

Induction of labour at term compared with expectant management in women over 40 years of age: a retrospective study.

Elena Marin¹, Vanesa Rodríguez Fernández¹, Laura González Rodríguez¹, and Carlos López Ramón y Cajal¹

¹Affiliation not available

April 16, 2024

Abstract

Objective To compare maternal and neonatal outcomes of induction of labour at term to those of expectant management in women over 40 years of age. **Design** Retrospective cohort study. **Setting** Data were derived from the Hospital Álvaro Cunqueiro birth cohort (Vigo). **Population** Women at [?]40 years of age and [?]39 weeks of gestation that delivered from 1 January 2012 to 31 December 2017. **Methods** Women were classified into two groups: expectant management group (women who delivered from 1 January 2012 to 31 December 2014) and nonmedically indicated induction of labour group (women who delivered from 1 January 2015 to 31 December 2017). These two groups were described and compared. **Main outcome measures** The primary outcome was the route of delivery. Perinatal results were also studied. **Results** There was a total of 603 pregnant women in the expectant management group compared to 634 women in the induction group. The rate of cesarean section did not increase in the maternal age-based labour induction group compared to the expectant management group. Subgroup analysis did not demonstrate an increased risk by parity. Women in the expectant management group were more likely to require neonatal intensive care unit admission and need pediatric support. **Conclusion** Compared to expectant management, induction of labour at 39 weeks of gestation results in significantly better neonatal outcomes without increasing the cesarean section rates in older women. **Tweetable abstract** Induction of labour in women over 40 years of age associates better perinatal outcomes without increasing the rate of caesarean sections.

Title page

TITLE: Induction of labour at term compared with expectant management in women over 40 years of age: a retrospective study.

Elena MARÍN ORTIZ MD¹, Vanesa RODRÍGUEZ FERNÁNDEZ MD PhD¹, Laura GONZÁLEZ RODRÍGUEZ MD¹, Carlos N. LÓPEZ RAMÓN Y CAJAL MD PhD¹.

1.Department of Obstetrics and Gynecology, Hospital Álvaro Cunqueiro, Vigo, Pontevedra, Spain

Corresponding author's contact information :

Elena Marín Ortiz

Elena.marinortiz@gmail.com

+34 650033899

Hospital Álvaro Cunqueiro.

Estrada Clara Campoamor 341, 36213. Vigo. Spain.

Running head:

Advanced maternal age and induction of labour.

Word count

Abstract: 260 words

Main Text: 2162 words

Objective

To compare maternal and neonatal outcomes of induction of labour at term to those of expectant management in women over 40 years of age.

Design

Retrospective cohort study.

Setting

Data were derived from the Hospital Álvaro Cunqueiro birth cohort (Vigo).

Population

Women at [?]40 years of age and [?] 39 weeks of gestation that delivered from 1 January 2012 to 31 December 2017.

Methods

Women were classified into two groups: expectant management group (women who delivered from 1 January 2012 to 31 December 2014) and nonmedically indicated induction of labour group (women who delivered from 1 January 2015 to 31 December 2017). These two groups were described and compared.

Main outcome measures

The primary outcome was the route of delivery. Perinatal results were also studied.

Results

There was a total of 603 pregnant women in the expectant management group compared to 634 women in the induction group. The rate of cesarean section did not increase in the maternal age-based labour induction group compared to the expectant management group. Subgroup analysis did not demonstrate an increased risk by parity. Women in the expectant management group were more likely to require neonatal intensive care unit admission and need pediatric support.

Conclusion

Compared to expectant management, induction of labour at 39 weeks of gestation results in significantly better neonatal outcomes without increasing the cesarean section rates in older women.

Tweetable abstract

Induction of labour in women over 40 years of age associates better perinatal outcomes without increasing the rate of caesarean sections.

Keywords

Advanced maternal age, induction of labor, cesarean section, neonatal outcomes.

Main text

Introduction

The birth rate of women aged 40 years or older has been rising steadily. Delaying childbearing is an ongoing and universal phenomenon. In Spain, the average age of women at childbirth remained at 32.2 years in 2019.

