Obstetric interventions during labor and childbirth in Brazilian low-risk women

Intervenções obstétricas durante o trabalho de parto e parto em mulheres brasileiras de risco habitual

Intervenciones obstétricas durante el trabajo de parto y parto en mujeres brasileñas de bajo riesgo

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Abstract

This study evaluated the use of best practices (eating, movement, use of nonpharmacological methods for pain relief and partograph) and obstetric interventions in labor and delivery among low-risk women. Data from the hospital-based survey Birth in Brazil *conducted between 2011 and 2012 was used. Best practices during labor occurred in less than 50% of women and prevalence of the use of these practices was lower in the North, Northeast and Central West Regions. The rate of use of oxytocin drips and amniotomy was 40%, and was higher among women admitted to public hospitals and in women with a low level of education. The uterine fundal pressure, episiotomy and lithotomy were used in 37%, 56% and 92% of women, respectively. Caesarean section rates were lower in women using the public health system, nonwhites, women with a low level of education and multiparous women. To improve the health of mothers and newborns and promote quality of life, a change of approach to labor and childbirth that focuses on evidence-based care is required in both the public and private health sectors.*

Public Health Practice; Maternal and Child Health; Obstretic Labor; Parturition

Resumo

Este artigo avaliou o uso das boas práticas (alimentação, deambulação, uso de métodos não farmacológicos para alívio da dor e de partograma) e de intervenções obstétricas na assistência ao trabalho de parto e parto de mulheres de risco obstétrico habitual. Foram utilizados dados da pesquisa Nascer no Brasil*, estudo de base hospitalar realizada em 2011/2012, com entrevistas de 23.894 mulheres. As boas práticas durante o trabalho de parto ocorreram em menos de 50% das mulheres, sendo menos frequentes nas regiões Norte, Nordeste e Centro-oeste. O uso de ocitocina e amniotomia foi de 40%, sendo maior no setor público e nas mulheres com menor escolaridade. A manobra de Kristeller, episiotomia e litotomia foram utilizada, em 37%, 56% e 92% das mulheres, respectivamente. A cesariana foi menos frequente nas usuárias do setor público, não brancas, com menor escolaridade e multíparas. Para melhorar a saúde de mães e crianças e promover a qualidade de vida, o SUS e, sobretudo o setor privado, necessitam mudar o modelo de atenção obstétrica promovendo um cuidado baseado em evidências científicas.*

Práticas de Saúde Pública; Saúde Materno-Infantil; Trabalho de Parto; Parto

Introduction

There is robust scientific evidence that certain practices during pregnancy and childbirth are effective in reducing adverse perinatal outcomes. Factors affecting maternal health influence pregnancy outcomes and quality antenatal care may contribute to a reduction in adverse outcomes in mothers and newborns. Furthermore, a significant proportion of potential complications during labor and childbirth may be avoided with adequate obstetric care based on the use of appropriate technology. At the same time, the inappropriate use of techniques to forgo the use of obstetric interventions can compromise the health of mothers and babies [1].

Although Brazil has achieved universal antenatal care coverage and a hospital birth rate of over 98% in 2010, the maternal mortality ratio still remains high (68.2/100,000 live births), as does the perinatal mortality rate, suggesting flaws in the quality of maternal and perinatal care (Health Informatics Department – DATASUS. http://tabnet.datasus.gov.br/cgi/idb2011/C03b.htm).

Although several national level studies have been conducted in the last decade to assess antenatal care coverage, including time to hospital admission, number of antenatal check-ups, and performance of obstetrical procedures [2], national level studies to describe practices and procedures used during labor and childbirth have yet to be carried out. Studies regarding the use and frequency of best practices and unnecessary obstetric interventions in Brazil by geographic area that also take into account the socioeconomic status of mothers, parity and type of health care involved (public or private) do not exist.

Although relevant, Brazilian Ministry of Health initiatives such as the development of technical manuals [3], reminders and other educational materials for healthcare professionals have proven insufficient to change the highly interventionist approach to obstetric care in a country which has the world's highest Caesarean section rates [4].

Given the high rate of healthcare coverage provided by the Brazilian Unified National Health System (SUS), the question arises as to whether the persistent negative picture painted by the maternal and perinatal health indicators in Brazil is a result of low quality obstetric care.

The aim of this study is to describe best practices in childbirth care (eating and mobility during labor and childbirth, use of nonpharmacological methods of pain relief and monitoring of labor with the use of a partograph) and obstetric interventions (intravenous catheters, oxytocin drips, amniotomy, epidural, the uterine fundal pressure maneuver, episiotomy and caesarean section) among low-risk women using a representative sample of Brazilian hospitals that perform 500 or more deliveries a year.

Methods

Birth in Brazil is a national hospital-based survey of postnatal women and newborns conducted between February 2011 and October 2012.

Sample design

The study sample was selected in three stages. In the first stage hospitals that performed 500 or more births in 2007 were stratified according to geographical region, location in or outside a state capital, and type of hospital health care (private, public or both). Hospitals were selected with probability proportional to the number of births in each stratum. In the second stage an inverse sampling method was used to select the number of days (minimum of seven) necessary to carry out 90 interviews of postnatal women in each hospital. In the third stage the following eligibility criteria were used to determine the final sample: hospital birth, regardless of birth weight or gestational age; live birth or stillborn weighing more than 500g or gestational age of over 22 weeks.

Sampling weights represented the inverse probability of being included in the sample. A weighting calibration procedure was used for each selection stratum to ensure that estimated totals matched the number of births in the sample population in 2011. The results presented are estimates based on a sample of 23.940 postnatal women derived from the study population (2,337,476).

For each stratum the sample size was calculated based on an estimated caesarean section rate of 46.6% (based on data from the year 2007), a 5% significance level to determine a difference of 14% between type of health care, a statistical power of 95% and design effect of 1.3, resulting in a minimum sample of 450 women per group from a total of 266 hospitals spread over 191 municipalities.

Data collection

In the first phase of the study data was obtained from two sources: interviews conducted with postnatal women during hospitalization within the first 24 hours after birth; mother and newborn medical records consulted after hospital discharge or death. In the case of prolonged postpartum hospital stays, records were analyzed up to the 42nd day of hospitalization for mothers

and up to the 28th day for newborns. In the case of postnatal transfers of mothers and/or newborns, data was obtained from the hospital records of the transfer destination, even when the hospital was not part of the original sample of the study. In the case of refusal or early discharge the participant was replaced by a new subject selected from the same hospital. A digital photograph of antenatal notes was taken when available and the relevant data from the notes was inputted into electronic forms. Follow-up telephone interviews were conducted before six months and at twelve months postpartum to assess maternal and newborn outcomes. All field work was conducted by healthcare professionals or healthcare students under the supervision of the research team. Further information about the sample design and data collection are detailed elsewhere [5,6].

