

Early and late puerperal complications associated with the mode of delivery in a cohort in Brazil

Complicações puerperais precoces e tardias associadas à via de parto em uma coorte no Brasil

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ABSTRACT: Introduction: The rates of cesarean section births significantly increased in Brazil and worldwide in recent years; and along with them, the interest in studying the complications related to this procedure. **Objective:** To assess the early and late maternal complications associated with the mode of delivery in up to six years after labor. **Methods:** This is a prospective cohort study that followed all births in the city of Pelotas, in Southern Brazil (4,244 mothers) in 2004, for a period of 6 years. Descriptive analyses and the association between the outcome and mode of delivery were performed. The control for potential confounding factors was performed using Poisson regression with robust error variance. **Results:** About half (44.9%) of the women underwent cesarean section. Cesarean sections were associated with a 56% higher risk of early complications, 2.98 times higher risk of postpartum infection, 79% higher risk of urinary tract infection, 2.40 times higher risk of pain, 6.16 times higher risk of headaches, and 12 times higher risk of anesthetic complications compared to the vaginal delivery. Cesarean section was a protection factor against the presence of hemorrhoids. The mode of delivery was not associated with any of the late complications studied. **Conclusions:** Due to the risk of associated complications, cesarean sections should be performed with caution, when their benefits outweigh the risks.

Keywords: Cesarean section. Natural childbirth. Puerperal disorders.

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RESUMO: *Introdução:* As taxas de cesárea aumentaram significativamente no Brasil e no mundo nos últimos anos; e junto delas o interesse em estudar as complicações relacionadas a esse procedimento. *Objetivo:* Avaliar as complicações maternas precoces e tardias relacionadas à via de parto, por até seis anos após o parto. *Métodos:* Trata-se de um estudo tipo coorte prospectiva que acompanhou todos os nascimentos da cidade de Pelotas, no Sul do Brasil (4.244 mães), no ano de 2004, por um período de 6 anos. Foram realizadas análises descritivas e de associação entre o desfecho e a via de parto. O controle para potenciais fatores de confusão foi realizado através da regressão de Poisson com variância robusta. *Resultados:* Cerca da metade das mulheres (44,9%) foram submetidas à cesárea. O parto cesárea foi associado a um risco 56% maior de complicações precoces, 2,98 vezes maior de infecção pós-parto, 79% mais risco de infecção urinária, 2,40 vezes maior de dor, 6,16 vezes maior de cefaleia e mais de 12 vezes maior de complicações anestésicas, quando comparado ao parto vaginal. A cesárea foi proteção contra a presença de hemorroidas. A via de parto não foi associada a nenhuma das complicações tardias estudadas. *Conclusão:* Devido ao risco de complicações associado, as cesáreas devem ser realizadas com cautela, quando seus benefícios superam os riscos.

Palavras-chave: Cesárea. Parto normal. Transtornos puerperais.

INTRODUCTION

The improvements in surgical and anesthetic techniques, as well as the relative rarity of severe complications and death, have led pregnant women and health professionals to the false perception that the cesarean section is a risk-free procedure. Their rates have significantly increased over recent decades in Brazil and in several countries around the world¹. Estimates from 1970 indicate that the rate of cesarean sections in Brazil was about 15%, rising to 38% in 201 and to 48.8% in 2008, representing 35% of deliveries in the Unified Health System (*Sistema Único de Saúde – SUS*) and 80% of deliveries in the private care sector². Cesarean rates in Brazil have significantly increased and are strongly associated to maternal educational levels and higher among the most favored social classes, probably performed without clinical indication³.

In China, cesarean sections rates have also increased over the past years, going from 28.8% in 2008 to 34.9% in 2014⁴. In the United States, rates went from 22.8% in 1988 to 32.8 in 2010; in Germany, from 15.7% in 1990 to 30.3% in 2009. The lowest cesarean rates are found in Finland, Iceland, Sweden, Belgium and the Netherlands, representing about 16% of all births⁵.

However, the increased number of cesarean section without medical indication may increase the risk of maternal complications⁶, many of them inherent in any surgical procedure. Therefore, the use of this technology must be carefully considered by both pregnant women and health professionals and their benefits must outweigh their potential risks. Knowing these risks in the light of the best evidence available at this time is essential for a truly enlightened decision making by both pregnant women and health professionals.

Thus, this study had the objective of evaluating early and late maternal associated with vaginal and cesarean deliveries for up to six years postpartum.