In the last 10 years, the number of births to women aged 40 years and older has increased by 63.1%. In 2008, 4.2% of births were to women with maternal age \geq 40 years, while in 2019, this percentage increased to 9.7%.¹

Advanced maternal age has been historically defined as \geq 35 years at the time of delivery and is widely associated with adverse obstetric outcomes. The risks of hypertensive disorders, gestational diabetes mellitus, placenta previa, placental abruption, and stillbirth are higher among women aged 35 years or older than among younger women.²⁻⁶

The incidence of stillbirth at 39–40 weeks of gestation is 2 in 1000 for women \geq 40 years of age compared with 1 in 1000 for women $<$ 35 years old. Women \geq 40 years of age have a similar stillbirth risk at 39 weeks of gestation to younger women at 41 weeks of gestation.⁴ Induction of labour in older mothers is widely practiced as an intervention to reduce the risk of late stillbirth.^{5,6} A survey showed that 37% of obstetricians offer induction of labour at term to women aged 40–44 years and 55% to those \geq 45 years.⁷ Studies suggest that there is a low threshold to perform a caesarean section in older women.^{5,6}

Nonmedically indicated induction of labour compared with spontaneous labour is associated with an increased risk of caesarean delivery, especially in nulliparous women. However, spontaneous labour may not be an ideal comparison. Detailed data regarding the outcomes of nonmedically indicated induction of labour are still limited. As of 1 January 2015, the Gynaecology and Obstetrics service of the Alvaro Cunqueiro Hospital offered induction of labour to women aged \geq 40 from the 39th week of gestation onwards. The objective of this study was to compare maternal and neonatal outcomes of nonmedically indicated induction of labour at term to those of expectant management in women over 40 years of age.

Material and methods

Study design

This is a retrospective cohort study that included all women at \geq 40 years of age and \geq 39 weeks of gestation that delivered in the city of Vigo from 1 January 2012 to 31 December 2017. Data were derived from the Hospital Alvaro Cunqueiro birth cohort, an electronic database created from gestational, birth, and neonatal data from hospitalisations in the Vigo delivery room.

Women aged \geq 40 years with singleton pregnancies were included in the database. Women with $<$ 39 weeks of gestation and those with multiple gestations were excluded. In January 2015, the gynaecology and obstetrics service of Vigo implemented the protocol for induction of labour due to advanced maternal age; therefore, patients were divided according to the management of labour at term. We compared expectant management (women who delivered from 1 January 2012 to 31 December 2014) to nonmedically indicated induction of labour (women who delivered from 1 January 2015 to 31 December 2017).

The primary outcome was the caesarean delivery rate. The secondary maternal outcomes were delivery methods other than caesarean section (that is, assisted vaginal delivery with the use of forceps or vacuum), the onset of labour (that is, spontaneous labour, elective caesarean section, or induction of labour), the indication for induction of labour, the method of labour induction, the indications for caesarean section, and intrapartum complications (that is, intrapartum fever or stained amniotic fluid).

The secondary neonatal outcomes were stillbirth, birth weight, the 5-minute Apgar score, the arterial cord pH value, paediatric birth support, degree of neonatal resuscitation, and admission to a neonatal intensive care unit (NICU). To analyse the type of paediatric support at birth, the participants were divided into 3 groups: group 1 included those new-borns who did not require paediatric assistance at birth; group 2 included new-borns who required suctioning; group 3 included those who required the three most advanced degrees of resuscitation, suctioning and oxygen administration, and use of ambu and intubation.

Basic demographic characteristics and obstetric and clinical outcomes were examined: parity, smoking status, assisted conception, gestational age at delivery, history of pregestational diabetes mellitus, gestational

diabetes mellitus, chronic hypertension, and any new hypertensive disorder during pregnancy (namely, preeclampsia or gestational hypertension), and pre-pregnancy medical pathology.

Statistical analyses

Data were analysed with SPSS 19.0. Qualitative variables were reported as absolute frequency and percentage, while quantitative variables were reported as the mean and standard deviation or the median and interquartile range if they did not fit a normal distribution. The Kolmogorov–Smirnov test was used for normality testing. A univariate analysis was performed to determine whether there were differences between the two study groups. For the relationship with qualitative variables, the Chi-square test was used, while for the comparison of quantitative variables, the parametric t-test or the non-parametric Mann-Whitney test was applied. Differences were considered statistically significant at $p < 0.05$. Ethics committee approval for this study was obtained from the Ethics and Clinical Research Committee of Galicia (approval number 2020/617).

