

## Epidemiological profile of pregnancies between 32 and 36 weeks in a public hospital in São Paulo, Brazil

Perfil epidemiológico de gestações entre 32 e 36 semanas em um hospital público de São Paulo, Brasil

Perfil epidemiológico de embarazos entre 32 y 36 semanas en un hospital público de São Paulo, Brasil

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### ABSTRACT

**Objective:** This study aimed to identify the epidemiological profile and obstetric characteristics of pregnant women between 32 and 36 weeks admitted to a public hospital in São Paulo, Brazil, between January and July, 2022. **Methods:** During the period studied, 1914 births were recorded at the institution, 163 of which were between 32 and 36 weeks, and the prematurity rate was 8.5%. This is retrospective cross-sectional study, with information obtained through the analysis of patients' medical records. **Results:** As for the epidemiological data, 67% of them were primigravidae, 56% underwent a cesarean delivery, and 57% had gestational age greater than 36 weeks. With regard to obstetric characteristics, delayed umbilical cord clamping was found in 40% of those born weighing < 2,500 g and, among those weighing > 2,500 g, that rate was 60% ( $p < 0.001$ ); whereas breastfeeding in the first hour was indicated in 32% of cases involving a weight < 2,500 g and recommended in 68% with a weight > 2,500 g ( $p < 0.001$ ). **Conclusion:** Therefore, our study showed the importance of investigating both favorable and unfavorable factors in pregnancies between 32 and 36 weeks as it may allow for the possibility of minor maternal and fetal complications following delivery.

**Keywords:** Preterm births, Pregnancy, High-Risk Pregnancy, Obstetric Labor.

### RESUMO

**Objetivo:** Identificar o perfil epidemiológico e características obstétricas das gestantes entre 32 a 36 semanas internadas no Hospital Público de São Paulo, que tiveram partos durante janeiro a julho de 2022. **Métodos:** Durante o período estudado, foram registrados 1914 partos na instituição, sendo 163 partos entre 32 a 36 semanas e a taxa de prematuridade foi de 8.5%. Trata-se de uma pesquisa de caráter transversal retrospectivo, com informações obtidas através da análise dos prontuários das pacientes. **Resultados:** Quanto aos dados epidemiológicos, foram encontrados 67% primigestas, 56% foram parto cesárea, 57% apresentaram idade gestacional maior que 36 semanas. De acordo com as características obstétricas, o clampeamento tardio do cordão umbilical 40% nos nascidos com <2.500g e com peso > 2.500g foi de 60% ( $p < 0.001$ ) e a amamentação na 1ª hora foi indicada em 32% nos casos com peso <2.500g e foi recomendada em 68% com > 2.500g ( $p < 0.001$ ). **Conclusão:** Nosso estudo mostrou a importância da investigação de fatores favoráveis e desfavoráveis para as gestações entre 32 a 36 semanas, viabilizando a possibilidade de menores complicações maternas e fetais após o parto.

**Palavras-chave:** Parto Pré-termo, Gravidez, Gestação de Alto Risco, Trabalho de Parto Prematuro.

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## RESUMEN

**Objetivo:** El estudio fue identificar el perfil epidemiológico y las características obstétricas de gestantes entre 32 y 36 semanas ingresadas en el Hospital Público de São Paulo, que dieron a luz entre enero y julio de 2022. **Métodos:** Durante el período estudiado, se registraron 1914 nacimientos en la institución, con 163 nacimientos entre 32 y 36 semanas y la tasa de prematuridad fue del 8,5%. Se trata de una investigación transversal retrospectiva, con información obtenida a través del análisis de las historias clínicas de los pacientes. **Resultados:** Respecto a los datos epidemiológicos, el 67% se encontró primigesta, el 56% tuvo cesárea, el 57% tuvo una edad gestacional mayor a 36 semanas. Según características obstétricas, el pinzamiento tardío del cordón umbilical fue del 40% en los nacidos con peso < 2.500g y > 2.500g ( $p < 0,001$ ) y la lactancia materna en la primera hora fue indicada en el 32% de los casos con peso < 2.500g y fue recomendado en 68% con > 2.500g ( $p < 0,001$ ). **Conclusión:** Nuestro estudio demostró la importancia de investigar factores favorables y desfavorables para embarazos entre 32 y 36 semanas, posibilitando la posibilidad de menores complicaciones maternas y fetales después del nacimiento.

