Maternal And Neonatal Characteristics: A Comparison Of The Pre-pandemic And COVID-19 Pandemic Period

Características Maternas e Neonatais: Uma Comparação do Período Pré-pandemia e Pandemia de Covid-19

Características Maternas Y Neonatales: Comparación Del Período Prepandémico Y De La Pandemia Covid-19

RESUMO

Objetivo: Comparar características maternas e neonatais nos períodos pré-pandemia e pandemia de Covid-19 no Estado do Paraná. Métodos: Estudo descritivo de abordagem quantitativa, baseado em dados do Sistema de Informações sobre Nascidos Vivos, dos anos de 2019 e 2020 no Estado do Paraná. Os dados foram coletados em setembro de 2022. Foi utilizada estatística descritiva, teste qui-quadrado de Pearson para comparar os anos e medida V de Cramer para avaliar a associação das variáveis. O estudo foi autorizado sob os pareceres nº 3.032.650/2018 e nº 5.620.752/2022. Resultados: Foram 298.818 nascimentos no Paraná. Comparando os anos de 2019 e 2020, houve diferenças significativas, a um nível de significância de 5%, mas ao avaliar as razões de tamanho e efeito, a associação entre os dois anos é muito fraca (<0,05). Conclusão: A pandemia de covid-19 não refletiu nas características maternas e neonatais. Os resultados contribuem para o aprimoramento das ações de saúde.

DESCRITORES: COVID-19; Recém-nascido; Gravidez; Cuidado pré-natal; Sistemas de informação em saúde.

ABSTRACT

Objective: To compare maternal and neonatal characteristics in the pre-pandemic and COVID-19 pandemic periods in the state of Paraná. Methods: Descriptive study with a quantitative approach, based on data from the Live Birth Information System, from 2019 and 2020 in the state of Paraná. Data were collected in September 2022. Descriptive statistics, Pearson's chi-square test to compare years, and Cramer's V measure to assess the association of variables were used. The study was authorized under opinions No. 3,032,650/2018 and No. 5,620,752/2022. Results: There were 298,818 births in Paraná. Comparing the years 2019 and 2020, there were significant differences, at a significance level of 5%, but when evaluating the size and effect ratios, the association between the two years is very weak (<0.05). Conclusion: The COVID-19 pandemic did not reflect on maternal and neonatal characteristics. The results contribute to the improvement of health actions.

DESCRIPTORS: COVID-19; Newborn; Pregnancy; Prenatal care; Health information systems.

RESUMEN

Objetivo: Validar el contenido del módulo de calidad de vida para familiares de personas con cáncer. Método: El instrumento fue desarrollado por etapas, evaluado por expertos y comprendido semánticamente por el público objetivo. Los datos se describieron en frecuencia simple y se analizaron mediante el cálculo del Índice de Validez de Contenido, que fue superior a 0,78. Resultados: Los ítems del instrumento fueron creados a partir de la investigación de las bases teóricas en la literatura y de la elaboración de la matriz de especificaciones, que resultó en 40 ítems. Tras ser analizados por expertos, se obtuvieron 21 ítems para el pre-test y el Índice de Validez de Contenido global y el coeficiente de validez de contenido. En el pre-test, 5 ítems fueron reformulados y excluidos, resultando 16 ítems. Conclusión: El desarrollo y la validación de contenido del cuestionario resultaron en un instrumento conceptualmente apropiado para evaluar familiares de personas con cáncer, y está listo para proceder a la validación empírica.

DESCRIPTORES: Estudio de validación;Psicometría;Calidad de vida;Familia;Neoplasias.

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Gabriela Rufino da Silveira
University of Western Paraná.
ORCID: https://orcid.org/0000-0002-2956-2483

Camila Moraes Garollo Piran
Master in Nursing. State University of Maringá.
ORCID: https://orcid.org/0000-0002-9111-9992

Mariana Martire Mori
Nurse. State University of Maringá.
ORCID: https://orcid.org/0000-0003-1744-3580

Vinícius Basseto Félix
Master in Statistics. State University of Maringá.
ORCID: https://orcid.org/0009-0005-0965-4224

Camila Siqueira Floresta Lehmkuhl
Nurse. State University of Maringá.
ORCID: https://orcid.org/0009-0000-2490-7289

Gilvanuza de Amorim Teles
Nurse. Maringá Regional University Hospital.
ORCID: https://orcid.org/0009-0000-4056-7149

Bianca Machado Cruz Shibukawa
Post-doctorate in Nursing. Lecturer in the Nursing Department at the Federal University of Mato Grosso do Sul. ORCID: https://orcid.org/0000-0002-7739-7881