METHOD

A prospective cohort study, using data from the *Coorte de Nascimentos de Pelotas*, Rio Grande do Sul, 2004. This cohort includes all birth occurred in 2004 of mothers living in the urban area of Pelotas and in Jardim América, a neighborhood belonging to the municipality of Capão do Leão, contiguous to Pelotas.

In 2004, 4,287 children were born in Pelotas and their mothers were invited to take part in the study, which would interview the puerpera and assess the newborn; 4,244 mothers were included in the study (including stillbirth mothers). Follow-up visits to these children took place in their households at 3, 12, 24 and 48 months and in the Epidemiological Research Center at 6 years of age. Each visit was carried out with the use of standardized questionnaires by trained interviewers. 3,985 children and their mothers were followed-up at 3 months of age, 3,907 at 12 months, 3,869 at 24 months, 3,799 at 48 and 3,722 at 6 years of age. From the beginning of the study to the 6-year-old follow-up, losses and refusals accounted for 9.8% (414 children). Further methodological details, including sample characteristics, may be obtained from another publication⁷.

The present study used information on demographic, socioeconomic and obstetric characteristics obtained from the perinatal study (2004). Data regarding complications were obtained from the other follow-ups, with early complications being surveyed up to 48 months into follow-ups and late complications at 6 years into them. In order to evaluate early complications, women who had information regarding complications associated to delivery were included in at least one of the subsequent perinatal follow-ups (n = 3,984; 93.9%) as well as all women in the 6-year-old follow up with information on these complications (n = 3,430; 80.8%).

Complications associated with childbirth reported by women during follow-up were considered as outcomes and then classified according to the International Statistical Classification of Diseases and health-related problems (CID 10). Early complications were assessed jointly and separately, such as postpartum infection, anemia, hemorrhage, urinary tract infection, pain, headache, anesthetic complications, hemorrhoids, curettage and adherence at the surgical/episiotomy site. Late complications were also evaluated jointly and separately, such as urinary and fecal incontinence, dyspareunia, cystocele, genital prolapse and perineal rupture.

The other variables presented for the characterization of the subjects were: age at the time of delivery, school education in full years, asset index (AI)⁸, living with husband or partner, skin color observed by the interviewer, type of care provider during delivery (SUS or not), parity, number of prenatal consultations, mode of delivery and complications during pregnancy (hypertension, diabetes, anemia and bleeding in the third trimester).

The analysis was carried out by the statistical software Stata 13.0. A descriptive analysis of the subjects was performed as well as an assessment on the association between puerperal characteristics and exposure (mode of delivery) and outcomes (early and late complications), through the Pearson's χ^2 test. The variables associated with exposure and outcome at the critical level of $p < 0.20$ were considered potential confounder factors and were included in the adjusted analysis. This approach is powerful enough to detect any important positive confounding effects⁹.

The association between mode of delivery and outcomes was evaluated using Poisson's regression with robust variance, resulting in the gross effect measure. The multivariable analysis was carried out by using the same regression, including all potential confounders raised ($p < 0.20$ in gross analysis) at one time, being disregarded due to the lack of statistical significance of the variables AI, living with a partner, skin color, episiotomy and bleeding during pregnancy for the early complications outcome; and living with a partner, high blood pressure and gestational diabetes for the late complications outcome.

The study protocol was approved by the Research Ethics Committee of the School of Medicine of *Universidade Federal de Pelotas* (UFPel) and complies with Resolution No. 196/96 of the National Health Council. An Informed Consent was signed in each follow-up, once all doubts regarding the research procedure had been solved.

RESULTS

Table 1 presents the sociodemographic and obstetric characteristics of the 4,244 puerperae included in this study; 19% were under 20 years of age, 27.2% were between 20 and 24 years of age and 13.5% were aged 35 years old or older; 42.9% had 9 or more years of school education at the moment of the interview; 20.2% were black; 81.1% had their deliveries performed by SUS; 55.1% had vaginal deliveries and the remaining ones underwent cesareans sections; the episiotomy was performed in 65.2% of women submitted to vaginal delivery (data not shown in the table). Other characteristics are presented in Table 1.

As for the association of complications: early complications were associated to the type of provider, whether SUS or not SUS, and the mode of delivery. Late complications were associated to age, education, AI, type of provider, number of prenatal consultations, parity, mode of delivery and episiotomy.