**Palabras clave:** Parto Prematuro, Embarazo, Embarazo de Alto Riesgo, Trabajo de Parto Prematuro.

## INTRODUCTION

According to the World Health Organization (WHO, 2023), prematurity is defined as a gestation of less than 37 weeks (259 days), irrespective of weight, and can be subdivided into: infants born extremely preterm (<28 weeks), severely preterm (28–31 weeks), and moderately to late-preterm (32–36 weeks). It also recommends calculating the gestational age based on the first day of the last regular menstrual cycle. We can consider that the earlier the gestational age at birth, the greater the neonatal complications (WALANI SR, 2020).

According to the World Health Organization (WHO, 2023), in global proportions, 13.2 million premature births occurred in 2020, with an estimate of more than one in ten newborns being preterm. In Brazil, the prevalence of prematurity is 11.2%, about 300,000 preterm births per year, ranking it as the ninth country in terms of absolute numbers of premature births (DIAS BAS, et al., 2022). Of the 323,676 live births under 37 weeks, 17,382 (5%) died in the neonatal period, with the vast majority in their first days of life (Brazil, 2020). Prematurity has become a cause for great concern, since neonatal mortality and morbidity rates are higher among them (DIAS BAS, et al., 2022; BRAZIL, 2020).

Among preterm births, about 70% are born between 34 and 36 weeks, which classifies them as late-preterm (WHO, 2023). Newborns during this period are more likely to have respiratory disorders, hyperbilirubinemia, and other disorders. The risk of death among late-preterm infants in their first year of life is about three times greater than that of term infants (KIM SH, et al., 2020). *Group B Streptococcal* infection is considered an important public health problem and may be associated with pneumonia, neonatal sepsis, meningitis and neonatal death (BARBOSA TDF, et al., 2017). The *Lancefield Group B Streptococcal* and others microorganisms such as *Gardnerella vaginalis*, *Neisseria gonorrhoeae*, *Escherichia coli*, *enterococci*, have been associated with prematurity (CORRÊA CRGL, et al., 2023).

Stoll BJ, et al. (2011) evaluated newborns weighing more than 400 grams in relation to neonatal sepsis. The overall incidence of infection with *Group B Streptococcal* was higher than *Escherichia coli*. The rates of *Escherichia coli* were higher than rates of *Group B Streptococcal* among very low birth weight newborns and infants with birth weight of 401 to 1500 grams and lowest among those with a birth weight more than 2500 grams.

Clinical trials in the 1980s demonstrated that antibiotic prophylaxis administered during labor to mothers colonized with *Group B Streptococcal* was highly effective in preventing disease in newborns (VAN DYKE MK, et al., 2009). In 2002, the Centers for Disease Control and Prevention updated the guidelines and the screening approach proved to be about 50% more effective than the risk-based approach in preventing perinatal disease by *Group B Streptococcal* (SCHRANG SJ, et al., 2002). In 2020, the Centers for Disease

Control and Prevention provided an update of the recommended prophylaxis and prevention strategies for women during pregnancy and labor about *Group B Streptococcal* (ACOG, 2020).

*Group B Streptococcal* infection of infants by this bacteria results from vertical transmission (mother-fetus), either ascending, through intact membranes or at the time of birth, or through contact of the microorganism with fetal tissues or through aspiration of vaginal secretions through the fetus. The colonization rate in newborns of colonized women is approximately 50%, regardless of the mode of delivery (BARBOSA TDF, et al., 2017).

The causes leading to premature birth can vary and in 50% of cases they are due to unknown causes (HUANG H, et al., 2018). However, among the factors that may contribute to prematurity, there are socio-demographic, genetic, environmental factors, and especially those related to pregnancy (HUANG H, et al., 2018). For this reason, being aware of its causes can help to reduce the incidence rate of preterm births. This study thus aims to identify the epidemiological profile and obstetric characteristics of pregnant women between 32 and 36 weeks in a public hospital in São Paulo, Brazil, between January and June 2022.

## METHODS

This is a retrospective cross-sectional study, conducted at Hospital in the city of São Paulo – SP, Brazil. Data were collected from the medical records of pregnant patients between 32 and 36 weeks, in the period from January to July 2022.

The research was approved by the Ethics Committee (number CAAE: 64801422.5.0000.5479 and approved with number: 5.880.404). The data collected for assessing the epidemiological profile were: age, parity, gestational age, number of prenatal medical visits, *Streptococcus agalactiae* status, Robson's classification, labor induction, type of delivery (vaginal or cesarean delivery), birth canal laceration, episiotomy, need for anesthesia.