Maria de Fátima Garcia Lopes Merino
PhD in Nursing. Lecturer in the Postgraduate Program in Nursing at the State University of Maringá.
ORCID: https://orcid.org/0000-0001-6483-7625

Viviane Cazetta de Lima Vieira
PhD in Nursing. Lecturer in the Nursing Department at the State University of Maringá.
ORCID: https://orcid.org/0000-0003-3029-361X

Marcela Demitto Furtado
Doutora em Enfermagem. Docente no Programa de Pós-Graduação em Enfermagem da Universidade Estadual de Maringá.
ORCID: https://orcid.org/0000-0003-1427-4478

INTRODUCTION

Covid-19 (coronavirus disease 2019), a disease correlated with infection by the Sars-CoV-2 virus (severe acute respiratory syndrome coronavirus 2), emerged at the end of 2019 in Wuhan, Hubei province, China; and in March 2020, the World Health Organization (WHO) declared the pandemic. [1]

Given the changes in the provision of care during the pandemic, physical contact between pregnant women, babies and health professionals was restricted, leading to an adaptation of prenatal, childbirth and postpartum care models, which generally affected care aimed at maternal and child health. [2]

Adequate prenatal care is related to better perinatal outcomes as it identifies early health risks to the baby and pregnant woman, through complementary exams, periodic consultations and physical evaluation. [3] It is known, therefore, that during the pandemic, pregnant women faced difficulties in accessing health services and prenatal care due to cancellation, telehealth or postponement of consultations, in cases of suspected or confirmed COVID-19. [4]

Pregnant women's fear and anxiety about becoming infected with the virus has led to absenteeism in prenatal care appointments, which can negatively impact the health of mothers and babies. [5]

A study carried out in two cities in China, Wuhan and Chongqing, during the pandemic, identified that in order

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to reduce vertical transmission of the virus, there was a suggestive increase in cesarean sections and bottle feeding. [5]

Pregnant women diagnosed with COVID-19 have significantly higher risks of serious complications during pregnancy compared to those without a diagnosis. COVID-19 increases the risk of preeclampsia/eclampsia/HELLP syndrome, referrals to Intensive Care Units (ICU) or more complex levels of care, and infections requiring antibiotics, premature births, and low birth weight. Serious neonatal risks, including stays of seven days or more in the Neonatal Intensive Care Unit (NICU) and severe neonatal morbidity rates are higher in the group of women diagnosed with COVID-19. [6]

Therefore, globally, COVID-19 infection during pregnancy was associated with a substantial risk of morbidity and mortality in perinatal outcomes, especially in symptomatic cases or those with associated comorbidities, compared to uninfected pregnant women. [6] Considering the above, the following problematizing question arose: "What is the maternal and neonatal epidemiological profile before and during the covid-19 pandemic in the State of Paraná?".

It is believed that the identification of the epidemiological characteristics of pregnancy and childbirth before and during the COVID-19 pandemic in the state of Paraná can support reflections on improving the management of health services aimed at the maternal and child population. In this sense, the study aims to compare maternal and neonatal characteristics in the pre-pandemic period and during the COVID-19 pandemic in the state of Paraná.

METHODS

This is a descriptive quantitative study, based on secondary data extracted from the Live Birth Information System, for the years 2019 and 2020 in the State of Paraná.

The state of Paraná is located in the southern region of Brazil, with a population of approximately 11,597,484 inhabitants and a Human Development Index (HDI) of 0.7497. The health macro-regions are divided into East, West, North and Northwest, and are subdivided into twenty-two health regions. [8]

The data was collected in September 2022 and later organized and summarized in an Excel 2016 spreadsheet.

The variables analyzed were:

a) Maternal sociodemographic profile: age (< 20 years, 20 to 34 years, ≥ 35 years), education (< eight years, ≥ eight years), marital status (single, married, widowed and divorced), race/color (white, black, brown, yellow), number of children (no children, 1 to 3 children, 4 or more children).

b) Prenatal and delivery characteristics: trimester of start of prenatal care (first, second and third trimester), number of prenatal consultations (none, 1 to 3, 4 to 6, 7 or more), type of delivery (vaginal, cesarean).

c) Newborn characteristics: sex (male, female), gestational age of newborns (less than 22 weeks, 22 to 27 weeks, 28 to 31 weeks, 32 to 36 weeks, 37 to 41 weeks, 42 weeks or more), birth weight (<2500g, ≥2500g to 3999g, >4000g), Apgar at 5 minutes, congenital malformations (yes, no).

Apgar at 5 minutes, congenital malformations (yes, no).