Results

From 1 January 2012 to 31 December 2017, there were 1,776 women aged [?] 40 years who delivered at Alvaro Cunqueiro Hospital. Women who had multiple gestations and women delivering at < 39 weeks of gestation were excluded. There were a total of 603 pregnant women in the expectant management group compared to 634 women in the induction group. Baseline characteristics were similar between the two groups (Table 1). The delivery outcomes are shown in Table 2. There was no significant difference in the rate of caesarean section between the induction and expectant management groups (24% vs. 24.4%) ($p=0.971$). The risk of urgent intrapartum caesarean section was 44.1% in the induction group versus 33.1% in the expectant management group; these differences were not significant ($p=0.127$).

A secondary analysis showed that in the group of women without any previous surgical or vaginal delivery, the distribution according to the type of labour did not show statistically significant differences between groups ($p= 0.109$). The rate of successful trial of labour after caesarean (TOLAC) was 57.3% in the expectant management group and 51.2% in the induction group. These differences were not statistically significant ($p=0.247$). There were significant between-group differences in the frequency of stained amniotic fluid (147 of 603 in the expectant management group [24.4%] versus 89/634 in the induction of labour group [10.9%]).

The neonatal outcomes are presented in Table 3. No statistically significant differences were found for the Apgar value at 5 min and umbilical artery pH value. There were two cases of stillbirth in the expectant management group, and no intrauterine foetal deaths were registered in the induction group. These differences were not statistically significant ($P =0.147$). The expectant management group needed more advanced paediatric support at birth than the labour induction group. (Table 4). The rate of admission to the NICU was lower in the labour induction group ($p=0.000$) than that in the expectant management group.

Discussion

Principal findings

This study analysed expectant management versus induction of labour at 39 weeks of gestation in women 40 years of age or older at the time of delivery. In older women, active labour management resulted in better perinatal outcomes without increasing the caesarean section rate and with similar vaginal delivery rates compared to expectant management.

Results in the context of what is known

The number of published studies on pregnant women of advanced maternal age is scarce. Most of the studies on induction of labour at term involved women with established complications, such as hypertensive disorders⁸ rupture of membranes⁹, foetal growth restriction^{10,11}, diabetes¹², or foetal macrosomia¹³. The 35/39 study was a randomised clinical trial designed to test the hypothesis that induction of labour at 39 weeks of gestation would reduce the rate of caesarean delivery among nulliparous women of advanced

maternal age. Their data showed that induction of labour at 39 weeks of gestation, as compared with expectant management, did not increase caesarean delivery.¹⁴

The study by Knight et al included a total of 77,327 women aged 35 years. They found no statistically significant difference in the caesarean section rate between the 39-week labour induction groups and the expectant management group (Adjusted relative risk: 1.04, confidence interval [CI] 95%: 0.99–1.01).¹⁵ In 2019, a retrospective cohort study including 35-year-old nulliparas with singleton gestations at term comparing elective induction at 37, 38, 39 and 40 weeks' gestation and those with expectant management at the same number of weeks found that induction at 39 weeks' gestation was associated with decreased odds of caesarean section delivery (Ora 0.69; CI95%, 0.53-0.91).¹⁶ Our data supported previous studies and found no statistically significant difference in the type of delivery between the expectant management group and the induction at 39 weeks group. In the secondary analysis of the type of delivery according to parity, we found no significant differences in the route of delivery among the groups studied. In the expectant management group, the subgroup of women aged 40 years at 39 weeks of gestation and without any previous type of delivery (vaginal or caesarean) included 227 patients, of whom 24.2% had vaginal deliveries and 41.4% had operative vaginal deliveries. This meant that 65.6% of deliveries were vaginal delivery versus 34.4% of deliveries by caesarean section. In the active management group, the group of patients with the same characteristics was made up of 252 women, of which 69% delivered vaginally (32.9% vaginal delivery and 36.1% operative vaginal delivery) as opposed to 31% of deliveries by caesarean section.

Our data showed a rate of successful TOLAC similar to the 62.3% reported in previous studies.¹⁷

Another main finding was better neonatal outcomes in the labour induction group than in the expectant management group. The need for paediatric support at birth, the type of neonatal resuscitation measures, and the NICU admission rates were lower in the labour induction group than in the expectant management group. These data support the results of study lines in which perinatal outcomes improved with elective induction at 39 weeks of gestation.^{16,18}

Finally, another result to highlight is the 0% stillbirth in the active management group versus the two intrauterine foetal deaths recorded in the expectant management group. These differences were not statistically significant because intrauterine foetal death is a rare adverse outcome, and a large sample size would be needed to find significant differences between the groups.