Early complications were reported by 11.4% of women, the most common being: postpartum infection (3.4%), anemia (1.8%) and hemorrhage (1.7%). Late complications were present in 24.1% of women, with greater prevalence of urinary incontinence (13.0%) and dyspareunia (11.9%) (data not presented in tables).

Table 2 presents the gross and adjusted analyses of early maternal complications in relation to the mode of delivery, as well as the number and the percentage of each

Table 1. Sociodemographic and obstetric characteristics associated with early and late complications, among mother of the children included in the *Coorte de Nascimentos de Pelotas, 2004*.

Variable	n	Early complications n (%) ^a	Late complications n (%) ^a	Associations to early complications (p-value)	Associations to late complications (p-value)
Age (years) (n = 4,242)					
< 20	807	97 (13.1)	143 (23.5)	0.030	< 0.001
20 to 24	1,153	114 (10.8)	190 (20.7)		
25 to 29	954	93 (10.2)	180 (23.0)		
30 to 34	756	70 (9.9)	158 (24.6)		
35 or more	572	78 (14.6)	157 (32.8)		
Education (years) (n = 4,202)					
0 to 4	658	70 (11.7)	187 (38.0)	0.189	< 0.001
5 to 8	1,740	201 (12.5)	374 (26.7)		
9 or more	1,804	179 (10.5)	263 (17.4)		
Asset Index (n = 3,234)					
1 st quintile (poorest)	700	87 (12.8)	160 (29.0)	0.486	< 0.001
2 nd quintile	614	63 (10.4)	142 (27.0)		
3 rd quintile	629	72 (11.6)	147 (26.4)		
4 th quintile	644	72 (11.4)	153 (26.5)		
5 th quintile (richest)	647	62 (9.8)	76 (13.8)		
Living with a partner (n = 4,244)					
No	702	72 (11.4)	116 (22.6)	0.965	0.381
Yes	3,542	381 (11.5)	712 (24.4)		
Color of the skins (n = 4,244)					
White	3,092	331 (11.4)	614 (24.2)	0.250	0.189
Black	856	98 (12.5)	150 (22.3)		
Other	296	24 (8.8)	64 (28.3)		
Type of provider (n = 4,238)					
SUS	3,439	382 (11.0)	716 (26.0)	0.034	< 0.001
Not SUS	799	69 (9.2)	111 (16.4)		

Continue...

Table 1. Continuation.

Variable	n	Early complications n (%) ^a	Late complications n (%) ^a	Associations to early complications (p-value)	Associations to late complications (p-value)
Number of prenatal consultations (n = 4,065)					
0 to 3	312	38 (15.7)	56 (28.9)	0.106	0.006
4 to 6	890	81 (9.9)	177 (26.8)		
7 to 9	1,511	165 (11.4)	308 (24.0)		
10 or more	1,352	146 (11.3)	238 (20.6)		
Parity (n = 4,244)					
1	1,673	165 (10.5)	241 (17.7)	0.110	< 0.001
2	1,105	114 (10.98)	207 (22.4)		
3	684	74 (11.65)	153 (27.5)		
4	354	47 (14.5)	95 (34.7)		
5 or more	427	53 (12.4)	132 (30.9)		
Mode of delivery (n = 4,244)					
Vaginal	2,340	207 (9.9)	481 (26.7)	< 0.001	< 0.001
Cesarean	1,904	239 (13.8)	323 (21.5)		
Episiotomy (n = 2,280)					
Yes	1,488	142 (10.1)	287 (23.6)	0.373	< 0.001
No	792	63 (8.9)	196 (32.6)		

^aTotal number and percentage regarding subjects with information in both variables (exposure and outcome); SUS: Unified Health System (*Sistema Único de Saúde*).

complication according to the type of delivery. In the gross analysis, the cesarean section was the risk factor of grouped early complications, with prevalence ratio (PR) of 1.39 and confidence interval of 95% (95%CI) 1.17 – 1.65; post-partum infection (PR = 2.56; 95%CI 1.80 – 3.65), headache (PR = 5.34; 95%CI 2.02 – 14.08) and anesthesia complications (PR = 12.14; 95%CI 2.84 – 51.89); and protection factor for anemia (PR = 0.60; 95%CI 0.37 – 0.98), hemorrhoids (PR = 0.22; 95%CI 0.08 – 0.57) and curettage (PR = 0.20; 95%CI 0.04 – 0.90).