The characteristics of newborns were: gender, Apgar scores at 1 and 5 minutes, delayed umbilical cord clamping, skin-to-skin contact, breastfeeding in the first hour, companionship during hospitalization, and delivery shift. A Voluntary Informed Consent Form (VICF) was obtained from all patients participating in the study.

To calculate the preterm rate, the formula indicated by Brazil's Ministry of Health was used, in which the number of premature births (163) was divided by the total number of births in the period and year of the study (1914) and then multiplied by 100 (BRAZIL, 2012).

Descriptive analysis was performed with the collected data by using the program *Statistical Package for Social Science* (SPSS®) version 21.0 (Windows; Chicago, USA). Frequency was used for descriptive variables and for those with normal distribution, the chi-squared test and paired Fisher's exact test were used to draw comparisons. The significance level adopted was 5%.

## RESULTS

During the period studied, *i.e.*, from January to July 2022, 1914 births were registered at the institution, of which 163 occurred between 32 and 36 weeks of gestation. The preterm rate in our study was 8.5%. The total number of cesarean deliveries was 57% of the cases, with the following indications: 12% had non-reassuring cardiotocography, 6% pre-eclampsia, 6% breech and placenta previa and cord prolapse, 11% fetal malformations and oligoamnion, 18% twins, 4% iterativeness.

With respect to the characteristics of the pregnant women receiving healthcare, we found that there was a higher frequency of women aged between 21 and 30 years (52%), primigravidae (67%), having a gestational age greater than 36 weeks (57%) and number of prenatal medical visits greater than or equal to 6 (75%). The *Streptococcus agalactiae* status was unknown in 80% of cases.

Concerning the characteristics pertaining to delivery, as per Robson's Ten Group Classification System, 63% of the cases corresponded to a score between 6 and 10, and there was no need to induce labor in 75% of patients.

Among the pregnant women who progressed to vaginal birth (44%), in 80% of cases there were no lacerations to the birth canal and 90% of parturient did not require an episiotomy. Regarding anesthesia type, spinal anesthesia had a frequency of 58% of cases, with cesarean section being the most commonly performed type of delivery (56%) (**Table 1**).

**Table 1** - Characteristics pertaining to the delivery among pregnant women between 32 and 36 weeks.

Robson's ten group classification	N = 163	Frequency (%)
1 to 5	61	37%
6 to 10	102	63%
<b>Labor induction</b>		
None	123	75%
Misoprostol	23	15%
Oxytocin	11	7%
Misoprostol + Oxytocin	6	3%
<b>Type of Delivery</b>		
Vaginal Delivery	71	44%
Cesarean Section	92	56%
<b>Birth canal laceration</b>		
No	131	80%
Yes	32	20%
<b>Episiotomy</b>		
No	162	99%
Yes	1	1%
<b>Anesthesia</b>		
No	42	26%
Local	27	16%
Spinal or General Anesthesia	94	58%

**Note:** N: total number of cases.

**Source:** Macruz CF, 2024.

When considering neonatal characteristics, females accounted for 61% of newborns weighing < 2,500 g, whereas males accounted for 48% weighing > 2,500 g. There were 5 stillbirth cases among newborns with a fetal weight less than 2,500 g and 1 case among those with a fetal weight greater than 2,500 g. The Apgar score at 1 minute ranged from 7 to 10 in 51% of cases weighing < 2,500 g and 49% of those with a weight > 2,500 g ( $p = 0.009$ ). The Apgar score at 5 minutes, in turn, varied from 7 to 10 in 56% of cases weighing < 2,500 g and 44% of those > 2,500 g. Delayed umbilical cord clamping occurred in 40% of those born weighing < 2,500 g and in 60% of those weighing > 2,500 g, a significant finding ( $p < 0.001$ ). Skin-to-skin contact occurred in 40% of cases < 2,500 g and 60% of cases > 2,500 g.

Breastfeeding in the first hour was indicated in 32% of cases involving a weight < 2,500 g and recommended in 68% of newborns with a weight > 2,500 g, which is yet another significant piece of data ( $p < 0.001$ ) (Table 2).