Initially, a descriptive analysis of the results was performed to obtain frequency tables, with the aim of characterizing the observations. In addition, summary metrics were also used for continuous numerical variables: minimum, first quartile (P25), median, third quartile (P75), maximum, mean and coefficient of variation (CV). The comparative analysis was performed using the chi-square test of association given by:

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{ij}-E_{ij})^2}{E_{ij}},$$

In which r is the number of lines, c is the number of columns, Oij the observed frequencies and Eij the expected frequencies of the contingency table of the variables in question. In this way, it is possible to compare the distribution of two samples, in order to compare their respective proportions. Using the chi-square test, it is possible to assess statistical significance, but its calculation is sensitive to large samples, so it is possible to calculate an effect size measure that weighs this factor.

Cramer's V measure estimates the effect size between two variables, that is, how strong or not the association is between them, and is given by:

$$\sqrt{\frac{\chi^2}{n^*min(l-1,c-1)}},$$

In which x^2 is the chi-square test statistic, n is the total number of observations in the sample, l and c are the number of levels of the variables tested. 9 Cramer's V ranges from 0 to 1, where the closer to 1, the stronger the association.

The research was authorized by the Permanent Committee on Ethics in Research involving Human Beings of the State University of Maringá, under Opinions No. 3,032,650/2018 and No. 5,620,752/2022.

RESULTS

In the period from 2019 to 2020, 298,818 births were registered in the state of Paraná. Regarding sociodemographic characteristics, in 2019 there were 152,525 women who gave birth, aged 10 to 62 years, with an average age

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of 27.50 years. In addition, 86.40% (n = 140,274) had more than eight years of schooling and 52.15% (n = 64,585) had no partners. In 2020, there were 146,292 births, with an average age of 27.62 years, 86.87% (n = 126,582) with more than eight years of schooling and 53.62% (n = 63,564) had no partners (Table 1).

TABLE I – MATERNAL SOCIODEMOGRAPHIC CHARACTERISTICS OF PREGNANT WOMEN IN THE STATE OF PARANÁ IN 2019 AND 2020. MARINGÁ, PARANÁ, BRAZIL, 2022.

Sociodemographic profile						
	2019		2020		Tes	
	N	%	N	%	p Value	Cramer's V
Maternal age					< 0,001*	0,0145
< 20 years	18.702	12,2	16.587	11,3		
20 to 34 years	108.598	71,2	105.007	71,7		
≥ 35 years	25.223	16,5	24.695	16,8		
Education					0,0014*	0,0077
None	233	0,15	202	0,14		
1 to 3 years	1.649	1,09	1.613	1,11		
4 to 7 years	18.793	12,3	17.322	11,8		
8 to 11 years	89.981	59,2	86.863	59,6		
12 or more	41.293	27,1	39.719	27,2		
Marital status					< 0,001*	< 0,001*
Single	62.030	50,0	60.916	51,3		
Married	59.261	47,8	54.976	46,3		
Widow	284	0,23	261	0,22		
Divorced	2.271	1,83	2.387	2,01		
Race/color					< 0,001*	0,0116
White	111.353	73,6	105.346	72,8		
Black	4.115	2,72	4.359	3,01		
Yellow	583	0,39	564	0,39		
Brown	34.614	22,9	33.981	23,4		
Indigenous	470	0,31	491	0,34		
Number of living children					< 0,001*	0,0072
No children	64.685	42,5	61.032	41,9		
1 to 3 children	82.850	54,5	79.921	54,9		
4 or more children	4.434	2,92	4.482	3,08		

*p Value < 0,05.

**Excluded from ignored data

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It was observed that all variables were statistically significant, presenting a p-value <0.001, allowing us to highlight that the pandemic was reflected in the sociodemographic characteristics of birth according to the chi-square test, but when evaluating the value of the size and effect measure, it is noted that the association is very weak <0.05 (Table I).

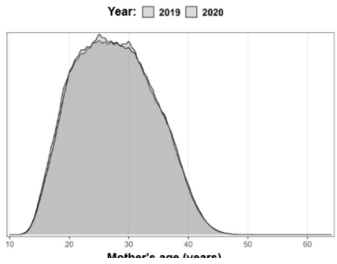
The summary metrics for the variable "mother's age" are very similar when comparing the years 2019 and 2020, with the 2020 average being slightly higher (0.12 years). Furthermore, it is noted that the coefficient of variation for both years shows moderate variation around the average (Table II).

TABLE II – SUMMARY METRICS FOR MATERNAL AGE (YEARS) VARIABLES IN THE STATE OF PARANÁ IN 2019 AND 2020. MARINGÁ, PARANÁ, BRAZIL, 2022.