In the multivariable analysis, post-adjustment, the cesarean section was associated to a 56% higher risk of early complications (PR = 1.56; 95%CI 1.28 – 1.89), 2.98 times higher risk of postpartum infection (95%CI 2.02 – 4.40), 79% higher risk of urinary infection

Table 2. Early complications associated with mode of delivery, among mothers of children included in the *Coorte de Nascimentos de Pelotas, 2004* (n = 3,984*).

	Vaginal	Cesarean	Gross analysis		Adjusted analysis ^a	
			PR ^b	95%CI	PR ^b	95%CI
Early complications						
Yes	211 (46.6)	242 (53.4)	1.39	1.17 – 1.65	1.56	1.28 – 1.89
No	1,953 (55.9)	1,540 (44.1)				
Postpartum infection						
Yes	44 (32.1)	93 (67.9)	2.56	1.80 – 3.65	2.98	2.02 – 4.40
No	2,120 (55.6)	1,689 (44.4)				
Anemia						
Yes	48 (66.7)	24 (33.3)	0.60	0.37 – 0.98	0.59	0.34 – 1.02
No	2,116 (54.6)	1,758 (45.4)				
Hemorrhage						
Yes	35 (52.2)	32 (47.8)	1.11	0.69 – 1.78	0.94	0.54 – 1.65
No	2,129 (54.9)	1,750 (45.1)				
Urinary infection						
Yes	24 (45.3)	29 (54.7)	1.46	0.85 – 2.51	1.79	1.00 – 3.18
No	2,140 (55.0)	1,753 (45.0)				
Pain						
Yes	22 (41.5)	31 (58.5)	1.71	0.99 – 2.94	2.40	1.30 – 4.43
No	2,142 (55.0)	1,751 (45.0)				
Headache						
Yes	5 (18.5)	22 (81.5)	5.34	2.02 – 14.08	6.16	2.31 – 16.45
No	2,159 (55.1)	1,760 (44.9)				
Anesthetic complications						
Yes	2 (9.1)	20 (90.9)	12.14	2.84 – 51.89	12.68	2.64 – 60.83
No	2,162 (55.1)	1,762 (44.9)				
Hemorrhoids						
Yes	27 (84.4)	5 (15.6)	0.22	0.08 – 0.57	0.16	0.04 – 0.57
No	2,137 (54.6)	1,777 (45.4)				

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Table 2. Continuation.

	Vaginal	Cesarean	Gross analysis		Adjusted analysis ^a	
			PR ^b	95%CI	PR ^b	95%CI
Curettage^c						
Yes	12 (85.7)	2 (14.3)	0.20	0.04 – 0.90	–	–
No	2,152 (54.7)	1,780 (45.3)				
Hysterectomy						
Yes	7 (63.6)	4 (36.4)	0.69	0.20 – 2.36	0.30	0.03 – 2.59
No	2,157 (54.8)	1,778 (45.2)				
Adhesion surgery or episiotomy						
Yes	2 (22.2)	7 (77.8)	4.25	0.88 – 20.43	3.23	0.68 – 15.23
No	2,162 (54.9)	1,775 (45.1)				

*Information of at least one follow-up; PR: prevalence ratio; 95%CI: confidence interval 95%; ^aadjusted for age, type of provider, number of prenatal consultations, parity, hypertension during pregnancy, diabetes during pregnancy;

^bcesarean section compared to vaginal delivery; ^cit was not possible to perform the adjusted analysis due to the low number of cases.

(95%CI 1.00 – 3.18), 2.40 times higher risk of pain (95%CI 1.30 – 4.43), 6.16 times higher risk of headache (95%CI 2.31 – 16.45) and 12.68 times higher risk of anesthetic complications (95%CI 2.64 – 60.83), when compared to the vaginal delivery. The cesarean section remained as a protection against hemorrhoids (PR = 0.16; 95%CI 0.04 – 0.57).

Regarding the late complications in Table 3, the gross analysis figured cesarean sections as a protection against complications in general (PR = 0.78; 95%CI 0.69 – 0.89), urinary incontinence (PR = 0.75; 95%CI 0.63 – 0.90), cystocele (PR = 0.56; 95%CI 0.38 – 0.85) and genital prolapse (PR = 0.43; 95%CI 0.22 – 0.83). However, after adjustments for age, education, AI, skin color, type of provider, number of prenatal consultations, parity, anemia and bleeding during pregnancy, the mode of delivery did not remain associated to any of the late complications studied.