**Table 2** - Characteristics of newborns among pregnant women between 32 and 36 weeks.

Variables	Weight < 2,500 g (n = 92)	Weight > or equal to 2,500 g (n =71)	<i>p</i>
<b>Sex</b>			
Female	61% (n=51)	39% (n=33)	0.257*
Male	52% (n=41)	48% (n=38)	
<b>Stillbirth</b>			
No	55% (n=87)	45% (n=70)	0.234**
Yes	83% (n=5)	17% (n=1)	
<b>Apgar score at 1 minute</b>			
0 to 6	77% (n=24)	23% (n=7)	0.009*
7 to 10	51% (n=68)	49% (n=64)	
<b>Apgar score at 5 minutes</b>			
0 to 6	67% (n=6)	33% (n=3)	0.733**
7 to 10	56% (n=86)	44% (n=68)	
<b>Delayed Umbilical Cord Clamping</b>			
No	75% (n=57)	25% (n=19)	<0.001*
Yes	40% (n=35)	60% (n=52)	
<b>Skin-to-skin contact</b>			
No	58% (n=86)	42% (n=62)	0.178*
Yes	40% (n=6)	60% (n=9)	
<b>Breastfeeding within the 1<sup>st</sup> hour</b>			
No	70% (n=74)	30% (n=32)	<0.001*
Yes	32% (n=18)	68% (n=39)	

**Note:** \*Chi-squared test; \*\*Fisher's exact test;  $p < 0.05$ ; n: number of cases.

**Source:** Macruz CF, 2024.

In relation to obstetric characteristics, cesarean section was performed on 58% of cases with a fetal weight less than 2,500 g *versus* 42% when fetal weight was greater than 2,500 g ( $p=0.732$ ). Episiotomy was not performed on patients who underwent vaginal delivery when fetal weight was less than 2,500 g.

However, it was performed in a single case, in which fetal weight was greater than 2,500 g ( $p=0.436$ ). *Streptococcus agalactiae* status was unknown in 58% of cases from the group with a fetal weight less than 2,500 g and corresponded to 42% from the group with a fetal weight greater than 2,50 g ( $p=0.748$ ). *Streptococcus agalactiae* prophylaxis was not given to most newborns ( $p=0.799$ ).

A companion was present during hospitalization in 51% of the women from the group with a fetal weight less than 2,500 g as compared to 49% of cases with a fetal weight greater than 2,500 g ( $p < 0.006$ ). The number of deliveries was proportionally the same across all shifts ( $p=0.957$ ) (Table 3).

**Table 3** - Obstetric characteristics related to fetal weight among pregnancies between 32 and 36 weeks.

Variables	Weight < 2,500 g (n=92)	Weight > or equal to 2,500 g (n =71)	p
<b>Type of delivery</b>			
Vaginal Delivery	55% (n=39)	45% (n=32)	0.732*
Cesarean Section	58% (n=53)	42% (n=39)	
<b>Episiotomy</b>			
No	57% (n=92)	43% (n=70)	0.436**
Yes	0	100% (n=1)	
<b>Streptococcus agalactiae status</b>			
Negative	50% (n=14)	50% (n=14)	0.748*
Positive	60% (n=3)	40% (n=2)	
Unknown	58% (n=75)	42% (n=55)	
<b>Streptococcus agalactiae prophylaxis</b>			
No	57% (n=84)	43% (n=64)	0.799*
Yes	53% (n=8)	47% (n=7)	
<b>Companion during hospitalization</b>			
No	78% (n=25)	22% (n=7)	<0.006*
Yes	51% (n=67)	49% (n=64)	
<b>Delivery Shift</b>			
Morning	58% (n=33)	42% (n=24)	0.957*
Afternoon	56% (n=27)	44% (n=21)	
Night	55% (n=32)	45% (n=26)	

**Note:** \*Chi-squared test; \*\*Fisher's exact test; p<0.05; n: number of cases.

**Source:** Macruz CF, 2024.

## DISCUSSION

This study allows for the assessment of the main characteristics found among pregnant women between 32 and 36 weeks, admitted to Hospital São Luiz Gonzaga from January to June 2022 regarding the healthcare received by both them, prenatally and during delivery, and the newborns. The preterm rate has increased worldwide, mainly due to an increase in late-preterm births, often associated with obstetric interventions (KIM SH, et al., 2020). In 2014, the global preterm rate was 10.6 per 100 live births, with Asia accounting for 52.9% of these premature births. Brazil ranks ninth among the 10 countries with the highest preterm rates (11.2 births per 100 live births) (DIAS BAS, et al., 2022). In our study, the preterm rate found for the period studied was 8.5%, which is lower than both the global and Brazil's rates.

Most pregnant women were aged between 21 and 30 years (52%) and primigravidae (67%), with a gestational age of 36 weeks (57%). Santos RAJ (2018) carried out a randomized clinical trial in Brazil's Northeast Region and found that 50% of cases corresponded to a gestational age of 35 weeks and 54% of patients were primiparous, which is consistent with our study. In respect of the number of prenatal medical visits, we identified that 75% of patients had a number of prenatal medical visits greater than or equal to 6. According to other studies, 85% of patients who had preterm birth also had more than 6 medical appointments as they were receiving prenatal healthcare (MENETRIER JV and DE ALMEIDA G, 2016; SALOIO CA, et al., 2012; WEAVER ER, et al., 2015).

