18.5 kg/m², 65.6% (N=61) had a BMI between 18.5-24.9 kg/m², 24.7% (N=23) of the patients had a BMI between 25-29.9 kg/m² and 8.6% (N=8) had a BMI above 30 kg/m².

Figure 1. Mean maternal BMI changes between 2014 and 2018. BMI: Body Mass Index.

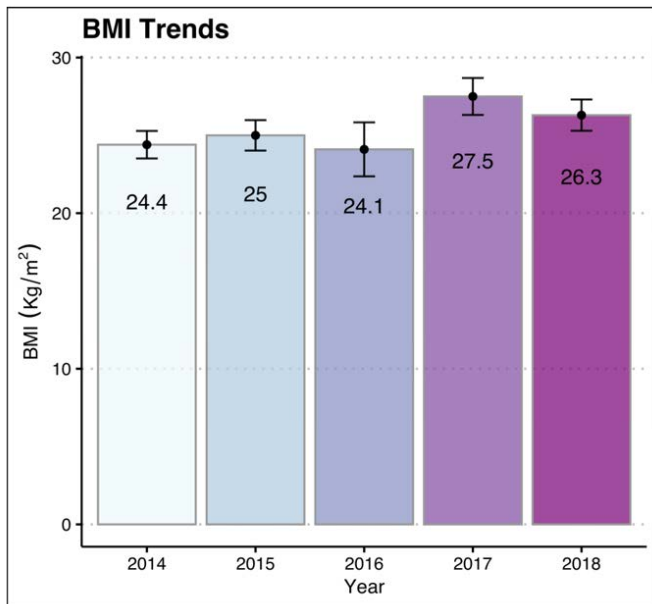
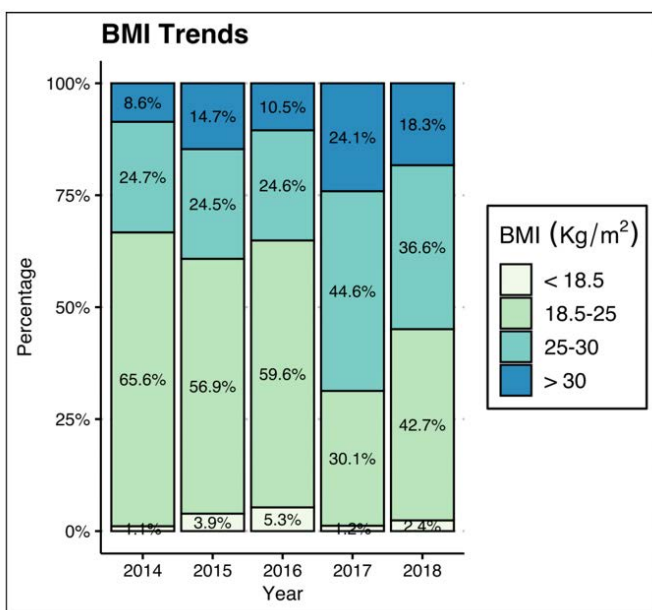


Figure 2. Maternal BMI changes between 2014 and 2018. Maternal BMI is categorized in: Underweight (BMI<18.5 Kg/m²), Normal (BMI 18.5-25 Kg/m²), Overweight (BMI 25-30 Kg/m²) and Obesity (BMI>30 Kg/m²). BMI: Body Mass Index.



In 2015, 102 pregnant women were recruited (Table 2 and Fig-

ures 1, 2). Mean maternal BMI was 25.0 kg/m². When maternal BMI is categorized, 3.9% (N=4) of the patients had a BMI below 18.5 kg/m², 56.9% (N=58) had a BMI between 18.5-24.9 kg/m², 24.5% (N=25) of the patients had a BMI between 25-29.9 kg/m² and 14.7% (N=15) had a BMI above 30 kg/m².

In 2016, 57 pregnant women were recruited (Table 2 and Figures 1, 2). The mean maternal BMI was 24.1 kg/m². When maternal BMI is categorized, 5.3% (N=3) of the patients had a BMI below 18.5 kg/m², 59.6% (N=34) had a BMI between 18.5-24.9 kg/m², 24.6% (N=14) of the patients had a BMI between 25-29.9 kg/m² and 10.5% (N=6) had a BMI above 30 kg/m².

In 2017, 83 pregnant women were recruited (Table 2 and Figures 1, 2). Mean maternal BMI was 27.5 kg/m². When maternal BMI is categorized, 1.2% (N=1) of the patients had a BMI below 18.5 kg/m², 30.1% (N=25) had a BMI between 18.5-24.9 kg/m², 44.6% (N=37) of the patients had a BMI between 25-29.9 kg/m² and 24.1% (N=20) had a BMI above 30 kg/m².

In 2018, 82 pregnant women were recruited (Table 2 and Figures 1, 2). Mean maternal BMI was 26.3 kg/m². When maternal BMI is categorized, 2.4% (N=2) of the patients had a BMI below 18.5 kg/m², 42.7% (N=35) had a BMI between 18.5-24.9 kg/m², 36.6% (N=30) of the patients had a BMI between 25-29.9 kg/m² and 18.3% (N=15) had a BMI above 30 kg/m².

DISCUSSION

In our study, mean maternal BMI increase over the years. This escalation has a multifactorial explanation: social habits, older pregnant women, and others that still unknown. The obesity index has grown during the last 40 years.²¹ Certain socio-economic inequalities have been associated with an increased risk of sedentary behavior and passive smoking in pregnant women such as lower level of education (OR=1.7 and OR=1.6, respectively) or less skilled occupations (OR=1.7 and OR=1.2, respectively).²² This may be the basis for future studies in patients who undergo ECV.

An increased BMI has been also related to a lower ECV success rate²³ and with other obstetric complications such as cesarean section.²⁴ Chaudhary et al. have reported a decreased success rate for ECV as BMI increased (p<.01).²³ Burgos et al. have highlighted that in patients who underwent ECV, the higher pregnant women's degree of obesity, the higher their risk of cesarean section (p<0.006).²⁴⁻³⁰ These hypotheses may encourage researchers to analyze the relationship between obesity and the type of delivery in patients who undergo ECV.

Public policies have tried to reduce obesity among the population. Pregnant women and their partners are an important part of society with key roles (breastfeeding, upbringing, reproductive age, working-age, ...). Public campaigns against maternal obesity should be enhanced.

A strength of this study is the fact that in the present study ritodrine is administered for 30 minutes just before the procedure. There were no significant differences in obstetric characteristics making selection bias less likely.

This study has some limitations. First, the maternal weight was measured at 12 weeks gestation when the 1st-trimester scan was performed. The weight modifications during pregnancy were not taken into consideration with this measure.

CONCLUSION

Maternal BMI has increased over the years in patients who undergo ECV. In patients who undergo ECV, maternal BMI should be related to socio-economic inequalities and social behavior in future researches. It should be also associated with maternal BMI of pregnant women who undergo ECV with ECV success rate and with the type of delivery of those pregnancies.

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