DISCUSSION

This study provides important information on early and late maternal complications regarding mode of delivery. Cesarean section was associated with: greater risk of postpartum infection, urinary infection, headache, pain and anesthetic complications; and, unlike expected, was not a protection factor against late complications, such as urinary and fecal incontinence, cystocele and uterus prolapse.

Previous studies evaluating postpartum complications only address severe ones^{10,11}, such as intensive care unit (ICU) hospitalization, blood transfusion, hysterectomy and death, requiring a great number of samples in order to obtain the expected results. This study, however, had the advantage of evaluating more common complications, though still impacting

Table 3. Late gynecological complications associated with the mode of delivery, among mothers of children included in the *Coorte de Nascimentos de Pelotas, 2004*^a.

	Vaginal	Cesarean	n ^a	Gross analysis		Adjusted analysis ^b	
				PR ^c	95%CI	PR ^c	95%CI
Late complications							
Yes	498 (60.1)	330 (39.9)	3,430	0.78	0.69 – 0.89	0.88	0.75 – 1.02
No	1,366 (52.5)	1,236 (47.5)					
Urinary incontinence							
Yes	273 (61.1)	174 (38.9)	3,430	0.75	0.63 – 0.90	0.83	0.66 – 1.04
No	1,591 (53.3)	1,392 (46.7)					
Feces or gas incontinence							
Yes	71 (57.3)	53 (42.7)	3,428	0.88	0.62 – 1.25	1.01	0.65 – 1.58
No	1,791 (54.2)	1,513 (45.8)					
Dyspareunia							
Yes	238 (58.5)	169 (41.5)	3,422	0.84	0.70 – 1.01	1.02	0.81 – 1.28
No	1,621 (53.8)	1,394 (46.2)					
Cystocele							
Yes	71 (67.6)	34 (32.4)	3,425	0.56	0.38 – 0.85	0.64	0.38 – 1.07
No	1,789 (53.9)	1,531 (46.1)					
Genital prolapse							
Yes	33 (73.3)	12 (26.7)	3,425	0.43	0.22 – 0.83	0.68	0.31 – 1.51
No	1,828 (54.1)	1,552 (45.9)					
Perineal rupture							
Yes	20 (71.4)	8 (28.6)	3,426	0.47	0.21 – 1.07	0.52	0.17 – 1.59
No	1,841 (54.2)	1,557 (45.8)					

^aInformation of the 6-year follow-up; ^badjusted for age, education, index of goods, color of the skin, type of provider, number of prenatal consultations, parity, anemia and bleeding during pregnancy; ^ccesarean section compared to vaginal delivery; PR: prevalence ratio; 95%: confidence interval of 95%.

the quality of life of women in the postpartum period, such as pain, headache and urinary infection, little studied until then.

As for the risk of postpartum infection, other studies found similar results, indicating cesarean sections as a risk factor¹²⁻¹⁴.

Women submitted to cesarean sections also had 2.40 times more complaints of pain in comparison to women who underwent vaginal delivery. Another research carried out in Brazil showed that women who had vaginal delivery were 82% less likely to feel intense postpartum pain¹⁵. In a study performed in Finland, persistent pain was more common one year after cesarean than after vaginal deliveries¹⁶.

In regard to the risk of anesthetic complications, those are more frequent among women who underwent cesarean sections, obviously because it is a surgical procedure and because providing analgesia and anesthesia during labor and vaginal delivery is not a routine in all Brazilian services. However, regardless of anesthesia being almost exclusively used in surgical deliveries, which makes comparisons difficult, this risk must be considered when electing the mode of delivery, especially when a cesarean section without medical indication will be performed. Women who had cesarean sections also had greater risk of headaches, which may be associated to anesthesia use.

Hemorrhage and hysterectomy outcomes were not associated with the mode of delivery in this study, and have presented controversial results in the current literature. Liu et al.¹² found greater chance of hemorrhage which required hysterectomy among women who had cesarean sections —*odds ratio* (OR) of 21 and 95%CI 1.2 – 3.8 — though lower chance of hemorrhage requiring transfusion (OR = 0.4; 95%CI 0.2 – 0.8) among surgical deliveries, in comparison to vaginal ones. Another study¹⁴ also found protection against hemorrhage among cesarean sections (OR = 0.51; 95%CI 0.46 – 0.56). Although the chance of hemorrhage is controversial, women who undergo cesarean sections seem to have greater chance of blood transfusion^{10,11,14,17}. Hysterectomy is also more frequent among women who undergo cesarean sections^{10-12,18,19}, suggesting that the hemorrhagic symptoms presented by women who underwent cesarean sections are more severe. This inconsistency in findings related to hemorrhage may result from the difficulty in measuring the amount of blood lost.