Subjects

Women were defined as low-risk according to the following criteria used by Dahlen et al. [7]: absence of pre-existing or pregnancy-related hypertension or diabetes; body mass index < 30 (above which the person is considered obese); HIV negative; gestational age between 37 and 41 weeks; singleton pregnancy with cephalic presentation; birth weight between 2,500 and 4,499g and between the 5th and 95th centiles of birth weight for gestational age.

The *Birth in Brazil* survey sample (23,894 individuals) represents a total of 2,337,475 postnatal women of which 56.8% were classified as low-risk. All low-risk women were included in the analysis of type of birth. With respect to the analysis of interventions during labor, women who did not go into labor (28.1%) were excluded. With regard to interventions during vaginal birth, those women that had caesarean sections (45.5%) were excluded.

Since the number of eligible postnatal women was lower than in the total sample, it was necessary to perform *post-hoc* sample size calculations. Based on an estimated prevalence rate for interventions during birth of 50% and a significance level of 5%, the smallest sample used in this study (analysis of interventions during vaginal birth, n = 6,740) had a 90% power to detect a difference of at least 3,5%.

The following exposure variables were considered by this study: Geographic Region (North, Northeast, Southeast, South and Central); source payment (public, private); age (< 20; 20 to 34; 35 years or over); years of education (seven or less; eight to 10; 11 to 14; 15 or more); self-rated skin color/race based on the five categories used by the Brazilian Institute of Geography and Statistics (IBGE: white, black, brown, yellow and indigenous); and parity (0; one to two; three or more previous births).

Women who delivered in public health care facilities and women who delivered in mixed health care facilities that were not paid by health insurance plans were classified as "public source of payment". Women whose delivery was paid by health insurance plan, and the delivery occurred in mixed or private hospitals, and women who delivered in private facilities, regardless if the delivery had been paid or not by the health insurance plan, were classified as "private source of payment".

The outcomes evaluated by this study were best practices and interventions during labor and childbirth. The following best practices were analyzed: eating during labor; use of nonpharmacological pain relief; mobility during the first stage of labor; and monitoring progress of labor using a partograph. Another best practice is the presence of a companion during the entire period of hospital stay, which will be the subject of another article in this special issue [8]. The following interventions during labor were considered: the use of a peripheral venous catheter; the use of an oxytocin drip; amniotomy (for women with intact membranes at hospital admission); and spinal/epidural analgesia. The following interventions during childbirth were evaluated: use of the supine (with the legs elevated) or lithotomy positions; use of the uterine fundal pressure maneuver (vaginal births); episiotomy (vaginal births); and caesarean section.

Information about eating during labor, use of nonpharmacological pain relief, mobility during the first stage of labor and interventions such as the use of a peripheral venous catheter, lithotomy and uterine fundal pressure were reported by postnatal women during the interview. Information regarding the use of a partograph, oxytocin drip, amniotomy, spinal/epidural analgesia and type of birth was collected from the patient's medical records.

Statistical analysis

Multiple logistic regression analysis was used to identify the sociodemographic characteristics associated with the outcomes. All of the exposure variables were included in this analysis. These variables were carefully chosen to represent the different sociodemographic factors that may influence the prevalence of these interventions. A significance level of 5% was adopted.

The statistical analysis software package used for this analysis was IBM SPSS, version 19.0 (IBM Corp., Armonk, USA).

This research was carried out in accordance with the National Health Council *Resolution n. 196/96* which provides guidelines and human research standards under the research protocol CEP/ENSP – n. 92/10. All hospital directors and postnatal women signed an informed consent form.

Results

Eating during labor and use of nonpharmacological pain relief occurred in less than 30% of cases, while mobility during labor and monitoring labor progress using a partograph occurred in 45% of cases. A peripheral venous catheter was used in more than 70% of cases, while an oxytocin drip and amniotomy were used in around 40% of cases. Spinal/epidural analgesia was used in around 30% of cases. During childbirth, the supine or lithotomy position, uterine fundal pressure maneuver and episiotomy were used in 92%, 37% and 56% of cases, respectively. Except for eating during labor, the use of best practices in obstetric care was more frequent among low-risk women than in women at risk. This was also found to be the case for the majority of interventions during labor and childbirth (oxytocin drip, amniotomy, uterine fundal pressure and episiotomy). With respect to type of birth, 48.1% were vaginal, 5% vaginal without obstetric interventions during labor and birth (normal birth) and 51.9% were Caesarean deliveries. Caesarean section rates and normal birth rates in low-risk women were 45.5% and 5.6%, respectively (Table 1).

Eating during labor was most frequent in the Southeast Region, while the use of nonpharmacological pain relief and monitoring progress of labor using a partograph was less frequent in the North, Northeast and Central Regions. In contrast, mobility during labor was more frequent among women from the South Region than in women from the Southeast Region. Women without private health insurance who gave birth in public hospitals were more likely to experience the use of good practices. No association was found between the use of best practices and the variables education level and skin color/race. Older women were less likely to experience the use of nonpharmacological pain relief and monitoring of progress of labor using a partograph. The use of all good practices, except the use of a partograph, was more frequent among primiparous women(Table 2 and 3).

After controlling for potential confounders, the use of an oxytocin drip was significantly less frequent in the poorest regions of the country (North, Northeast and Central). For those women without health insurance, the use of a peripheral venous catheter and spinal/epidural analgesia was less frequent, while the use of an oxytocin drip and amniotomy was more frequent. The use of a peripheral venous catheter and spinal/epidural analgesia was less frequent among teenagers. With respect to women with a lower level of education (≤ 7 years), the use of an oxytocin drip (OR = 1.53, 95%CI: 1.03-2.28) and amniotomy (OR = 1.98, 95%CI: 1.38-2.84) was more frequent, while the use of spinal/epidural analgesia (OR = 0.48, 95%CI: 0.32-0.71) was less frequent. The use of all interventions during labor, except amniotomy, was more frequent in primiparous women, while in multiparous women the use of a peripheral catheter and spinal/epidural analgesia was less frequent (Table 4 and 5).

Table 6 and 7 show the frequency of interventions during childbirth according to the different variables. The use of the lithotomy position was more frequent in the Central Region and less frequent in black women. The use of the fundal pressure maneuver was more frequent in the Central Region and in older and primiparous women, while the use of episiotomy was much more frequent in the Central Region and in primiparous women and slightly less frequent among women with low levels of education.

The highest caesarean section rates were found in the Central Region (50.2%). After controlling for potential confounders, older (≥ 35) and primiparous women were more likely to have a caesarean section. Women with no health insurance, teenagers, women in the lowest level of education category, nonwhite individuals (except yellow skin color) and multiparous women were less likely to have a caesarean section (Table 6 and 7).

Discussion

This study used comprehensive criteria to define low-risk women with the goal of excluding any possible risk that could justify the use of interventions during labor and birth.