Research implications

There is a continuous risk for both the mother and baby with increasing maternal age, with numerous studies reporting multiple adverse foetal and maternal outcomes associated with advanced maternal age. Women [?] 40 years of age had a similar stillbirth risk at 39 weeks of gestation with younger women at 41 weeks of gestation. Induction of labour at 39 weeks of gestation reduced these adverse outcomes. However, at present, there are insufficient data available on the effect such a policy would have on caesarean rates and perinatal outcomes, specifically in older women. Our study analysed the effect of labour induction compared with expectant management in women over 40 years of age. Our results provided data on intrapartum complications, mode of delivery, neonatal morbidity, and late stillbirth.

Strengths and limitations

Our study has several limitations. The definition of advanced maternal age in the literature varies with publications using different criteria. The definition used in our study aligns with the hospital's definition of [?]40 years. The major limitation of our study was its retrospective nature. The retrospective dataset was subject to incomplete data entry and variation in practice. Despite our limitations, there are only a few studies in the literature that evaluated obstetric and perinatal outcomes according to active or expectant management in pregnant women of advanced maternal age and consider parity within their data.

Conclusion

In conclusion, induction of labour at 39 weeks of gestation compared to expectant management in women

of advanced maternal age results in significantly better neonatal outcomes without increasing the caesarean section rate. Hence, it is important that advanced maternal age pregnant women be informed of the risks involved in delaying childbearing until the fourth decade of life. Further studies on this topic are necessary to develop new policies for clinical care in this group of pregnant women.

Disclosure of interest

The authors declare that we are free of any personal or commercial association that may constitute a conflict of interest. Ethical principles of research have also been respected.

Contribution to authorship

All the authors contributed to the content and development of the article. All authors reviewed and agreed to the final version of this manuscript.

Details of ethics approval

Ethics committee approval for this study was obtained from the Ethics and Clinical Research Committee of Galicia (approval number 2020/617, 20 May 2021).

Funding

The research has no financial support.

Acknowledgements

We would like to thank the women who participated in the study and to midwives and doctors who enter detail data, diagnoses and procedures in their everyday practice to forming the Hospital Alvaro Cunqueiro birth cohort.

References

1. National Statistics Institute. Spanish Statistical Office.
2. Luke B, Brown MB. Elevated risks of pregnancy complications and adverse outcomes with increasing maternal age. *Hum Reprod.* 2007 May;22(5):1264-72. doi: 10.1093/humrep/del522. Epub 2007 Feb 8. PMID: 17289684.
3. Yogev Y, Melamed N, Bardin R, Tenenbaum-Gavish K, Ben-Shitrit G, Ben-Haroush A. Pregnancy outcome at extremely advanced maternal age. *Am J Obstet Gynecol.* 2010 Dec;203(6): 558.e1-7. doi: 10.1016/j.ajog.2010.07.039. Epub 2010 Oct 20. PMID: 20965486.
4. Reddy UM, Ko CW, Willinger M. Maternal age and the risk of stillbirth throughout pregnancy in the United States. *Am J Obstet Gynecol* 2006; 195:764-70.
5. Carolan M, Davey MA, Biro MA, Kealy M. Older Maternal Age and Intervention in Labor: A Population-Based Study Comparing Older and Younger First-Time Mothers in Victoria, Australia. *Birth* 2011; 38:24-9.
6. Ecker JL, Chen KT, Cohen AP, Riley LE, Lieberman ES. Increased risk of cesarean delivery with advancing maternal age: Indications and associated factors in nulliparous women. *Am J Obstet Gynecol* 2001; 185:883-7.
7. Walker KF, Bugg GJ, Macpherson M, Thornton J. Induction of labour at term for women over 35 years old: a survey of the views of women and obstetricians. *Eur J Obstet Gynecol Reprod Biol* 2012; 162:144-8.
8. Grobman WA; Rice MM; Reddy UM et al. Labor Induction versus Expectant Management in Low-Risk Nulliparous Women *N Engl J Med.* 2018 August 09; 379(6): 513-523. doi:10.1056/NEJMoa1800566.
9. Walker KF, Bugg GJ, Macpherson M, et al. 35/39 Trial Group. Randomized Trial of Labor Induction in Women 35 Years of Age or Older. *N Engl J Med.* 2016 Mar 3;374(9):813-22. doi: 10.1056/NEJMoa1509117. PMID: 26962902.
10. Koopmans, C., Bijlenga, D., Groen, H., Vijgen, S., Aarnoudse, J., & Bokedam, D. (2009). Induction of labour versus expectant monitoring for gestational hypertension or mild pre-eclampsia after 36 weeks'