*Streptococcus agalactiae* status was unknown in 80% of our cases, and there was no difference between groups ( $p=0.748$ ). The American College of Obstetricians and Gynecologists recommends screening for *Streptococcus agalactiae* between 36- and 37-weeks' gestation, with appropriate intrapartum antibiotic prophylaxis (ACOG, 2020). The gestational age for requesting such screening during prenatal healthcare was not in accordance with the recommended one in the cases analyzed in this study.

*Streptococcus agalactiae* prophylaxis was not carried out for the majority of our newborns ( $p=0.799$ ). According to ACOG 2020 women with a positive prenatal *Group B Streptococcus agalactiae* culture result who undergo a cesarean birth before the onset of labor and with intact membranes do not require *Group B Streptococcus agalactiae* antibiotic prophylaxis.

More than half of our patients had an indication for cesarean delivery, and among the indications were fetal centralization, pre-eclampsia, decreased amniotic fluid, fetal malformation, twinning, iterative activity and others and prophylaxis for *Group B Streptococcus agalactiae* was not performed. The risk factors for neonatal sepsis due to *Group B Streptococcus agalactiae* are preterm labor (less than 37 weeks gestation), maternal fever during labor (greater than 100.4 F or 38 C), membranes ruptured greater than 18 hours at term, and/or in patients with a history of a previous child with invasive early-onset *Group B Streptococcus agalactiae* infection (ACOG, 2011, 2020).

If the prenatal *Group B Streptococcus agalactiae* culture result is unknown when labor starts, intrapartum antibiotic prophylaxis is indicated for women who have risk factors for neonatal *Group B Streptococcus agalactiae* early-onset disease (ACOG, 2020). Patients who have an indication for preterm or early term induction of labor will benefit from *Group B Streptococcus agalactiae* culture at or before 35 weeks (VERANI JR, et al., 2010). Apgar scores at 1 minute (which ranged from 7 to 10) in newborns weighing less than 2,500 g and in those weighing more than 2,500 g corresponded to a frequency of around 50% of all cases, which is a significant piece of data ( $p=0.009$ ). Delayed umbilical cord clamping occurred in 60% of cases weighing more than 2,500 g and breastfeeding in the first hour in 68% of these cases, with both these findings also being significant data obtained in this study, with  $p<0.001$  and  $p<0.001$ , respectively.

In 2019, a review published in the Cochrane Database of Systematic Reviews (40 randomized studies;  $n=4,880$  preterm NB) assessed different clamping strategies and showed that delayed clamping (30-180 seconds), when compared to early clamping (<30 seconds, most of which were performed immediately), was associated with a lower mortality rate during hospitalization (OR: 0.73; CI95%: 0.54-0.98) and decreased peri-intraventricular hemorrhages of any extent, but did not reduce severe forms thereof (RABE H, et al., 2019). In our study, cord clamping occurred timely in 60% of cases weighing more than 2,500 g ( $p<0.001$ ).

The Pan-American Health Organization/World Health Organization (PAHO/WHO) recommends starting breastfeeding within the first 60 minutes of birth, as well as breastfeeding as the sole form of feeding up to six months of age and complementarily up to two years. When started within the first hour of birth, breastfeeding protects newborns from infections and can save lives (OPAS, 2018). In our study, 68% of newborns weighing more than 2,500g were breastfed in the first hour of birth ( $p<0.001$ ). A companion was present in 49% of patients who had newborns weighing more than 2,500 g, which is an additional significant finding in our research ( $p<0.006$ ). The comforting and reassuring presence of a trusted companion during labor and delivery foster better perinatal outcomes (BRAZIL, 2017).

## CONCLUSION

The main obstetric characteristics of pregnancies between 32 and 36 weeks were greater expectation of cesarean section, *Group B Streptococcus agalactiae* was unknown in most cases and during hospitalization most of the patients who had companions were those in which the newborn was larger than 2,500 g. The main neonatal characteristics referred to newborns weighing more than 2,500 g, as they had better first-minute Apgar scores, benefited from delayed umbilical cord clamping and were breastfed in the first hour of life. The analysis of obstetric and perinatal data can help reduce prematurity and reinforce practices that provide well-being for the maternal-fetal binomial.

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