Prevalence of the use of best practices (eating, mobility during the first stage of labor, use of nonpharmacological pain relief methods and monitoring progress of labor using a partograph) varied. Rates were generally below 50% and were higher among low-risk women. On the other hand, prevalence rates of obstetric interventions during labor and birth were high, particularly for the use of the lithotomy position and venous catheters.

Brazil is known worldwide for its high caesarean section rates. This study confirms this

Table 1

Frequency of best practices and interventions during labor and childbirth in Brazil, 2011.

	Low-risk women (%)	Women at risk (%)	All women (%)	p-value *
For women who went into laborlabor				
Best practices during labor				
Eating during labor	25.6	24.5	25.2	0.408
Mobility during labor	46.3	41.1	44.3	< 0.001
Use of nonpharmacological pain relief	28.0	24.7	26.7	0.012
Monitoring progress of labor using a partograph	44.2	36.9	41.4	< 0.001
Interventions during labor				
Peripheral venous catheter	73.8	76.7	74.9	0.043
Oxytocin drip	38.2	33.3	36.4	0.001
Spinal/epidural analgesia	31.5	37.8	33.9	< 0.001
Amniotomy **	40.7	36.4	39.1	< 0.001
For women who had vaginal births				
Interventions during birth				
Lithotomy	91.7	91.8	91.7	0.946
Uterine fundal pressure	37.3	33.9	36.1	0.017
Episiotomy	56.1	48.6	53.5	< 0.001
For all women				
Caesarian section	45.5	60.3	51.9	< 0.001
Normal births ***	5.6	4.2	5.0	0.845

* p-value of chi-square tests of comparison between low-risk women and women at risk.

** Also excluding women with spontaneous rupture of membranes before hospital admission.

*** Vaginal births without interventions during labor and childbirth.

situation with a rate of 45.5% among low-risk women. Furthermore, the study noted excessive medical interventions during labor and vaginal delivery, with only 5.6% of low-risk women and 3.2% of primiparous low-risk women (data not shown) having normal natural childbirth. In Australia, a country where interventions during labor have also increased in recent decades, 15% of women attending the private health system had a normal birth, compared to 35% of those attending the public health system [7]. In the United Kingdom, normal births accounted for 41.8% of total births in 2011, 97% of which were in public hospitals [9].

It should be noted that all obstetric interventions, except for the use of venous catheters, obstetric analgesia and caesarean section, were more frequent among low-risk women. This demonstrates that these actions are largely unnecessary and fulfill the role of ritualistic repetition of procedures that fail to consider patients needs and scientific evidence.

This approach to labor and childbirth care, with the overuse of obstetric interventions, is not supported by scientific evidence. The use of episiotomy was observed in over 50% of low-risk women and almost 75% of first-time births. This practice has been used routinely since the beginning of the last century, with the intention of avoiding perineal trauma, reducing the risk of subsequent urinary and fecal incontinence, and protecting the newborn from birth trauma. However, episiotomy has become a routine practice in obstetric care without any accompanying research to assess its risks and benefits.

Controlled studies show that episiotomy increases the risk of perineal laceration, third and fourth degree tears, infection and bleeding without reducing the long-term complications of pain, urinary and fecal incontinence [10]. For these

Table 2

Frequency of good practices during labor in low-risk women according to sociodemographic characteristics in Brazil, 2011.

	Eating during labor (%)	Mobility during labor (%)	Use of nonpharmacological pain relief (%)	Monitoring progress of labor using a partograph (%)
Region				
North	18.4	54.2	17.7	20.7
Northeast	16.6	39.1	19.1	30.4
Southeast	35.7	47.0	37.5	59.4
South	22.0	56.3	30.5	51.1
Central	18.4	45.1	17.6	32.0
Source of payment				
Public	27.2	48.1	29.3	46.1
Private	10.4	29.1	15.3	25.7
Age [years]				
10-19	27.3	49.3	31.7	48.1
20-34	25.7	45.9	27.7	43.6
≥ 35	18.9	38.9	16.5	35.4
Years of education				
≤ 7	21.4	43.2	22.8	41.4
8-10	26.5	48.1	30.1	48.6
11-14	29.4	48.4	31.7	45.1
≥ 15	17.9	37.8	18.0	27.4
Skin color/Race				
White	29.7	48.5	31.5	47.5
Black	26.0	46.0	27.5	45.7
Brown	23.7	45.6	26.3	42.3
Yellow	26.0	37.4	30.2	40.4
Indigenous	17.5	38.7	23.2	56.3
Number of previous births				
0	28.9	48.3	32.9	44.5
1-2	23.2	44.2	24.6	45.4
≥ 3	19.9	45.3	18.4	37.8
Brazil	**25.6**	**46.3**	**28.0**	**44.2**

reasons, clinical guidelines discourage the routine use of episiotomy [11].

Episiotomy rates recommended by the World Health Organization (WHO) are between 10 and 30% [1]. In Canada episiotomy rates decreased from 38% to 24% between 1993 and 2001[12] and in Finland rates decreased from 42% in 1997 to 25% in 2009 [10].In France, between 2003 and 2010, episiotomy rates declined in primiparous women and multiparous women from 71% to 44% and 36% to 14%, respectively [13], while in 2012 in the United States the vaginal delivery rate was 17% [14].

Despite the benefits of the vertical position for the mother and fetus, the lithotomy position was used in 90% of low-risk women[15].

Our study shows that the use of an oxytocin drip and artificial rupture of the amniotic membrane is widely used to speed up labor. Both interventions were used in approximately 40% of low-risk women, and were more common in women who had source of payment and lower

Table 3

Crude and adjusted * ORs for the sociodemographic determinants of good practices during labor in low-risk women. Brazil, 2011.

