


## Profile of maternal mortality in the State of Ceará


Lucélia Rodrigues Afonso <sup>1</sup>

 <https://orcid.org/0000-0002-8370-4008>


Lívia Lopes Custódio <sup>4</sup>

 <https://orcid.org/0000-0001-9610-7379>


Victor Hugo Santos de Castro <sup>2</sup>

 <https://orcid.org/0000-0001-7465-9092>


Marcelo Gurgel Carlos da Silva <sup>5</sup>

 <https://orcid.org/0000-0003-4030-1206>

Cláudia Patrícia da Silva Ribeiro Menezes <sup>3</sup>

 <https://orcid.org/0000-0002-0559-9302>

Ilvana Lima Verde Gomes <sup>6</sup>

 <https://orcid.org/0000-0002-1861-5121>

<sup>1-6</sup> Graduate Program in Collective Health. Health Care Department. State University of Ceará. Silas Munguba Avenue, 1700. Itaperi Campus. Fortaleza, CE, Brazil. CEP: 60.714.903. E-mail: luceliarodrigues@yahoo.com.br

### Abstract

*Objectives:* evaluate maternal mortality from January 2019 to January 2020 in the state of Ceará.

*Methods:* this is a descriptive and retrospective ecological study. Data collection was carried out from October to November 2020, considering the time interval from January 2019 to January 2020, through information registered in a public domain database in the State of Ceará, Brazil. The variables considered to outline the profile of maternal deaths were: age group, causes, marital status, color/race and education. Data analysis was performed using descriptive statistics by frequency distribution and presented through tables.

*Results:* 135 maternal deaths were registered, considering external, direct (most prevalent), indirect and late causes. The maternal mortality ratio in Ceará was 60.43%, whose profile of deaths was characterized by women with incomplete higher education (41.5%), brown (80%), in their 20-29 years (43%) and single (66.7%).

*Conclusion:* the information in this study is extremely importance, as it allows the understanding of a key population, women, in addition to assisting in the design of strategies for coping with maternal mortality.

**Key words** Maternal mortality, Cause of death, Pregnancy, Childbirth, Public health



## Introduction

Maternal mortality is known as a woman's death during a pregnancy or in a 42-day postpartum period, from any cause related or aggravated by pregnancy, except by accidental causes. It can be classified as direct death (resulting from obstetric complications during pregnancy, labor or puerperium, resulting from negligence or inadequate treatment) and indirect (resulting from previous existing disease or a disease developed during the pregnancy, aggravated by physiological effects of the moment).<sup>1</sup>

In this context, it also highlights that late maternal death is understood as a woman's death due by direct or indirect obstetric causes, occurred beyond 42 days or less than twelve months after the end of the pregnancy and maternal deaths for external causes, characterized by accidents or violence are considered unnatural causes.<sup>1</sup>

It is estimated worldwide that occurs around 600 thousand maternal deaths per year, for example a death per minute. In underdeveloped countries, the mortality rate is 239 for each 100 thousand live births. In Brazil, maternal mortality continually remains with higher levels and in 2018, the maternal mortality reason was 59.1 to each 100 thousand live births, that's higher than the goals in Sustainable Development Goals (SDG), which is reduce the global scale of maternal mortality to less than 70 to each 100 thousand live births, from 2016 to 2030.<sup>2,3</sup> The State of Ceará, according to the Public Health School of Ceará,<sup>4</sup> presented a reduction of maternal mortality in the last few years. In 2017, in each 100 thousand live births, 50 women died due to complications during pregnancy, labor or puerperium.

The mortality reduction, in Brazil, is a significant challenge to public health, since it has an uneven distribution in the Brazilian regions, above all, places where there's high social vulnerability. The maternal mortality can be considered a violation of human rights, because in most cases, it's about a preventable tragedy.<sup>3</sup>

Considering maternal deaths, in special in developing countries, such as Brazil, it becomes relevant the analyses of deaths in the presented perspective, overall in the state of Ceará, because in 2020, where was about 3 million people living under extreme poverty, according to *Cadastro Único* records, a federal government mechanism of data collection.<sup>5</sup>

This research is justified by comprehend tendencies of maternal mortality, and this makes it possible the design of strategies to promote access for women to health and also the adjustment of the health system from the perspective of complete care.

Thus, the guiding question of this study was: What are the characteristics of women who died from maternal causes in the state of Ceará from January 2019 to January

2020? This study had the objective to evaluate the maternal mortality from January 2019 to January 2020 in the state of Ceará.