As for late complications, after the control for confounding factors, vaginal delivery was not associated with greater chance of urinary, feces or gas incontinence, dyspareunia, cystocele, genital prolapse and perineum rupture. A systematic review which evaluated pelvic floor dysfunctions found a greater risk of urinary incontinence among women who underwent vaginal delivery, although this difference tends to be leveled over time. In regard to fecal incontinence, anal sphincter rupture was Paramount for the greater risk and not the vaginal delivery itself, unlike genital prolapse, which is more common among women who had vaginal deliveries²⁰.

The prevalence of cesarean sections in this study was 44.9%. In Brazil, in 2009, the rate of cesarean sections was 50.1%, surpassing, for the first time, the number of vaginal deliveries. This number continues to increase, represented by 56.63% of deliveries in 2013²¹, despite government recommendations and attempts to reduce them^{22,23}.

Since 1985, the World Health Organization (WHO) highlights that there is no justification for cesarean delivery rates above 15% of the total deliveries performed²⁴. Using the recommended percentage of 15% as the upper limit, it is estimated that 6.2 million unnecessary cesarean sections were performed worldwide in 2008¹.

This recommendation by WHO on the percentage of acceptable cesarean sections has been widely questioned in recent years and is being rediscussed in 2014, aggregating information from many studies carried out over the past 30 years. Conclusions were similar to those already known, in which countries with cesarean percentages below 10%, where the offer of cesarean deliveries might not meet the needs of the population, benefit from the reduction of neonatal and maternal mortality when the percentage of cesarean increases. No effect on mortality rates are observed with 10 to 30% of cesarean rates. The main recommendation, however, is to offer cesarean sections to women who would really need and benefit from the procedure rather than to meet a specific rate²⁵.

Women are often submitted to unnecessary surgical deliveries without any clear medical recommendation, for convenience due to the mother's request, or with medical recommendation without clinical justification^{26,27}. Besides, cesarean rates above this limit have not proven any additional benefit for the mother or the baby²⁸.

A study carried out in 19 countries evaluating maternal and neonatal mortality for different cesarean percentages demonstrated that neonatal and infant mortality curves, after adjusted for gross domestic product (GDP) and Human Development Index (HDI), become flat after cesarean section rates above 10%. Maternal mortality, on the other hand, increases for cesarean section rates over 15%, estimated at 7.8/100 thousand for 15% of cesarean sections, 7.9/100 thousand for 20%, 8.4/100 thousand for 25% and 8.8/100 thousand for 30%, having a contrary impact to the one often expected²⁹. The rarity of severe maternal episodes during pregnancy and childbirth may contribute to a misperception of safety related to cesarean sections and their excessive use⁶.

This study has some limitations which should be considered. Information regarding delivery and women were collected in 2004, thus, they may differ from the current profile of women who undergo vaginal or cesarean deliveries.

It was not possible to evaluate the real recommendations for surgical delivery, although the increased percentage of cesarean sections performed indicates that many of them did not follow a clear and specific clinical recommendation. A previous study carried out with the same population attempted to identify which cesarean sections were elective, but it was impossible to collect such information from medical records or interviews with the doctors, once that they were reluctant to admit the procedures had no medical indication³⁰.

Finally, it is difficult to separate the risk associated exclusively to the procedure and the risk women with obstetric indications would be exposed to, once that women with specific recommendations for surgery would be at greater risk, especially of more severe complications.

The 6-year follow-up period may have been short for late complications to show and be detected, provided they could onset later in the woman's life; in addition, the analysis was adjusted only for parity, not considering the mode of delivery of possible previous deliveries, which could also influence the presence of complications.

It also presents the limitations inherent to an observational study; however, it would be ethically unacceptable to unnecessarily expose women to the risk associated with cesarean sections in a randomized study, knowing the current evidence. The quality of the evidence is increased as it is a prospective cohort study of primary data, with few losses and a long follow-up period, despite its limitations.

CONCLUSION

Cesarean section should be performed with caution, when there are clear indication and their benefits outweigh potential risks. Thus, the main challenge regarding cesarean sections is to make the best use of this procedure, an important resource to reduce maternal and neonatal mortality, but, when excessively used, may be associated with an increased risk of unfavorable maternal outcomes⁶.

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