	Eating during labor			Mobility during labor			Use of nonpharmacological pain relief			Monitoring progress of labor using a partograph		
	Crude OR	Adjusted OR	95% CI	Crude OR	Adjusted OR	95% CI	Crude OR	Adjusted OR	95% CI	Crude OR	Adjusted OR	95% CI
Region (ref: Southeast)												
North	0.40	0.39	0.23-0.66	1.33	1.30	0.81-2.10	0.36	0.34	0.18-0.67	0.18	0.13	0.06-0.29
Northeast	0.36	0.36	0.24-0.54	0.72	0.74	0.53-1.03	0.39	0.40	0.27-0.58	0.30	0.27	0.16-0.43
South	0.51	0.48	0.30-0.78	1.45	1.44	1.03-2.03	0.73	0.73	0.49-1.10	0.71	0.75	0.46-1.23
Central	0.40	0.38	0.22-0.68	0.93	0.95	0.63-1.44	0.35	0.34	0.20-0.59	0.32	0.24	0.13-0.45
Source of payment (ref: private)												
Public	3.23	4.52	3.04-6.71	2.26	2.48	1.65-3.73	2,29	2.75	1.97-3.86	2.48	3.12	1.91-5.09
Age [years] (ref: 20-34)												
10-19	1.09	1.01	0.85-1.21	1.14	1.10	0.92-1.31	1.21	1.06	0.84-1.33	1.20	1.28	1.08-1.53
≥ 35	0.68	0.83	0.58-1.18	0.75	0.83	0.66-1.04	0.52	0.64	0.43-0.96	0.71	0.75	0.58-0.97
Years of education (ref: ≥ 15)												
≤ 7	1.25	0.84	0.56-1.26	1.25	0.78	0.57-1.08	1.35	1.08	0.76-1.52	1.87	1.36	0.91-2.03
8-10	1.65	0.92	0.63-1.34	1.52	0.91	0.67-1.23	1.96	1.27	0.93-1.72	2.51	1.47	1.01-2.14
11-14	1.91	1.06	0.71-1.57	1.54	1.02	0.74-1.42	2.11	1.36	1.02-1.81	2.18	1.35	0.95-1.90
Skin color/Race (ref: white)												
Black	0.83	0.79	0.59-1.05	0.90	0.92	0.75-1.14	0.83	0.85	0.64-1.14	0.93	0.96	0.71-1.31
Brown	0.73	0.76	0.58-1.00	0.89	0.91	0.79-1.06	0.78	0.89	0.73-1.08	0.81	1.01	0.83-1.24
Yellow	0.83	0.94	0.54-1.62	0.63	0.65	0.42-1.03	0.94	1.16	0.68-1.98	0.75	1.05	0.56-1.99
Indigenous	0.50	0.53	0.19-1.43	0.67	0.68	0.32-1.47	0.66	0.80	0.25-2.58	1.43	1.92	0.89-4.15
Previous births (ref: 1-2)												
0	1.35	1.36	1.16-1.58	1.18	1.14	1.02-1.29	1.50	1.49	1.1-2.00	0.96	0.89	0.75-1.06
≥ 3	0.82	0.97	0.74-1.27	1.05	1.13	0.94-1.36	0.69	0.84	0.66-1.08	0.73	0.89	0.68-1.17

* Adjusted for all variables plus location (in or outside capital city).

95%CI: 95% confidence interval; OR: odds ratio.

levels of education. The rate of use of the uterine fundal pressure maneuver in vaginal deliveries was also relatively high (37%). The use of an oxytocin drip and amniotomy are part of the concept of "active management of labor" to reduce the duration of labor and the rate of surgical delivery [16,17,18]. The Cochrane Systematic Reviews highlight a modest reduction in the number of Cesarean sections when the "active management" approach is adopted. However, the benefits of this small reduction must be balanced against the risks of interventions in low-risk women and this issue requires further research [19,20,21]. There is no evidence of the benefits of the routine use of the uterine fundal pressure maneuver [22] and strong recommendations exist to avoid its routine use.

A key issue raised by the literature is the relationship between epidural analgesia and childbirth interventions. There is strong evidence that epidurals are associated with an increased risk of

Tabel 4

Frequency of interventions during labor in low-risk women according to sociodemographic characteristics. Brazil, 2011.

	Peripheral venous catheter (%)	Oxytocin drip (%)	Spinal/epidural analgesia (%)	Amniotomy (%) *
Region				
North	72.1	22.8	28.8	40.4
Northeast	71.5	30.9	26.8	35.8
Southeast	76.0	47.2	34.9	43.4
South	72.9	46.1	28.7	47.9
Central	73.7	23.7	39.3	32.0
Source of payment				
Public	72.8	39.5	27.1	42.4
Private	83.2	25.8	73.7	27.1
Age [years]				
10-19	73.0	41.4	27.3	46.5
20-34	74.0	37.4	32.2	39.2
≥ 35	74.8	34.5	39.7	34.3
Years of education				
≤ 7	70.4	37.0	21.5	46.1
8-10	73.0	41.9	28.2	41.8
11-14	76.6	37.9	37.8	37.9
≥ 15	79.5	24.7	67.5	24.0
Skin color/Race				
White	74.8	41.5	37.3	37.8
Black	71.8	37.6	27.0	40.5
Brown	73.8	37.1	29.2	42.1
Yellow	74.5	24.8	39.8	41.4
Indigenous	54.3	31.7	26.6	57.4
Previous births				
0	78.1	40.0	37.8	41.5
1-2	70.9	37.0	28.0	40.0
≥ 3	65.0	34.7	15.3	40.0
Brazil	**73.8**	**38.2**	**31.5**	**40.7**

* Also excluding women with spontaneous rupture of membranes before hospital admission.

instrumental vaginal birth [23]. Although a recent Cochrane Systematic Review comparing epidurals with other analgesia techniques found no evidence of a statistical difference in the risks of caesarean section, it has been suggested that the rate of cross over in trials masks the relationship between epidurals and Caesarean sections [24]. A paper by Kotaska et al [25] and an editorial by Klein [26] also argue that the review lacks external validity and that there is sufficient evidence to suggest that epidural analgesia associated with low-dose oxytocin augmentation leads to an increase in caesarean births. The only uncontaminated randomized controlled trial to demonstrate an association between epidurals and caesarean sections was published 16 years ago [27]. This small trial showed that women giving birth for the first time who were randomly assigned to receive an epidural were 11.4 times more likely to have a caesarean due to dystocia than women who were randomly assigned to receive narcotic analgesics. The trial was discontinued on the grounds that it

Table 5

Crude and adjusted * ORs for the sociodemographic determinants of interventions during labor in low-risk women. Brazil, 2011.