- gestation (HYPITAT): a multicentre, openlabel randomised controlled trial. *Lancet* 2009, 374 , 979–88.
11. Hannah ME, Ohlsson A, Farine D, et al. Induction of labor compared with expectant management for prelabor rupture of the membranes at term. TERMPROM Study Group. *N Engl J Med*. 1996 Apr 18;334(16):1005-10. doi: 10.1056/NEJM199604183341601. PMID: 8598837.
 12. Van den Hove MML, Willekes C., & Roumen FJME. (2006). Induction or spontaneous labour?: Disproportionate intrauterine growth intervention trial at term (DIGITAT): A Pilot Study. *Eur J Obstet Gynecol Reprod Biol*, 125 (1), 54-8.
 13. Boers KE, Vijgen SM, Bijlenga D, et al. DIGITAT study group. Induction versus expectant monitoring for intrauterine growth restriction at term: randomised equivalence trial (DIGITAT). *BMJ*. 2010 Dec 21;341:c7087. doi: 10.1136/bmj.c7087. PMID: 21177352; PMCID: PMC3005565.
 14. Kjos SL, Henry OA, Montoro M, Buchanan TA, Mestman JH. Insulin-requiring diabetes in pregnancy: a randomized trial of active induction of labor and expectant management. *Am J Obstet Gynecol*. 1993 Sep;169(3):611-5. doi: 10.1016/0002-9378(93)90631-r. PMID: 8372870.
 15. Boulvain M, Senat MV, Perrotin F, et al. Groupe de Recherche en Obstetrique et Gynecologie (GROG). Induction of labour versus expectant management for large-for-date fetuses: a randomised controlled trial. *Lancet*. 2015 Jun 27;385(9987):2600-5. doi: 10.1016/S0140-6736(14)61904-8. Epub 2015 Apr 8. PMID: 25863654.
 16. Knight HE, Cromwell DA, Gurol-Urganci I, Harron K, van der Meulen JH, Smith GCS. Perinatal mortality associated with induction of labour versus expectant management in nulliparous women aged 35 years or over: An English national cohort study. *PLoS Med*. 2017 Nov 14;14(11): e1002425. doi: 10.1371/journal.pmed.1002425. PMID: 29136007; PMCID: PMC5685438.
 17. Kawakita T, Bowers K, Khoury JC. Nonmedically Indicated Induction of Labor Compared with Expectant Management in Nulliparous Women Aged 35 Years or Older. *Am J Perinatol*. 2019 Jan;36(1):45-52. doi: 10.1055/s-0038-1648228. Epub 2018 May 3. PMID: 29723903.
 18. Tita ATN, Doherty L, Grobman WA, et al. Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) Maternal-Fetal Medicine Units (MFMU) Network. Maternal and Perinatal Outcomes of Expectant Management of Full-Term, Low-Risk, Nulliparous Patients. *Obstet Gynecol*. 2021 Feb 1;137(2):250-257. doi: 10.1097/AOG.0000000000004230. PMID: 33416294.
 19. Levin G, Mankuta D, Yossef E, Yahalomy SZ, Meyer R, Elchalal U, Yagel S, Rottenstreich A. Trial of labor after cesarean in older women who never delivered vaginally. *Eur J Obstet Gynecol Reprod Biol*. 2020 Feb; 245:89-93. doi: 10.1016/j.ejogrb.2019.12.010. Epub 2019 Dec 24. PMID: 31891896.

Tables

Table 1. Baseline Characteristics of the Participants

Variable	Expectant management group (N = 603)	Induction of labor group (N = 634)	P value
Maternal age at delivery (years)			
Mean Range	41 40-50	41 40-50	
Parity no. (%)			
Nulliparous	227 (37,65)	252 (39,75)	
Multiparous	376 (62,35)	382 (60,25)	
Current smoker no. (%)	32 (5,3)	25 (3,9)	0,250
Medical history no. (%)			
Yes No	99 (16,4) 504 (83,6)	118 (18,6) 516 (81,4)	
Assisted reproductive technology no. (%)			0,181