Summary metrics for mother's age (years) variable		
	2000	2020
N	*152.525*	*146.291*
Missing values	*2*	*2*
Minimum	*10*	*12*
P25	*22*	*22*
Median	*27*	*27*
P75	*32*	*32*
Maximum	*61*	*64*
Average	*27,50*	*27,62*
CV	*23,87%*	*23,70%*

Figure 1 shows the similarity in the behavior of the mother's age between the years, with a higher density of births close to 25 years old, showing that the births of 2019 and 2020 have a positive asymmetry. In addition, it is noted that the coefficients of variation of both years have a moderate variation around the average, being 23.87% in 2019 and 23.70% in 2020.

Figure 1- Density graph of mother's age by year. Maringá, Paraná, Brazil, 2022.



Regarding the characteristics of pregnancy and childbirth, it was found that most prenatal care was initiated in the first trimester of pregnancy (p<0.001), with more than 7 follow-up consultations (p<0.001), and with more cesarean deliveries (p<0.001) in both years (Table III). Furthermore, at the 5% significance level, the characteristics of pregnancy and childbirth have significant sample evidence that the pandemic influenced these variables. When assessing the strength of association, pregnancy and delivery characteristics in both years had a very weak association (<0.05).

TABLE III – CHARACTERISTICS OF PREGNANCY AND CHILDBIRTH IN THE STATE OF PARANÁ IN 2019 AND 2020. MARINGÁ, PARANÁ, BRAZIL, 2022.

Features of pregnancy and childbirth						
	2019		2020		Test	
	N	%	N	%	p Value	Cramer's V
Trimester of prenatal care start					*< 0,001**	*0,0082*
First trimester	*132.684*	*88,4*	*126.605*	*87,9*		
Second trimester	*15.197*	*10,1*	*15.019*	*10,4*		
Third trimester	*2.175*	*1,45*	*2.305*	*1,6*		

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Number of prenatal visits					< 0,001*	0,0121
None	1.033	0,68	1.119	0,77		
From 1 to 3	3.740	2,45	4.028	2,76		
From 4 to 6	17.121	11,2	16.840	11,5		
7 or more	130.457	85,6	124.145	84,9		
Type of delivery					< 0,001*	0,0256
Vaginal	57.204	37,5	51.270	35,0		
Cesarean	95.220	62,4	94.944	64,9		

*p Value < 0,05.

**Excluded from ignored dat

Furthermore, the characteristics of the newborn showed that in 2019 more male children were born than in 2020 ($p < 0.001$). It can be observed that most children were born at term ($p = 0.0039$), with adequate weight ($p < 0.001$) and with good vitality ($p = 0.0035$), noting that there is evidence of a significant difference between the years 2019 and 2020 (Table IV). The value of the effect size measure, in which it is noted that all present a very weak association (< 0.05).

TABLE IV – CHARACTERISTICS OF NEWBORNS IN THE STATE OF PARANÁ IN 2019 AND 2020. MARINGÁ, PARANÁ, BRAZIL, 2022.

Características dos recém-nascidos						
	2019		2020		Test	
	N	%	N	%	p Value	Cramer's V
Gender					< 0,001*	0,0279
Female	74.337	48,7	75.373	51,5		
Male	78.176	51,2	70.900	48,4		
Gestational age of					0,0039*	0,0076
Less than 22 weeks	52	0,03	49	0,03		
22 to 27 weeks	738	0,49	725	0,5		
28 to 31 weeks	1.528	1,01	1.439	0,99		
32 to 36 weeks	13.828	9,13	13.624	9,37		
37 to 41 weeks	133.58	88,2	127.68	87,8		
42 weeks or more	1.691	1,12	1.815	1,25		
Birth weight					< 0,001*	0,0069
< 2.500g	13.421	8,8	12.672	8,66		
2.500g to 3.999g	132.311	86,75	126.697	86,61		
≥ 4.000kg	6.789	4,45	6.914	4,73		
Apgar at 5 min					< 0,001*	0,0069
0 to 3	480	8,8	12.672	8,66		
4 to 6	1.163	86,75	126.697	86,61		
7 to 10	150.46	4,45	6.914	4,73		

* p Value < 0,05.

****Excluded from ignored data

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DISCUSSION

The findings of this study demonstrated that the maternal and neonatal epidemiological profile before and during the COVID-19 pandemic had significant differences, with a significance level of 5%, but due to the sample size, it is necessary to evaluate the size and effect measures, which show a weak association. Therefore, the study allowed a comparison of the birth profile in 2019 and 2020, allowing for an overview of perinatal outcomes during the COVID-19 pandemic in the state of Paraná.