	Peripheral venous catheter			Oxytocin drip			Spinal/epidural analgesia			Amniotomy **		
	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI
Region (ref: Southeast)												
North	0.82	0.94	0.57-1.57	0.33	0.30	0.20-0.45	0.75	1.09	0.68-1.75	0.88	0.74	0.47-1.17
Northeast	0.79	0.82	0.55-1.21	0.50	0.49	0.33-0.71	0.68	0.75	0.52-1.09	0.73	0.64	0.48-0.86
South	0.85	0.87	0.58-1.29	0.96	0.95	0.71-1.28	0.75	0.76	0.51-1.12	1.20	1.24	0.95-1.61
Central	0.88	0.94	0.57-1.54	0.35	0.33	0.22-0.48	1.21	1.23	0.68-2.21	0.61	0.61	0.42-0.88
Source of payment (ref: private)												
Public	0.54	0.59	0.41-0.83	1.88	1.94	1.26-2.99	0.13	0.19	0.11-0.32	1.98	1.60	1.03-2.49
Age [years] (ref: 20-34)												
10-19	0.95	0.77	0.64-0.93	1.18	1.08	0.93-1.25	0.79	0.73	0.61-0.88	1.35	1.19	0.95-1.49
≥ 35	1.05	1.21	0.94-1.57	0.88	0.99	0.77-1.26	1.38	1.56	1.21-2.02	0.81	0.91	0.70-1.17
Years of education (ref: ≥ 15 years)												
≤ 7	0.61	1.08	0.76-1.53	1.79	1.53	1.03-2.28	0.13	0.48	0.32-0.71	2.71	1.98	1.38-2.84
8-10	0.70	1.08	0.76-1.53	2.20	1.65	1.08-2.52	0.19	0.54	0.36-0.8	2.28	1.53	1.11-2.12
11-14	0.84	1.11	0.75-1.64	1.86	1.38	1.00-1.91	0.29	0.62	0.44-0.88	1.93	1.42	1.01-2.01
Skin color/Race (ref: White)												
Black	0.86	0.95	0.71-1.26	0.85	0.86	0.70-1.06	0.62	0.85	0.65-1.12	1.12	1.07	0.86-1.33
Brown	0.95	1.05	0.81-1.35	0.83	0.96	0.81-1.12	0.69	0.87	0.7-1.09	1.20	1.26	1.07-1.47
Yellow	0.99	1.04	0.61-1.78	0.46	0.56	0.35-0.91	1.11	1.25	0.75-2.09	1.16	1.31	0.78-2.17
Indigenous	0.40	0.47	0.22-1.00	0.65	0.75	0.36-1.53	0.61	0.80	0.28-2.29	2.22	2.20	1.12-4.33
Number of previous births (ref: 1 to 2)												
0	1.46	1.63	1.38-1.93	1.13	1.16	1.00-1.33	1.56	1.77	1.5-2.08	1.07	1.07	0.90-1.27
≥ 3	0.76	0.76	0.62-0.93	0.90	1.00	0.83-1.20	0.46	0.55	0.4-0.73	1.00	0.92	0.76-1.12

* Adjusted for all exposure variables plus hospital location (in or outside capital city);

** Also excluding women with spontaneous rupture of membranes before hospital admission;

95%CI: 95% confidence interval; OR: odds ratio.

was unethical to randomly assign women to have an epidural. Epidurals are also associated with an increased rate of induction or augmentation of labor [28] and the use of antibiotics for maternal fever [29].

Current WHO and Brazilian Ministry of Health recommendations regarding labor management include the provision of isotonic beverages, the adoption of the vertical position and freedom of movement and the use of nonpharmacological methods to relieve pain, such as massage, shower or immersion in warm water to increase maternal comfort and ease labor. These techniques are affordable, noninvasive and inexpensive, and can be provided by both public and private healthcare services [1,30,31].

Systematic reviews indicate the benefits of adopting the best practices during labor and childbirth evaluated by this study. The adoption of an upright position and freedom of movement during labor reduces the duration of labor and does not seem to be associated with increased

Table 6

Frequency of interventions during birth in low risk women according to sociodemographic characteristics. Brazil, 2011.

	Lithotomy (%)	Uterine fundal pressure (%)	Episiotomy (%)	Caesarean section (%)
Region				
North	90.3	33.9	48.6	43.3
Northeast	89.2	40.6	52.5	44.8
Southeast	92.0	36.1	56.7	44.7
South	95.3	32.3	62.9	49.1
Central	97.3	45.5	69.2	50.2
Source of payment				
Public	92.0	37.3	55.5	35.6
Private	86.7	37.9	67.1	85.0
Age [years]				
10-19	91.6	43.5	69.5	31.7
20-34	91.7	35.2	52.3	47.6
≥ 35	91.8	34.4	40.0	63.2
Years of education				
≤ 7	91.1	36.4	47.4	30.3
8-10	92.3	37.1	57.7	36.7
11-14	92.0	38.3	61.9	52.8
≥ 15	92.2	40.0	74.1	83.0
Skin color/Race				
White	93.4	34.0	60.7	55.1
Black	87.7	38.4	52.1	34.3
Brown	91.5	38.5	54.8	41.6
Yellow	90.7	44.1	55.7	46.8
Indigenous	97.6	38.3	45.8	24.1
Previous births				
0	91.6	49.6	74.6	49.2
1-2	92.2	28.4	46.7	44.8
≥ 3	89.9	22.4	18.8	28.5
Brazil	**91.7**	**37.3**	**56.1**	**45.5**

interventions or negative effects on the well-being of mothers and babies [32,33]. Also there is no evidence to support the restriction of fluids and food during labor for low-risk women [34]. Non-pharmacological methods for pain relief are non-invasive and appear to be safe for the mother and the baby. Available evidence does not support the routine use of a partograph as a strategy to reduce caesareans and adverse outcomes, and its use should be defined locally. Studies conducted in less developed countries showed that lower caesarean section rates are associated with the use of a partograph and early identification of slow labor progress [35].

Prevalence of best childbirth practices was lower in the less developed North and Northeast Regions of the country. Although the rate of other interventions was also lower in these regions, this data does not necessarily reflect the adoption of a less interventionist and more "natural" approach to care. This situation is more likely to represent the neglect of pregnant women rather than a humanized care model, since these regions present the lowest rates of best practices and

Table 7

Crude and adjusted * ORs (95%CI) for the sociodemographic determinants of interventions during childbirth in low-risk women. Brazil, 2011.