## Methods

It's about a descriptive and retrospective ecological study. Data collection was carried out from October to November 2020, considering the time interval from January 2019 to January 2020, through information registered in a public domain database in the State of Ceará, in Integra SUS, a transparency platform of Health Department of the State of Ceará.

The data about the profile of maternal mortality in Ceará considered dependent variables, namely: age group (15-19; 20-29; 30-34; 35-39; 40-44; 45-49 years old); skin color/race (white, black, brown and ignored); marital status (single, married, divorced, stable relationship, ignored); education (primary school, secondary school, high school, complete higher education, incomplete higher education and ignored). The independent variables were the circumstances and/or causes of the deaths.

The extracted results about maternal mortality were registered on an electronic spreadsheet in the software Microsoft Excel 2016, creating a database that was analyzed in a descriptive statistic for distributions of frequency (absolute and relative). The reason of maternal mortality was calculated through the following expression:

$$\frac{\text{Number of women's deaths connected to pregnancy, labor and puerperium}}{\text{Number of live births}} \times 100$$

The ethical aspects were led by the principles of the Brazilian Resolution 466/2012 of National Health Council (NHC). As the result of a research based on a secondary data and no identification from the individuals, the study doesn't need the appreciation from the Research Ethics Committee (REC).

## Results

It was verified 135 maternal deaths in the state, considering the external causes, direct (others causes related to pregnancy, labor and puerperium; the end of pregnancy with abortion), indirect (pregnancy, labor and puerperium) and late deaths. And those were shown to be 60.43% of the reason to the maternal mortality in Ceará, from January 2019 to January 2020, and there was an increase registered in June 2019 and a decrease in November from the same year.

The researched data about the causes of the maternal deaths in the State of Ceará (Table 1), has shown that the direct causes was the most common (36.3%) and that the external causes were the less frequent (13.3%).

Regarding the education of the analyzed public (Table 2), the results show the major number of deaths

**Table 1**

Number of deaths for maternal causes in Ceará from January 2019 to January 2020.

Cause	N	%
External causes	18	13.3
Direct and others causes connected to pregnancy, labor and puerperium	46	34.1
Direct pregnancy ended in abortion	3	2.2
Indirect pregnancy, labor and puerperium	34	25.2
Late	34	25.2
Total	135	100.0

Source: IntegraSUS, 2020.

of women with incomplete higher education (41.5%) and minor number with women with low education level, more specifically, primary school (1.5%). In relation to their skin color/race (Table 3), it is verified that brown women were the most affected (80%).

Considering the age group (Table 4), the maternal deaths occurred in larger number, in a gap between 20-29 anos (43%) and identified that the minor number of deaths were registered in the age groups of 45-49 anos (0.7%). Respecting the marital status (Table 5), observed the largest number of deaths of single women (66.7%).

## Discussion

Observing the causes to the maternal deaths causes in Ceará, the most common was the direct causes, similar results to the national evidences and from others Brazilian's states. Nationally, from 1996 to 2018, were registered 38.919 maternal deaths in Information System about Mortality (ISM), which 67% occurred from direct obstetric causes.<sup>3</sup>

Evidences shown that in Minas Gerais, in the year of 2020, the avoidable deaths were totalized 74.4%

and that the higher rates of maternal deaths are related to direct causes.<sup>6</sup> The research reassures that the non-declared deaths add up 29.2%. In this context, it stands out health systems could have more effective and efficient technologies, in order to conduct an accurate survey of these deaths.<sup>6</sup>

It's noteworthy that in Brazil, 40% from the late maternal deaths, in the period from 2004 to 2013, were occasioned for direct obstetric causes, what could be avoided by a more qualified assistance.<sup>7</sup> Indirect obstetric deaths correspond 60%, could be reduced to control and/or treatment of chronic diseases in pregnant or postpartum women.

In 2016, Ceará registered 73 cases of obstetric maternal deaths, introducing a reason of 58.2 to each 100 thousand live births. Therefore, the State couldn't launch, by that time, the acceptable level by WorldWide Health Organization (WHO), which is 20 deaths for each 100 thousand live births.<sup>8</sup> In this study, the ratio achieved was superior to the evidences from 2016, distancing itself even more the State from the desirable goal.

Regarding the education of the analyzed public in this study, it's possible to observe a higher number of women

**Table 2**

Number of deaths for maternal causes according to education in Ceará from January 2019 to January 2020.