Primary Health Care (PHC) is an important tool in combating the COVID-19 pandemic, as it develops strategies to combat viral transmission due to its collective and territorial focus. This care model, due to its community approach, has a positive impact on the care network and population health. [10] Furthermore, in the face of the pandemic scenario, the PHC reorganized its work process, emphasizing health education, thus providing self-care. [11]

In this context, nurses have a care and management role, acting mainly in guiding the population, especially in prenatal care, detecting and preventing pathologies related to the gestational period early. The main actions of nurses in prenatal care are especially directed at health promotion, disease prevention, early detection of pathologies that affect maternal and fetal health, and health education, seeking to prevent viral contamination. Care is accentuated in the third trimester, since it is the period of final fetal development and greatest maternal anxiety. [12]

The epidemiological profile of pregnant women most affected by COVID-19 in Brazil are brown women, with complete secondary education, aged between 20 and 34 years old, which means it is necessary to develop actions to reduce viral transmission and deaths, especially in more serious cases. [12] According to a study carried out in China, which analyzed 38 pregnant women who became infected, it is clear that the age range was 26 to 40 years. [13]

The majority of prenatal care began in the first trimester, and seven or more consultations were carried out in both years. A study found that COVID-19 infection among pregnant women predominated in the third trimester, with an incidence of 50.3%, which is the time of pregnancy with the highest risk of the disease. The remaining cases occurred in the postpartum period and other trimesters. [12,14] Furthermore, there is an increased risk of miscarriages in women who test positive for COVID-19 due to the association of the virus's effect on the inflammatory process and the placenta, inducing spontaneous abortion and reduced fetal growth. [15]

Cesarean sections were the most common type of birth recorded in Paraná in both years, showing that even with the external factor of the pandemic, there was no change in the percentages of birth route chosen. This is different from two meta-analyses, which, when analyzing the included studies, showed that there was a significant increase in the number of cesarean sections, especially in patients diagnosed with COVID-19. [16,17] There are records of a higher rate of cesarean sections in women with covid-19 than women without the disease in the study. [14]

Pregnancies that require cesarean sections due to medical conditions are 10-15%, however the choice of this delivery method is more frequent in developed and developing countries. [18] O Brasil no ano de 2018 foi o país da América do Sul com o maior índice de cesáreas. 14 Highlighting a rate of 55% of cesarean sections performed in the country in 2021. [19]

Regarding the gestational age of the newborn, a difference was found when comparing the two years studied, however there was a predominance of full-term births. The pandemic is associated with prematurity, as there is a higher incidence of newborns admitted to NICUs born to pregnant women with COVID-19. [17,20] During the pandemic period, 23% of premature cases occurred, the majority of which were due to iatrogenic causes due to maternal-fetal compromise. [21]

It was possible to observe in relation to the Apgar score at the 5th minute, there was a greater number of births of babies with good vitality. A meta-analysis study indicates that newborns born to women diagnosed with covid-19 had a higher chance of fetal distress, prematurity and hospitalization in the NICU when compared to newborns of women without covid-19. [22]

Regarding birth weights, this proved to be adequate during the study period. However, in 2020, neonatal low weight rates, obtained in 15 systematic reviews, had a range of 7.8 - 47.4%, with the study with the largest sample being 7.8% with 20/256 newborns. [23]

Taking these aspects into account, the pandemic is associated with a greater risk of developing morbidities in the perinatal period, being mainly associated with critical illnesses and complications during childbirth. [24] However, the findings demonstrate that when comparing the two years studied, the pandemic in 2020 did not impact perinatal outcomes in the state of Paraná. As for the limitations of this study, one should consider the incomplete and ignored data that were not included in the analysis and its limited power of generalization, since it presents a local reality. In addition, it was not possible to estimate the number of women who were infected with COVID-19 through these data. However, the study contributes to reflections regarding health in the gestational and birth period in a period before the

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pandemic and during the COVID-19 pandemic, allowing us to look at pregnant women and the possible changes that may occur to improve their care in the area of public health.

The COVID-19 pandemic did not reflect on sociodemographic, pregnancy and childbirth, and newborn variables when comparing maternal and neonatal characteristics in the pre-pandemic and COVID-19 pandemic periods in the state of Paraná. Therefore, the study allowed the identification of the maternal and neonatal profile and demonstrated the similarities of the variables in the years 2019 and 2020, supporting data for the improvement of management in health services and maternal and child health care. The role of nursing in PHC is essential for good rates of perinatal outcomes. It is suggested that future studies be developed to analyze perinatal characteristics in Brazil throughout the pandemic period and address the main pathologies of the gestational period.

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