	Lithotomy			Uterine fundal pressure			Episiotomy			Caesarean section		
	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI	Crude OR	Adjusted OR	95%CI
Region (ref: Southeast)												
North	0.81	0.86	0.17-4.30	0.91	1.04	0.67-1.59	0.72	0.97	0.58-1.61	0.94	1.69	1.14-2.51
Northeast	0.72	0.72	0.37-1.39	1.21	1.15	0.88-1.51	0.84	0.88	0.54-1.44	1.00	1.24	0.95-1.62
South	1.76	1.49	0.86-2.58	0.85	0.81	0.59-1.11	1.30	1.27	0.75-2.15	1.19	1.07	0.80-1.43
Central	3.12	3.45	1.60-7.43	1.48	1.83	1.21-2.75	1.72	2.43	1.35-4.36	1.25	1.56	1.10-2.21
Source of payment (ref: private)												
Public	1.76	2.10	0.63-7.00	0.97	0.90	0.54-1.49	0.61	0.75	0.49-1.15	0.10	0.14	0.10-0.20
Age [years] (ref: 20 to 34)												
10-19	0.98	0.90	0.66-1.25	1.42	0.78	0.64-0.96	2.08	1.10	0.86-1.39	0.51	0.63	0.55-0.72
≥ 35	1.01	1.06	0.71-1.59	0.97	1.43	1.08-1.89	0.61	1.03	0.75-1.41	1.89	1.63	1.32-2.00
Years of education (ref: ≥15)												
≤ 7	0.86	0.74	0.31-1.75	0.86	1.17	0.77-1.77	0.31	0.48	0.3-0.77	0.09	0.40	0.30-0.53
8-10	1.01	0.80	0.34-1.87	0.89	1.04	0.67-1.61	0.48	0.52	0.33-0.81	0.12	0.46	0.35-0.61
11-14	0.96	0.77	0.38-1.56	0.93	0.92	0.59-1.44	0.57	0.55	0.33-0.92	0.23	0.58	0.46-0.73
Skin color/Race (ref: White)												
Black	0.50	0.57	0.35-0.92	1.21	1.17	0.87-1.56	0.70	0.77	0.57-1.03	0.43	0.72	0.58-0.89
Brown	0.76	0.82	0.52-1.29	1.22	1.18	0.94-1.47	0.78	0.87	0.67-1.14	0.58	0.82	0.70-0.95
Yellow	0.69	0.69	0.23-2.10	1.53	1.43	0.76-2.68	0.81	0.76	0.39-1.46	0.72	0.87	0.53-1.43
Indigenous	2.84	3.70	0.63-21.78	1.20	1.37	0.59-3.18	0.55	0.68	0.24-1.92	0.26	0.35	0.18-0.69
Number of previous births (ref: 1 to 2)												
0	0.92	1.04	0.82-1.32	2.48	2.97	2.49-3.54	3.35	3.54	2.80-4.49	1.19	1.29	1.16-1.44
≥ 3	0.75	0.72	0.47-1.12	0.73	0.58	0.46-0.72	0.26	0.27	0.21-0.35	0.49	0.65	0.54-0.78

* Adjusted for all variables plus hospital location (in or outside capital city);

** Health insurance or payment for birth.

95%CI: 95% confidence interval.

obstetric and perinatal indicators are the worst in the country.

The highest rates of best practice and lowest rate of use of venous access was observed in women attending the public health system. These results are probably due to Brazilian Ministry of Health efforts to promote a humane approach to childbirth through the dissemination of best practices manuals, ordinances and public policies and skills training for healthcare professionals [3,36]. As the instrument used did not allow the identification of women who gave birth paid by direct disbursement, it is possible that some women had their delivery assisted in mixed health care facilities and were classified as having public source of payment, having paid for their delivery care. However, as these women had very similar socioeconomic characteristics of women attending public hospitals, it is likely that misclassification occurred in a few cases. As it is a non-differential misclassification with respect to the outcomes studied, it is expected that there has been attenuation of the magnitude of the observed associations.

Moreover, the persistent use of practices that exacerbate pain and unnecessary interventions such oxytocin drips, amniotomy, episiotomy and the uterine fundal pressure maneuver, demonstrate that improvements in the quality of care are needed. The use of oxytocin drips during labor was also more common among SUS users and women with lower levels of education. These same groups experienced lower rates of use of obstetric analgesia, exacerbating pain during childbirth and consequently inducing fear and anxiety about vaginal delivery and increasing the prestige of the Caesarean section among Brazilian women.

A satisfaction study regarding labor and birth among women who participated in the *Birth in Brazil* survey [37] found lower levels of satisfaction and higher levels of violence among women who went through labor. There was significant association between the professional relationship between health professionals and pregnant women, showing that women highly value how they are treated. Patient neglect in the SUS has been widely reported in the lay press and even the Ministry of Health's ombudsman found that 12.7% of women claim poorly quality of care, going unheard, mistreatment and even suffering verbal and physical abuse [38]. The data presented in this study demonstrates that changing care practices alone is not enough if not accompanied by changes in the relationship between healthcare professionals and users.

The study also shows that the use of best practices and obstetric interventions was more frequent in primiparous women, who usually have a longer duration of labor. It was also found that primiparous women were more likely to be admitted to hospital in the early stages of labor (dilated to three or less centimeters) (data not shown), meaning that they become more exposed to hospital routines such as episiotomy, caesarean section and uterine fundal pressure that may lead to scarring and loss of tissue integrity.

Women with higher levels of education gave birth in private hospitals. While they were more likely to undergo a caesarean section, use epidural and be subjected to episiotomies, they were less exposed to the use of oxytocin.

The analysis of the variables according to skin cooler/race showed no set pattern. In general, indigenous women showed similar results to white women and yellow and brown skin color/race showed similar results to black color. A possible explanation for these results may be the subjectivity of the classification technique which was self-reported.

Best practices were most commonly used in low-risk women. Surprisingly, obstetric interventions were also more common, with the exception of venous catheters and epidural analgesia. With regard to the prevalence of the interventions studied, the caesarean section showed the biggest difference in rates between the risk groups and the rate was particularly high in the low-risk group.

It is well known that Brazil's caesarean section rate is the highest in the world, close to that of China (46.2%), Turkey (42.7%), Mexico (42%), Italy (38.4%) and the United States (32.3%), and much higher than that of England (23.7%), France (20%) and Finland (15.7%) [40].

Caesarean section rates were much lower in public hospitals, and among non-white women with lower levels of education, repeating a familiar pattern of inequality in Brazil [41,42] and in other countries [7,43] and showing that excessive rates of caesareans mainly affect Brazilian women with higher levels of education, affecting 89.9% of low-risk women that use the private health system.

The negative effects of caesarean section for the mother and newborn are known. A multicenter study of hospitals in eight Latin American countries [44] that evaluated the risks and benefits of the caesarean section compared to vaginal birth with cephalic presentation concluded that the caesarean section increased the risk of severe morbidity and maternal and neonatal mortality.

Similar results were found by Souza et al. [45] in a study carried out in 2010 that included countries in Latin America, Africa and Asia, leading the authors to conclude that the caesarean section should be performed when there is an indication that the benefits outweigh the risks of this surgery.

Hansen et al. [46] studied a cohort of high and low-risk women attending Aarhus University Hospital in Denmark and found that babies born by elective caesarean section had a higher risk of mild and severe respiratory morbidity, that increased with decreasing gestational age, than those born vaginally, suggesting that labor fulfils an important role in the maturation of the child's lung [46].

The caesarean section is also a well recognized risk factor for the subsequent development of abnormal placentation [47]. An analysis of the University of Chicago's database showed that an increase caesarean section rates was one of the factors associated with a five-fold increase in the rate of placenta previa [48].

Caesarean section rates were highest in the Center West Region and lowest in the North. However, after logistic regression, the North Region was shown to have the highest odds ratio showing that the likelihood of a pregnancy resulting in a caesarean section was greater in this

region. This is due to the low coverage of private health plans in the North Region and higher caesarean section rates in both public and private hospitals in the region (the caesarean section rate was two and half times higher in private hospitals than in public hospitals).

