Impact of the COVID-19 pandemic on the prevalence of prematurity cases

RESUMO | Objetivo: analisar a prevalência da prematuridade no contexto da pandemia. Método: estudo transversal, retrospectivo e descritivo, desenvolvido na maternidade de referência do estado do Piauí. Resultados: 46,7% dos prontuários foram do ano de 2020 e 53,3% do ano de 2021. Houve 79% para gravidez única, parto cesáreo 59,1% e líquido amniótico claro 53%. O perfil clínico do RN em relação ao sexo, 47% eram do sexo feminino e 35 % do masculino. Médias: peso de 2462g, perímetro cefálico 34.36cm, torácico 32.58 cm, e comprimento de 48.02 cm. Considerando essa análise no ano de 2020 e 2021 foram contabilizados 21,1% RN com idade gestacional identificando uma prematuridade ao nascer e, 78,9% com idade gestacional dentro dos valores para pós termo. Conclusão: Os índices de prematuridade estão acima do esperado (21,1%), novas pesquisas com amostras mais importantes e melhor delineamento de métodos são necessárias para ampliar o escopo da discussão.
Descritores: COVID-19; Recém-Nascido Prematuro; Nascimento Prematuro; Trabalho de Parto Prematuro; Estudos de prevalência.

ABSTRACT | Objective: to analyze the prevalence of prematurity in the context of the pandemic. Method: a cross-sectional, retrospective and descriptive study, carried out at a reference maternity hospital in the state of Piauí. Results: 46.7% of the medical records were from 2020 and 53.3% from 2021. There were 79% for singleton pregnancy, cesarean delivery 59.1% and clear amniotic fluid 53%. The clinical profile of the NB in relation to sex, 47% were female and 35% male. Averages: weight of 2462g, head circumference 34.36cm, thoracic circumference 32.58cm, and length of 48.02cm. Considering this analysis, in 2020 and 2021, 21.1% of newborns with gestational age were identified as prematurity at birth, and 78.9% with gestational age within the values for post-term. Conclusion: Prematurity rates are higher than expected (21.1%), new research with more important samples and better method design are necessary to broaden the scope of the discussion.
Keywords: COVID-19; Premature Newborn; Premature Birth; Premature Labor; Prevalence studies.

RESUMEN | Objetivo: analizar la prevalencia de la prematuridad en el contexto de la pandemia. Método: estudio transversal, retrospectivo y descriptivo, desarrollado en la maternidad de referencia del estado de Piauí. Resultados: El 46,7% de los registros fueron del año 2020 y el 53,3% del año 2021. Hubo un 79% por embarazo único, parto por cesárea un 59,1% y líquido amniótico claro un 53%. El perfil clínico del RN en relación al sexo, el 47% eran del sexo femenino y el 35% del masculino. Promedios: peso de 2462 g, perímetro cefálico 34,36 cm, perímetro torácico 32,58 cm y longitud de 48,02 cm. Considerando este análisis, en 2020 y 2021, el 21,1% de los recién nacidos con edad gestacional fueron identificados como prematuros al nacer, y el 78,9% con edad gestacional dentro de los valores para postérmino. Conclusión: Las tasas de prematuridad son más altas de lo esperado (21,1 %), se necesitan nuevas investigaciones con muestras más importantes y un mejor diseño de métodos para ampliar el alcance de la discusión.
Palabras claves: COVID-19; Premature Newborn; Premature Birth; Premature Labor; Prevalence studies.

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INTRODUCTION

Coronavirus Disease - 2019 (COVID-19) is an infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 (SARS-CoV-2) virus, commonly known as Novel Coronavirus, this virus causes mild clinical manifestations, like a cold or, in more severe cases, progress to respiratory distress syndrome that may require intensive care unit (ICU) care. [1-2] In March 2020, the World Health Organization (WHO) declared a pandemic due to the global spread of the virus and state of calamity [3].