Education	N	%
Primary School	02	1.5
Secondary School	24	17.8
High School	37	27.4
Incomplete Higher Education	56	41.5
Complete Higher Education	09	6.7
Ignored	07	5.2
Total	135	100.0

Source: IntegraSUS, 2020.

**Table 3**

Number of deaths for maternal causes according to race in Ceará from January 2019 to January 2020.

Race	N	%
Brown	108	80.0
White	19	14.1
Black	05	3.7
Ignored	03	2.2
Total	135	100.0

Source: IntegraSUS, 2020.

**Table 4**

Number of deaths for maternal causes according to age group in Ceará from January 2019 to January 2020.

Age group (year old)	N	%
45 - 49	01	0.7
40 - 44	10	7.4
35 - 39	13	9.6
30 - 34	36	26.7
20 - 29	58	43.0
15 - 19	17	12.6
Total	135	100.0

Source: IntegraSUS, 2020.

**Table 5**

Number of deaths for maternal causes according to marital status in Ceará from January 2019 to January 2020.

Marital Status	N	%
Single	90	66.7
Married	20	14.8
Stable Relationship	18	13.3
Divorced	04	3.0
Ignored	03	2.2
Total	135	100.0

Source: IntegraSUS, 2020.

affected with incomplete higher education, however, the data diverge from the country's reality and also from others states. In Brazil, in 2018, women with low education level (less than 8 years at school) correspond 33% of the registered cases in ISM.<sup>3</sup> In a study made in the State of Paraíba, considering the period from 2007 to 2016, verified that women deaths with time study between 8 and 11 years represent 14.5%. It emphasizes that women with low education level show disinterest in seeking health service access.<sup>9</sup>

In State of Amazonas, considering the period from 2006 to 2015, were identified that uneducated women represent a total of 15.32% of the mortality ratio, educated women mortality ratio with 1 to 3 years of study represent a total of 14.47% and women with 4 to 7 years of study represent a total of 27.66%.<sup>10</sup>

Research made in the state of Paraíba, in 2020, showed that uneducated women mortality ratio represents 3.4%, educated women mortality ratio with 1 to 3 years of study represent a total of 11.2% and 19.1% for women with 4 to 7 years of study.<sup>9</sup>

About the skin color/race, the most prevalent one identified was brown. A temporal analysis between 2006 and 2017, considering maternal mortality in Brazil, showed a quantitative of 49.2% of registered deaths between brown women, this variable being prevalent in Brazilian states, except southeast states, which maternal deaths addition was superior for white women.<sup>11</sup> Such evidences reinforce the obtained results in this study. It's emphasized that, in 2018, in Brazil, according to registers of ISM women of color/race black and brown totalize 65% of the maternal deaths.<sup>6</sup>

Considering the age group, the highest numbers of maternal deaths was in the 20s. In Brazil, in 2012, 14% from the total of maternal deaths was women under 20, 77.1% of the group was between their 20 to 39 years and 8.7% was in their 40s or more.<sup>3</sup> It is noted that the obtained results in this research are included in the national estimates. Nevertheless, it's Worth drawing attention to care strategies, before, during and after labor can secure women and newborn lives, regardless of age.

Regarding marital status, in this research, prevailed single women. This confirms the epidemiological profile of maternal mortality in Brazil, inherent to the period from 2015 to 2019, it's noteworthy that 173.445 (53.4%) of the registered deaths were single women.<sup>12</sup> In Pernambuco, from 2008 to 2014, occurred 595 maternal deaths, which 59.16% were single women.<sup>13</sup>

It is argued that single pregnant women, including the divorced women, tend to constitute a vulnerable group. The justification for it is based on the absence of the baby's father and his affective, emotional, social and financial support, and his encouragement to self-care for the baby's mother.<sup>14</sup>

Given the data pointed out, this study presented some limitations, to be known: incipient studies about maternal mortality in Ceará, it's believed beyond that, that the numbers presented are estimates, once the records may not be filled out properly, leading to incomplete information.

The information from this study is extremely relevant to public health, considering the maternal deaths are related to social inequalities. It was observed that direct causes were the most prevalent related to maternal deaths. Thus, the profile of maternal mortality identified in Ceará,

in the analyzed period was: women with incomplete higher education, brown, in age group of their 20s and single.

It is recommended that to achieve the reduction of maternal mortality in the State, it must be proposed prevention measures, comprehensive familiar planning, which minimize the incidence of unwanted pregnancies, moreover, the following are essential: an adequate prenatal care; a qualified team to attend to obstetric emergencies; surveillance during the postpartum period, among other care strategies that ensure women's access to health assistance and to attend the demands of this public.