Controlling for intervening variables surprisingly showed that the likelihood of having a Caesarean section was lower in the Southeast, despite being the richest region in the country and comprising the highest proportion of women with private source of payment. Best practices were also more prevalent in this region where the natural childbirth movement is stronger and more women and healthcare professionals are in favor of the humanization of childbirth care and this finding may therefore reflect the beginnings of a reversal of the interventionist approach.

One of the most striking aspects of obstetric practices in Brazil is the tendency to attempt to speed up delivery in total disrespect of the autonomy of laboring women. Obstetric care ends up being centered on doctor's decisions and not the dynamics of the female body and attempts to control the timing and duration of childbirth explains the excessive use of interventions, including caesarean sections. This process begins during antenatal care when women are not informed about best practices, the benefits of normal birth and appropriate obstetric care. This process continues at chilbirth with the imposition of a cascade of interventions that are not based on scientific evidence and result in negative experiences of childbirth.

Given the size and cultural diversity of Brazil, the interpretation of medical data is a complex process. However, the significant differences in caesarean rates between geographic regions may suggest varying approaches to labor and childbirth across the country. The cross-sectional nature of this study does not allow temporal trend analysis.

It may be concluded that low-risk Brazilian women are unnecessarily exposed to the risks of iatrogenic adverse effects during childbirth, regardless of their socioeconomic status. A number of unnecessary interventions were performed, particularly in women from the more affluent social groups, who may be more prone to the effects of the inappropriate use of medical techniques.

Socially disadvantaged women are more likely to suffer from the use of painful procedures such as speeding up labor with the use of an oxytocin drip and low uptake of obstetric analgesia. However, these groups had greater access to best practices in labor and childbirth care. Empowering women and promoting the use of evidence-based care are strategies to promote the humanization of childbirth care, and reduce inequality between the rich and the poor.

Finally, there is an urgent need to move towards a humanized approach to obstetric care that promotes evidence based practices to improve the health and quality of life of mothers and newborns.

Resumen

Se evaluó el uso de buenas prácticas (alimentación, métodos no farmacológicos para el alivio del dolor, caminar y el uso del partograma), además de las intervenciones obstétricas durante el parto, en mujeres con un riesgo obstétrico habitual. Los datos provienen del estudio Nacer en Brasil*, una cohorte de base hospitalaria realizada en 2011-2012, con entrevistas a 23.894 mujeres. Las buenas prácticas durante el parto se produjeron en menos de un 50% y fueron menos frecuentes en el Norte, Nordeste y Centro-Oeste. El uso de oxitocina y amniotomía fue del 40%, principalmente, en el sector público y en las mujeres de menor nivel educativo. La presión fúndica uterina, episiotomía y litotomía fueron utilizados en: un 37%, 56% y 92% respectivamente. La cesárea fue menos frecuente en mujeres que son usuarias del sector público, no blancas, con menor nivel educativo y multíparas. Para mejorar la salud de las madres y los niños, y con el fin de promover la calidad de vida, el SUS, y sobre todo el sector privado, necesitará cambiar el modelo de atención obstétrica mediante la adopción de evidencias científicas.*

Práctica de Salud Pública; Salud Materno-Infantil; Trabajo de Parto; Parto

Contributors

M. C. Leal was responsible for study conception, design and coordination, data analysis and drafting and revision of this manuscript. A. P. E. Pereira contributed to data analysis and drafting and revision of this manuscript. R. M. S. M. Domingues, M. M. Theme Filha, M. A. B. Dias, M. Nakamura-Pereira M. H. Bastos and S. G. N. Gama contributed to drafting and revision of the paper and approved the final manuscript.

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References

1. World Health Organization, Maternal and Newborn Health/Safe Motherhood Unit. Care in normal birth: a practical guide. Geneva: World Health Organization; 1996.
2. Victora CG, Aquino EM, do Carmo Leal M, Monteiro CA, Barros FC, Szwarcwald CL. Maternal and child health in Brazil: progress and challenges. Lancet 2011; 377:1863-76.
3. Ministério da Saúde. Manual técnico pré-natal e puerpério – atenção qualificada e humanizada. Brasília: Ministério da Saúde; 2006. (Série A Normas e Manuais Técnicos/Série Direitos Sexuais e Direitos Reprodutivos, 5).
4. Barros FC, Victora CG, Barros AJ, Santos IS, Albernaz E, Matijasevich A, et al. The challenge of reducing neonatal mortality in middle-income countries: findings from three Brazilian birth cohorts in 1982, 1993, and 2004. Lancet 2005; 365:847-54.
5. do Carmo Leal M, da Silva AA, Dias MA, da Gama SG, Rattner D, Moreira ME, et al. Birth in Brazil: national survey into labour and birth. Reprod Health 2012; 9:15.
6. Vasconcellos MTL, Silva PLN, Pereira APE, Schilithz AOC, Souza Junior PRB, Szwarcwald CL. Desenho da amostra *Nascer no Brasil*: Pesquisa Nacional sobre Parto e Nascimento. Cad Saúde Pública 2014; 30 Suppl:S49-58.