Therefore, considering the physiological changes during pregnancy, such as decreased lung volume in addition to residual and functional volumes due to diaphragmatic elevation, airway edema, increased oxygen consumption, hypercoagulable state and altered cellular immunity can make pregnant women prone to lung infections with worse outcomes. [4]

In relation to preterm childbirth, it is also called preterm labor (PTL), and corresponds to labor (L) that occurs after 20 or 22 weeks of early pregnancy or before the 37th week

of pregnancy. Therefore, considering that complications related to preterm birth are considered responsible for more than 75% of neonatal mortality and morbidity, this is considered an important obstetric problem. [5]

At the state level, the State Department of Health of Piauí (SESA-PI - Secretaria Estadual da Saúde do Piauí), warns of the number of premature babies. According to data from the secretariat, while Brazil has an average preterm birth rate of 11.5%, in Piauí the average is 11.1%. Therefore, according to statistics, in 2020, 4,890 babies were born within less than 22 weeks to 36 weeks, that is, NB (newborn) considered premature. [6]

The experience of pregnancy with COVID-19 infection has raised great concern due to the high risk of miscarriage, premature birth, morbidity or mortality in the fetus and newborn. [7]

Thus, considering that the pandemic associated with SARS-Cov-2 exposed pregnant women to a new epidemiological scenario and the need to formulate plans for rapid responses to the spread of the disease, this research, aims to analyze the prevalence of prematurity in the context of the COVID-19 pandemic as well as to characterize the social and clinical profile of the mother, in addition to the clinical profile of the NB.

METHODS

This is a cross-sectional, retrospective, descriptive study. The research was developed at the reference maternity hospital in the state of Piauí, for the care of high obstetric and neonatal complexity and offers care to patients of the Unified Health System (SUS). Therefore, the largest in the State of Piauí in a highly complex reference and continues to reinforce preventive measures against

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cases of patients with COVID-19 that may arrive at the institution. [8]

For the purpose of prevalence, the data available in the vital statistics of the DATASUS TABNET platform were used. In 2019, 13,624 children were born in Teresina (PI), 1,592 of which were less than 36 weeks old, thus a prevalence of 11.68%.

For the study, the average number of births of children registered at the Maternity was used, that is, in the year 2020 there were a total of 6,977 births, with an average of 581 per month. Sample calculation for finite population, stratified by proportion, was used. The average number per year was 581 patients (medical records), thus, a sample of 125 (medical records) with a sampling error of 5% and a confidence level of 95%. Thus, the research was developed using a finite sample by proportion.

As inclusion criteria for the research will be the aforementioned temporality, that is, from January 2020 to March 2020, similarly, from January to March 2021, considering this the most critical temporality of the pandemic. Regarding the exclusion criteria, medical records with information that did not correspond to the research, that is, those of pregnant women who were hospitalized for treatment of clinical complications, in addition, medical records with situations in which the pregnancy resulted in the death of the NB were disregarded. Thus, being compatible with the objective of the research, a total of 90 records were collected.

Initially, patients admitted to the hospital in the aforementioned temporality, that is, the first quarter of the years 2020 and 2021, were chosen by lot.

After this selection, the physical records were made available by the coordinator of the Medical and Statistical Archiving Service (SAME - Serviço de Arquivamento Médico e

Estatístico) of the Maternity Hospital to obtain the data.

Descriptive analysis were performed to verify data consistency and comparisons involving sociodemographic variables of postpartum women. For the variables, the absolute and relative frequencies were used, in addition, the mean standard deviation.

For inferential analysis, the chi-square test was used to study the association between sociodemographic data and preterm births. In comparison of the moments (quarters), the T Test was used, when the sample presented normality, otherwise a non-parametric test was used (Mann-Whitney U - U test). For all analyses, a significance level <5% was considered. Data were entered into an electronic spreadsheet and analyzed using the Software Statistical Package for the Social Sciences (SPSS), version 26.

The research complied with all the requirements that govern research with human beings. As a result, it was submitted and approved with an opinion on the Certificate of Presentation of Ethical Appreciation (CAAE) No. 5,086,132.

Therefore, the research had the following benefits: possibility of planning on the subject, in addition, development of new strategies in relation to the new coronavirus in cases of premature neonates, in addition, the main benefit was to add scientific knowledge to the area. Regarding the risks, these were the minimum possible, considering that it was a research carried out through indirect contact with the patient, that is, through the medical records.