### Author's contribution

Afonso LR e Castro VHS were responsible for the data collection. Afonso LR e Silva MGC carried out the statistical analysis. Menezes CPSR, Custodio LL e Castro VHS wrote the article draft. Gomes ILV revised the article. All authors approved the final version of the article. The authors declare no conflict of interest.

### References

1. OMS (Organização Mundial da Saúde). CID-10: classificação estatística internacional de doenças e problemas relacionados à saúde. São Paulo: EDUSP; 2012.
2. OPAS (Organização Pan-Americana da Saúde). Folha informativa – mortalidade materna [Internet]. Brasília: OPAS Brasil; 2018; [access in 2020 Nov 24]. Available from: [https://www3.paho.org/bra/index.php?option=com\\_content&view=article&id=5741:folha-informativa-mortalidade-materna&Itemid=820](https://www3.paho.org/bra/index.php?option=com_content&view=article&id=5741:folha-informativa-mortalidade-materna&Itemid=820)
3. Ministério da Saúde (BR). Secretaria de Vigilância em Saúde. Mortalidade materna no Brasil [Internet]. Brasília (DF): Ministério da Saúde/FIOCRUZ; 2020; [access in 2021 Feb 03]. Available from: <https://portaldeboaspraticas.iff.fiocruz.br/atencao-mulher/mortalidade-materna-no-brasil-boletim-epidemiologico-n-o-20-ms-maio-2020/>
4. ESPCE (Escola de Saúde Pública do Ceará). Colóquio da ESP-CE focaliza mortalidade materna. Cad Esc Saúde Pública Ceará [Internet]. 2019; [cited 2020 Dec 28]. Available from: <https://www.esp.ce.gov.br/2019/06/06/coloquio-da-esp-ce-focaliza-mortalidade-materna>
5. Nascimento T. Com 5,1 milhões de pessoas na pobreza, Ceará tem 33% da população em situação de extrema vivendo com R\$ 89. Diário do Nordeste [Internet]. 2021; [access in 2021 Feb 02]. Available from: <https://diariodonordeste.verdesmares.com.br/metro/com-51-milhoes-de-pessoas-na-pobreza-ce-tem-33-da-populacao-em-situacao-extrema-vivendo-com-r-89-1.3030635>
6. Ruas MAC, Quadros CFJ, Rocha DFJ, Rocha CF, Andrade Neto GR, Piris PA, *et al.* Perfil e distribuição espacial da mortalidade materna. Rev Bras Saúde Mater Infant. 2020; 20 (2): 385-96.
7. Vega CEP, Soares VMN, Nasr AMLF. Mortalidade materna tardia: comparação de dois comitês de mortalidade materna no Brasil. Cad Saúde Pública. 2017; 33 (3): e00197315.
8. Araújo RM, Coriolano LS, Sousa JCC, Dias JL, Pessoa TNF. Análise e distribuição geográfica da mortalidade materna obstétrica no Ceará. Cad Esc Saúde Pública Ceará. 2017; 11 (2): 36-40.
9. Azevedo LMA, Souza DRX, Bezerra KKS, Batista HMT, Sousa ESS, Bezerra AMF, *et al.* Distribuição da mortalidade materna no Estado da Paraíba no período de 2007 a 2016. Rev Mult Psic. 2020; 14 (51): 486-501.
10. Medeiros LT, Sousa AM, Arinana LO, Inácio AS, Prata MLC, Vasconcelos MNG. Mortalidade materna no estado do Amazonas: estudo epidemiológico. Rev Baiana Enferm. 2018; 32: e26623.
11. Rodrigues ARM, Cavalcante AES, Viana AB. Mortalidade materna no Brasil entre 2006-2017: análise temporal. ReTEP. 2019; 11 (1): 3-9.
12. Barreto BL. Perfil epidemiológico da mortalidade materna no Brasil no período de 2015 a 2019. Rev Enferm Contemp. 2021; 10 (1): 127-33.
13. Ribeiro RFSA. Redução da mortalidade materna em Pernambuco: realidade ou desafio? [dissertation]. Recife (PE): Universidade Federal de Pernambuco (UFPE); 2018.
14. Mascarenhas PM, Silva GRD, Reis TT, Casotti CA, Nery AA. Análise da mortalidade materna. Rev Enferm UFPE On line. 2017; 11 (Suppl 11): S4653-S62.

Received on March 13, 2021

Final version presented on October 19, 2021

Approved on December 7, 2021