7. Dahlen HG, Tracy S, Tracy M, Bisits A, Brown C, Thornton C. Rates of obstetric intervention among low-risk women giving birth in private and public hospitals in NSW: a population-based descriptive study. BMJ Open 2012; 2(5). pii: e001723.
8. Diniz CSG, d'Orsi E, Domingues RMSM, Torres JA, Schneck C, Dias MAB, et al. Implementação da presença de acompanhantes durante a internação para o parto: dados da pesquisa nacional *Nascer no Brasil*. Cad Saúde Pública 2014; 30 Suppl:S140-53.
9. Health & Social Care Information Centere. NHS Maternity Statistics, England, 2011-2012: summary report. London: Health & Social Care Information Centre; 2012.
10. Raisanen S, Vehvilainen-Julkunen K, Gisler M, Heinonen S. A population-based register study to determine indications for episiotomy in Finland. Int J Gynaecol Obstet 2011; 115:26-30.
11. Carroli G, Mignini L. Episiotomy for vaginal birth. Cochrane Database Syst Rev 2009; (1):CD000081.
12. Graham ID, Carroli G, Davies C, Medves JM. Episiotomy rates around the world: an update. Birth 2005; 32:219-23.
13. Blondel B, Lelong N, Kermarrec M, Goffinet F. Trends in perinatal health in France from 1995 to 2010. Results from the French National Perinatal Surveys. J Gynecol Obstet Biol Reprod 2012; 41:e1-e15.
14. Declercq ER, Sakala C, Corry MP, Applebaum S, Herrlich A. Listening to mothers III: pregnancy and childbirth. New York: Childbirth Connection; 2013.
15. Priddis H, Dahlen H, Schmied V. What are the facilitators, inhibitors, and implications of birth positioning? A review of the literature. Women Birth 2012; 25:100-6.
16. Schmitz T, Meunier E. Mesures à prendre pendant le travail pour réduire le nombre d'extractions instrumentales. J Gynecol Obstet Biol Reprod (Paris) 2008; 37 Suppl 8:S179-87.
17. Api O, Balcin ME, Ugurel V, Api M, Turan C, Unal O. The effect of uterine fundal pressure on the duration of the second stage of labor: a randomized controlled trial. Acta Obstet Gynecol Scand 2009; 88:320-4.
18. Matsuo K, Shiki Y, Yamasaki M, Shimoya K. Use of uterine fundal pressure maneuver at vaginal delivery and risk of severe perineal laceration. Arch Gynecol Obstet 2009; 280:781-6.
19. Wei S, Wo BL, Qi HP, Xu H, Luo ZC, Roy C, et al. Early amniotomy and early oxytocin for prevention of, or therapy for, delay in first stage spontaneous labour compared with routine care. Cochrane Database Syst Rev 2012; 9:CD006794.
20. Fraser WD, Turcot L, Krauss I, Brisson-Carrol G. WITHDRAWN: Amniotomy for shortening spontaneous labour. Cochrane Database Syst Rev 2006; (3):CD000015.
21. Brown HC, Paranjothy S, Dowswell T, Thomas J. Package of care for active management in labour for reducing caesarean section rates in low-risk women. Cochrane Database Syst Rev 2008; (4):CD004907.
22. Verheijen EC, Raven JH, Hofmeyr GJ. Fundal pressure during the second stage of labour. Cochrane Database Syst Rev 2009; (4):CD006067.
23. Anim-Somuah M, Smyth R, Howell C. Epidural versus non-epidural or no analgesia in labour. Cochrane Database Syst Rev 2005; (4):CD000331.
24. Lieberman E. Epidemiology of epidural analgesia and cesarean delivery. Clin Obstet Gynecol 2004; 47:317-31.
25. Kotaska AJ, Klein MC, Liston RM. Epidural analgesia associated with low-dose oxytocin augmentation increases cesarean births: a critical look at the external validity of randomized trials. Am J Obstet Gynecol 2006; 194:809-14.
26. Klein MC. Does epidural analgesia increase rate of cesarean section? Can Fam Physician 2006; 52: 419-21.
27. Thorp JA, Hu DH, Albin RM, McNitt J, Meyer BA, Cohen GR, et al. The effect of intrapartum epidural analgesia on nulliparous labor: a randomized, controlled, prospective trial. Am J Obstet Gynecol 1993; 169:851-8.
28. Mayberry LJ, Strange LB, Suplee PD, Gennaro S. Use of upright positioning with epidural analgesia: findings from an observational study. MCN Am J Matern Child Nurs 2003; 28:152-9.
29. Goetzl L, Cohen A, Frigoletto Jr. F, Lang JM, Lieberman E. Maternal epidural analgesia and rates of maternal antibiotic treatment in a low-risk nulliparous population. J Perinatol 2003; 23:457-61.
30. Secretaria de Políticas de Saúde, Ministério da Saúde. Parto, aborto e puerpério: assistência humanizada à mulher. Brasília: Ministério da Saúde; 2001.
31. Ministério de Sanidad y política Social de España. Guía de práctica clínica sobre la atención al parto normal. Madri: Ministerio de Sanidad y Política Social de España; 2010.
32. Gupta JK, Hofmeyr GJ, Shehmar M. Position in the second stage of labour for women without epidural anaesthesia. Cochrane Database Syst Rev 2012; 5:CD002006.
33. Lawrence A, Lewis L, Hofmeyr GJ, Dowswell T, Styles C. Maternal positions and mobility during first stage labour. Cochrane Database Syst Rev 2009; (2):CD003934.
34. Singata M, Tranmer J, Gyte GM. Restricting oral fluid and food intake during labour. Cochrane Database Syst Rev 2010; (1):CD003930.
35. Lavender T, Hart A, Smyth RM. Effect of partogram use on outcomes for women in spontaneous labour at term. Cochrane Database Syst Rev 2012; 8:CD005461.

36. Brasil. Portaria nº 1.459/GM/MS de 24 de junho de 2011, que instituiu, no âmbito do SUS, a Rede Cegonha. Diário Oficial da União 2011; 27 jun.
37. d'Orsi E, Brüggemann OM, Diniz CSG, Aguiar JM, Gusman CR, Torres JA, et al. Desigualdades sociais e satisfação das mulheres com o atendimento ao parto no Brasil: estudo nacional de pase hospitalar. Cad Saúde Pública 2014; 30 Suppl:S154-68.
38. Secretaria de Gestão Estratégica e Participativa, Ministério da Saúde. Resultados preliminares da pesquisa de satisfação com mulheres puérperas atendidas no Sistema Único de Saúde – SUS entre maio de 2012 a Fevereiro de 2013. Brasília: Ministério da Saúde; 2013.
39. Behague DP, Victora CG, Barros FC. Consumer demand for caesarean sections in Brazil: informed decision making, patient choice, or social inequality? A population based birth cohort study linking ethnographic and epidemiological methods. BMJ 2002; 324:942-5.
40. Organisation for Economic Co-operation and Development. Health at a glance 2011. Paris OECD Publishing; 2011.
41. Domingues RMSM, Dias MAB, Nakamura-Pereira M, Torres JA, d'Orsi E, Pereira APE, et al. Processo de decisão pelo tipo de parto no Brasil: da preferência inicial das mulheres à via de parto final. Cad Saúde Pública 2014; 30 Suppl:S101-16.
42. Barros AJ, Santos IS, Matijasevich A, Domingues MR, Silveira M, Barros FC, et al. Patterns of deliveries in a Brazilian birth cohort: almost universal cesarean sections for the better-off. Rev Saúde Pública 2011; 45:635-43.
43. Barbadoro P, Chiatti C, D' Errico MM, Di Stanislao F, Prospero E. Caesarean delivery in South Italy: women without choice. A cross sectional survey. PLoS One 2012; 7:e43906.
44. Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, et al. Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. BMJ 2007; 335:1025.
45. Souza JP, Gulmezoglu A, Lumbiganon P, Laopaiboon M, Carroli G, Fawole B, et al. Caesarean section without medical indications is associated with an increased risk of adverse short-term maternal outcomes: the 2004-2008 WHO Global Survey on Maternal and Perinatal Health. BMC Med 2010; 8:71.
46. Hansen AK, Wisborg K, Uldbjerg N, Henriksen TB. Risk of respiratory morbidity in term infants delivered by elective caesarean section: cohort study. BMJ 2008; 336:85-7.
47. Lee YM, D'Alton ME. Cesarean delivery on maternal request: the impact on mother and newborn. Clin Perinatol 2008; 35:505-18.
48. Wu S, Kocherginsky M, Hibbard JU. Abnormal placentation: twenty-year analysis. Am J Obstet Gynecol 2005; 192:1458-61.

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