RESULTS

Table 01 describes the maternal social and clinical characterization, in addition to contemplating the cli-

Tabela 01. Caracterização do perfil social e clínico materno e perfil clínico do RN atendidos na maternidade de referência do Estado do Piauí. Teresina-PI. (n=90),2022.				
	N(%)	**IC-95%**	**Média (IC-95%)**	**Dp**
Perfil Social -Mãe				
Young (≥19 years)			26.49 (25.15±27.82)	6.38
	13(14.4)	(8.3-22.8)		
Adult (20|-|59 years)	77(85.6)	(77.2-91.7)		
Education				
Elementary School	17(29.3)	(18.8-41.8)		
High School	31(53.4)	(40.7-65.9)		
Incomplete higher education	7(12.1)	(5.6-22.2)		
Complete higher education	3(5.2)	(1.5-13.2)		
Marital Status				
Stable Union	37(45.1)	(34.7-55.9)		
Single	31(37.8)	(27.9-48.6)		
Married	14(17.1)	(10.1-26.3)		
Ethnicity				
Brown	39(75.0)	(62.1-85.2)		
Black	5(9.6)	(3.8-19.8)		
White	8(15.4)	(7.6-26.9)		
Habits				
Cigarette	2(3.0)	(0.6-9.4)		
Alcohol	3(4.5)	(1.3-11.6)		
Alcohol and Cigarette	1(1.5)	(0.2-6.9)		
None	60(90.9)	(82.2-96.1)		
Clinical Profile - Mother				
GA (Gestational Age))			37.84 (37.06±38.62)	3.55
Type of Pregnancy				
Singleton	79(90.8)	(83.4-95.6)		
Multiple	8(9.2)	(4.4-16.6)		
Type of Childbirth				
Cesarean	52(59.1)	(48.7-68.9)		
Natural	36(40.9)	(31.1-51.3)		
Amniotic fluid				
Meconium	13(19.7)	(11.5-30.5)		
Clear	53(80.3)	(69.5-88.5)		

nical profile of the NB in a high complexity maternity hospital in the State of Piauí, considering the importance of the main factors surveyed.

Initially, in general, the study participants were characterized in table 1. Thus, it was observed that in relation to mothers there were more adult patients 85.6%, attending high school 53.4%, in a stable relationship 45.1%, brown 75% and, mostly without having alcohol habits, cigarette or other 90.9%, the type of pregnancy was 79% for singleton pregnancy, cesarean section 59.1% and with clear amniotic fluid in 53%.

Regarding the clinical profile of the NB, 47% were born female and 53% were male. Finally, the following averages were obtained, respectively: weight of 2462 g (2234±2689), head circumference 34.36cm (33.94±34.79), thoracic 32.58 cm (32.05±33.12), and length of 48.02 cm (47.44±48.61).

The distribution of the binomial mother and child research is illustrated, indicating the respective numbers.

In the study, 90 medical records compatible with the research objective were analyzed. Thus, in relation to the distribution of participants (mother and newborn) attending at the maternity ward, it was observed that 46.7% corresponded to the year 2020 and 53.3% to the year 2021 (Graph 1).

Considering the association between the years in a reference maternity, the data will be exposed in the following table:

In 2020, it was observed that there were more adults (88.1%), attending high school (40.6%), in a stable relationship (58.3%), brown (85.2%), without any habit of alcohol or tobacco (85.3%). The mean gestational age in 2020 was 38.03±3.11, the

Clinical Profile - NB			
Gender			
Female	31(47.0)	(35.3-58.9)	
Male	35(53.0)	(41.1-64.7)	
Birth weight (g)		2462 (2234±2689)	1087
Head circumference (cm)		34.36 (33.94±34.79)	1.67
Thoracic perimeter (cm)		32.58 (32.05±33.12)	2.10
Length (cm)		48.02 (47.44±48.61)	2.29

Source: direct research, author data 2022.