Variable	Expectant management group (N = 603)	Induction of labor group (N = 634)	P value
Artificial insemination	10 (1,65)	9 (1,42)	0,601
In vitro fertilization	46 (7,62)	54 (8,51)	
Ovodon	34 (5,63)	55 (8,67)	
Hypertension disorders no. (%)			
Pregestational	4 (0,7)	6 (0,9)	0,070
Gestational	6 (1)	4 (0,6)	
Preeclampsia	1 (0,1)	1 (0,1)	
Diabetes Mellitus no. (%)			
Pregestational	0	0	0,070
Gestational with diet	76 (12,6)	65 (10,3)	
Gestational with insulin	4 (0,7)	10 (1,6)	

Table 2. Maternal outcomes

Variable	Expectant management group N = 603)	Induction of labor group (N = 634)	P value
Gestational age at the time of delivery			0,000
Mean Range	40+2 39-42	39+3 39-42+1	
Onset of the birth process no. (%)			
Spontaneous labor	357 (59)	100 (15,8)	
Induced labor	211 (35,2)	509 (80,4)	0,000
Elective cesarean section	35 (5,8)	25 (3,9)	
Indication for induction of labor no. (%)			
>41 wk of gestation	72 (34.1)	10 (2)	
Term prelabor rupture of membranes	61 (28.9)	26 (5.1)	0,018
Others	26 (12.3%)	13 (2.5)	
Posity amnioscopy	14 (6.6)	0 (0,0)	
Oligoamnios	13 (6.2)	7 (1.4)	
Advanced maternal age	0 (0)	437 (85.68)	0,258
Amniotic fluid color no. (%)			
Clear	450 (74,6)	559 (88,2)	
Stained	147 (24,4)	89(10,9)	
Hemorrhagic	6 (1)	6 (0,9)	0,258
Intrapartum fever no. (%)	21 (8,6)	92 (14,6)	
Epidural use no. (%)	464 (77,5)	504 (79,9)	
Method of delivery no. (%)			
Vaginal delivery	306 (50,7)	325 (51,3)	0,258
Assisted vaginal delivery	150 (24,8)	157 (24,8)	
Cesarean section	147 (24,4)	152 (24)	

Variable	Expectant management group N = 603)	Induction of labor group (N = 634)	P value
No previous type of delivery. Method of delivery no (%)*	227	252	0,109
Vaginal delivery	55 (24,2) 94 (41,4) 78	83 (32,9) 91 (36,1) 78	
Assisted vaginal delivery Cesarean section	(34,4)	(31)	
Type of cesarean section no. (%)			0,127
Programmed	33 (22,3) 66 (44,6) 49	25 (16,4) 60 (39,5) 67	
Non-urgent	(33,1)	(44,1)	
intrapartum Urgent			
Indication for cesarean section no. (%)	N = 147	N = 152	
Suspected fetal distress	40 (27) 24 (16,2) 15	54 (34,9) 14 (9,2) 17	
Active phase arrest	(10,1) 18 (12,2) 18	(11,2) 14 (9,2) 26	
Cephalopelvic	(8,1) 11 (7,4)	(17,1) 9 (5,9)	
disproportion Breech presentation Failure of induction Elective			
Indication for assisted vaginal delivery no. (%)	N = 150	N = 157	
Suspected fetal distress	99 (66) 50 (33,3) 1	128 (81,5) 28 (17,9) 1	
Second Stage	(0,7)	(0,6)	
Protraction Maternal exhaustion			

*** Patients without any previous surgical or vaginal delivery**

Table 3. Neonatal outcomes

Variable	Expectant management group (N = 603)	Induction of labor group (N = 634)	P value
Sex no. (%)			
Male Female	285 (47,3) 318 (52,7)	324 (51,1) 310 (48,9)	
Birth weight (g)			0,001
Mean Range	3371,61g 2050g-4630g	3270,23g 2215g- 4600g	
Apgar score at 5 min			0,317
Mean Range	9,85 0-10	9,91 6-10	
Umbilical-cord- arterial pH			0,083
Mean Range	7,20 0-7,41	7,23 6,95-7,46	
Stillbirth no. (%)	2 (0,3)	0 (0)	0,147
Required intervention no. (%)	357 (59,3)	184 (29)	0,000
NICU admission no. (%)	143 (23,7)	65 (10,3)	0,000

Table 4. Groups based on the degree of neonatal resuscitation

	Group 1*	Group 2**	Group 3***
2012-2014	245(40,7%)	279 (46,3%)	78 (13%)
2015-2017	450 (71%)	135 (21,3%)	49 (7,7%)

Group 1: No pediatric assistance at birth

** Group 2 : suctioning *** Group 3 : suctioning and oxygen administration, use of ambu and intubation