Graph 01. Distribution of mother and newborn binomials attended at a reference maternity hospital in the State of Piauí - 2020/2021. Teresina-PI. n=90, 2022.
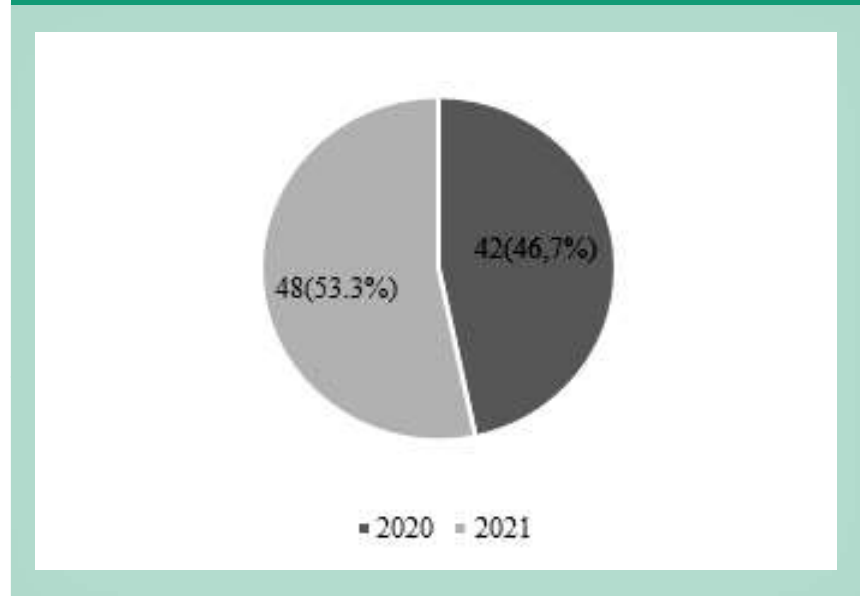
Source: direct research, author data 2022.

type of singleton pregnancy 92.7%, type of cesarean delivery 61.9%, clear amniotic fluid 87.5%, female NB 51.4% and male 48.6%.

In 2021, 83.3% of them were adults (69.2%), in a stable relationship (34.8%), mixed race (64%), without any habit of alcohol or tobacco (96.9%). The mean gestational age in 2020 was 37.68±3.92, single

pregnancy type 89.1%, cesarean delivery type 56.5%, clear amniotic fluid 73.5%, female NB 41.9% and male 58.1%. Considering the difference in years in association, there was a reduction from 38.03 to 37.68 in the mean value of the GA, configuring that the decrease in this parameter corroborates the increase in premature births.

Tabela 03. Análise de associação entre o perfil social e clínico materno e a caracterização clínica do RN atendido em uma maternidade de referência do Estado do Piauí - 2020/2021. Teresina-PI. n=90, 2022.					
	Ano				
	2020		**2021**		
	2020	2021	2020	2021	2020
		27.76±6.48		25.38±6.14	0.521[1]
Faixa Etária			8(16.7)		
Jovens (≥19 anos)			40(83.3)		
Adulto (20|-|59 anos)	37(88.1)				0.111[1]
Escolaridade			6(23.1)		
Fundamental	11(34.4)		18(69.2)		
Ensino Médio	13(40.6)		2(7.7)		
Ensino Superior Incompleto	5(15.6)		0(0.0)		
Ensino Superior Completo	3(9.4)				0.072[1]
Estado Civil			16(34.8)		
União Estável	21(58.3)		22(47.8)		
Solteira	9(25.0)		8(17.4)		
Casada	6(16.7)				0.175[1]
Raça			16(64.0)		
Parda	23(85.2)		4(16.0)		
Preta	1(3.7)		5(20.0)		
Branca	3(11.1)				0.342[1]
Hábitos			0(0.0)		
Cigarro	2(5.9)		1(3.1)		
Álcool	2(5.9)		0(0.0)		
Álcool e Cigarro	1(2.9)		31(96.9)		
Nenhum	29(85.3)				
IG (Idade Gestacional)		38.03±3.11		37.68±3.92	0.996[3]
Tipo de Gravidez					0.567[1]
Única	38(92.7)	38(92.7)	41(89.1)		
Múltipla	3(7.3)	3(7.3)	5(10.9)		
Tipo de Parto					0.608[1]
Cesáreo	26(61.9)	26(61.9)	26(56.5)		
Natural	16(38.1)	16(38.1)	20(43.5)		
Líquido Amniótico					0.154[1]
Meconial	4(12.5)	4(12.5)	9(26.5)		
Claro	28(87.5)	28(87.5)	25(73.5)		
Sexo					0.441[1]
Feminino	18(51.4)	18(51.4)	13(41.9)		
Masculino	17(48.6)	17(48.6)	18(58.1)		

Peso ao nascer (g)	2570±1097	2366±1080	0.516²
Perímetro cefálico (cm)	34.37±1.96	34.35±1.36	0.820²
Perímetro torácico (cm)	32.74±2.48	32.42±1.67	0.614³
Comprimento (cm)	47.95±2.39	48.10±2.23	0.446³

¹Teste Exato de Fisher, ao nível de 5%.
²Teste T de Student, ao nível de 5%.
³ Teste U de Mann-Whitney, ao nível de 5%.
Fonte: pesquisa direta, dados do autor, 2022.

Regarding the complications in the pregnancy of the mothers participating in the study, considerable diversity was identified among the researched data.

The most frequent complications were UTI (urinary tract infection), preeclampsia and vulvovaginitis, thus, respectively, 26 pregnant women with UTI, 22 with a clinical picture of preeclampsia, in addition to 8 study participants had vulvovaginitis. In relation to no complications, a number of 12 patients were counted, that is, patients with the development of pregnancy without pathological changes.

Finally, the following table analyzes preterm infants in the State of Piauí in 2020/2021:

The analysis of the number of premature babies in the year 2020 corresponded to 16.7% NB with gestational age identifying prematurity at birth, and in the year 2021 there was a percentage of 25%. On the other hand, 83.3% were not premature in the year 2020 and 75% in 2021 did not correspond to preterm NB values (Table 3).

Considering this analysis, in the year 2020/2021, 21.1% of newborns with gestational age identified prematurity at birth and 78.9% with gestational age within the values for post-term (Table 3).

DISCUSSION

OThe present study identified that most participants (77%) were adults,

Graph 02. Distribution of complications during pregnancy. Teresina-PI. n=90, 2022.
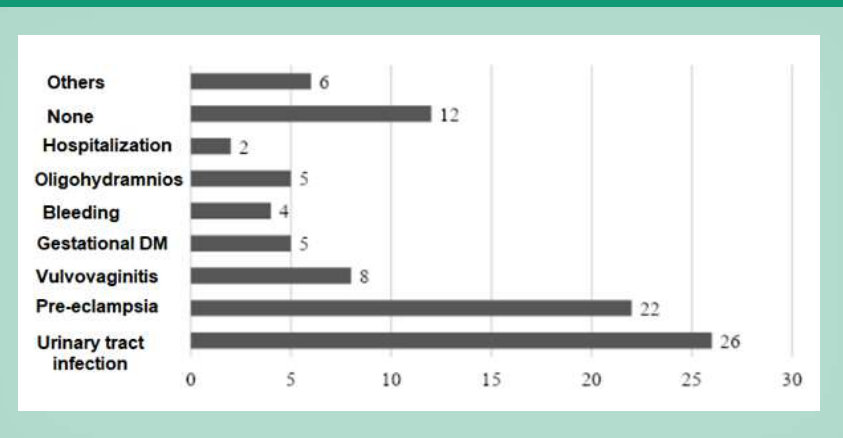
Source: direct research, author data, 2022.

Table 03 - Analysis of association between premature births in a reference maternity hospital in the State of Piauí -2020/2021. Teresina-PI. n=90, 2022.

Premature birth	2020	2021	2020/2021
No	35 (83.3%)	36 (75.0%)	71 (78.9%)
Yes	7(16.7%)	12 (25.0%)	19 (21.1%)

Source: direct research, author data, 2022.

that is, between 20 and 59 years old. Thus, the reduction in the occurrence of pregnancy among adolescents, as well as the increase among older women, is mainly attributed to greater access to health services [10] and an increase in the level of education. [11] In high-risk pregnancy, maternal age is a factor associated with unfavorable perinatal outcomes. [12]

Regarding the marital status of the pregnant woman, being single points to the outcome of premature births, as this may be due to the lack of a partner to share or share the difficulties and responsibilities of this phase, which can lead to a more stressful pregnancy, triggering a delivery ahead of schedule. [13] In the research, it was identified that the majority of pregnant women 45.1% were in a stable relationship, however, the literature does not refer to an association between this parameter with the consequent outcome for premature births.

It was identified that 59.1% of deliveries that took place were by cesarean section, which can be observed in Brazil due to the fact that according to a study reported that the occurrence of episiotomy, cesarean sections are also performed mainly by doctors, whose practice is characterized by the excess of obstetric interventions. [14]

As with any surgery, a cesarean section carries immediate and long-term risks. These risks can extend many years after delivery has taken place and affect the health of the woman and her child, and may also compromise future pregnancies. These risks are greater in women with limited access to adequate obstetric care. [15]

In the present study, the prevalence of prematurity was 21.1%, that is, a percentage higher than the estimated rates for pregnant women described in a study in Brazil: between 7.7% [16] and 11,1%. [17] This prevalence is approximately double that observed in European countries. [18] However, this fact was expected, since the studied maternity hospital is a reference for high-risk childbirth.

Furthermore, a study on the prevalence of prematurity in Denmark found the rate of preterm births during the period of confinement in 2020 was significantly lower than the average of the corresponding periods of previous years, that is, there was a drop of about 90% in the birth rate of extremely premature babies during the period of confinement. For the other categories of gestational age at birth, no statistically significant differences were observed between the periods studied for the year of confinement and the previous years. [19]

In a study prior to the pandemic period, carried out at Hospital Santa Cruz, Santa Cruz do Sul/RS, from December 2013 to June 2014, the prevalence of premature births found

in this study was 11.65%, result similar to the rate of the Nascer no Brasil Study (2015), the state rates of 2013 and 2014, but above the municipal rates. [20]

According to the Brazilian Federation of Gynecology and Obstetrics Associations - FEBRASGO, urinary infection is the second cause of premature fetal mortality, second only to chromosomal alterations. [21] Regarding UTI (Urinary Tract Infection) in the sample of a survey carried out in a public maternity hospital in Imperatriz-MA, there was no statistically significant association between UTI and premature birth. [22] The study data indicate that this complication was the most evident, configuring 26 patients with the presence of UTI during pregnancy.

In Brazil, the reported prevalence of vulvovaginal candidiasis during pregnancy was 11.8% [23], in Argentine women it was 28% [24], in Turkish, a prevalence of 37.4% was found. [25]

Therefore, even with the aforementioned methodological limitations, this research was important for local and neighboring health professionals to know the main risk factors in pregnancy and, in addition, that can develop a prematurity that affects this region.

In this pandemic scenario, the strategies programmed for the study in practice had to be re-signified. In this regard, the limitations found are related to the collection of data from the medical records, which in some situations presented incomplete information, requiring more detailed analyzes and diagnoses to obtain the necessary data. Added to this, the expected period for acceptance by the research committee was one of the main limitations, however, this was circumvented in the best way, seeking to make the collection as agile as possible for the work to be completed. Finally, the temporality

and quantity analyzed need to be expanded in studies to more generally investigate the behavior of situations that have prematurity as an outcome.

The data and analyzes presented allow a reflection on the current health scenario and, in addition, allow us to visualize this topic in order to formulate new strategies related to the new coronavirus in cases of premature babies inserted in this environment of global news and challenges. Likewise, the study contributed to increasing scientific knowledge and promoting reflections on the work of nursing care, which is essential for the good development of Pediatrics and Neonatology.

CONCLUSION

It is concluded that the study, despite considering that scientific research is still in development about the scenario facing COVID-19, little is known about the repercussions of this situation for the processes involving pregnancy and its outcomes. However, the research showed that prematurity rates are higher than expected and that physiological changes during pregnancy predispose to an increased risk of complications and worse maternal-fetal clinical conditions, such as intrauterine growth restriction, spontaneous abortion and perinatal death, in addition to premature birth.

However, in spontaneous preterm birth, it is impossible to assume that only one factor causes preterm birth, but to treat it as a fact with multiple independent or interdependent causes. Therefore, further research with more important samples and better design of methods are needed in Brazil to broaden the scope of the discussion and provide new insights into the topic.

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