

Analysis of the prevalence of maternal deaths in São Luís, Maranhão, during 2008-2018

RESUMO | Objetivo: investigar a prevalência de óbitos maternos ocorridos entre 2008 e 2018. Método: estudo descritivo, exploratório, transversal, com abordagem quantitativa, realizado no município de São Luís, Maranhão. A amostra foi composta por 161 óbitos maternos cujos dados epidemiológicos foram disponibilizados publicamente por meio do Departamento de Informática do Sistema Único de Saúde. A coleta de dados foi realizada no 1º semestre de 2021, entre os meses de abril e maio. O tratamento dos dados se deu por meio de análise uni-variada. Resultados: prevalência de mulheres entre 20-29 anos, solteira, de 8-11 anos de estudos e pardas. Quanto ao mês e ano de notificação, houve prevalência em abril e em 2010. A causa mais prevalente foi a eclampsia. Destaca-se que estes óbitos foram mais recorrentes durante o puerpério, até 42 dias. Conclusão: houve redução significativa dos óbitos maternos em um período de 10 anos, porém aumentaram-se os fatores de risco, principalmente cardiovasculares, em mulheres jovens, sendo necessárias as ações de identificação e controle das complicações.

Descritores: Mortalidade materna; Serviços de saúde materno-infantil; Prevenção primária.

ABSTRACT | Objective: to investigate the prevalence of maternal deaths that occurred between 2008 and 2018. Method: descriptive, exploratory, cross-sectional study with a quantitative approach, conducted in the municipality of São Luís, Maranhão. The sample was composed of 161 maternal deaths whose epidemiological data were publicly available through the Department of Informatics of the Unified Health System. Data collection was conducted in the 1st half of 2021, between the months of April and May. Data were treated using univariate analysis. Results: prevalence of women aged 20-29 years, single, 8-11 years of schooling, and mixed race. As for the month and year of notification, there was prevalence in April and in 2010. The most prevalent cause was eclampsia. It is noteworthy that these deaths were more recurrent during the puerperium, up to 42 days. Conclusion: there was a significant reduction in maternal deaths over a 10-year period, but risk factors increased, especially cardiovascular factors in young women, requiring actions to identify and control complications.

Descriptors: Maternal mortality; Maternal-child health service; Primary prevention.

RESUMEN | Objetivo: investigar la prevalencia de las muertes maternas ocurridas entre 2008 y 2018. Método: estudio descriptivo, exploratorio, transversal, cuantitativo, realizado en São Luís, Maranhão. La muestra fue compuesta por 161 muertes maternas cuyos datos epidemiológicos fueran disponibles públicamente a través del Departamento de Informática del Sistema Único de Salud. La recogida de datos se llevó a cabo en el primer semestre de 2021, entre los meses de abril y mayo. El tratamiento de los datos se realiza mediante un análisis univariable. Resultados: prevalencia de mujeres entre 20-29 años, soltera, de 8-11 años de estudios y pardas. En cuanto a los meses y años de notificación, la prevalencia fue en abril y en 2010. La causa más frecuente fue la eclampsia. Destaca que estos óbitos fueron más recorridos durante el puerperio, hasta los 42 días. Conclusión: hubo reducción significativa de los óbitos maternos en un período de 10 años, pero aumentó los factores de riesgo, principalmente cardiovasculares, en las mujeres jóvenes, siendo necesarias las acciones de identificación y control de las complicaciones.

Descriptores: Mortalidad materna; Servicios de salud materno-infantil; Prevención primaria.

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INTRODUCTION

Maternal mortality (MM) can be defined by the death of a woman during pregnancy, childbirth or the puerperium (up to 42 days postpartum), caused by intrinsic factors, that is, related to the pregnant woman or pregnancy, which are the socioeconomic aspects (age, marital status, education, race/color, abortions, underlying diseases, among others); or to extrinsic factors, these procedures being related to it (previous and previous surgeries, unhealthy environment, among others). (1)

According to the World Health Organization (WHO), in the 10th revision of the International Classification of Diseases (ICD-10), the causes of MM, as defined by the ICD-10, are divided into direct obstetric causes, which result from complications of the pregnancy, childbirth or puerperium due to interventions, omissions, incorrect treatment or the chain of events resulting from any of the aforementioned causes. The most frequent causes are hypertensive diseases (including eclampsia, HELLP syndrome), hemorrhages and puerperal infection; as well as indirect obstetric causes, which result from the mother's previous illness or developed during pregnancy, not due to direct obstetric causes, but aggravated by the physiological effects of pregnancy. The most frequent causes are Diabetes Mellitus (DM), Systemic Arterial Hypertension (SAH) and cardiovascular diseases (CVD). (2)

It should be noted that almost all direct causes are preventable. As for indirect causes, it is important to note that they are linked to women who already have the disease and should, therefore, be considered, initially, as high-risk pregnant women and monitored with more care. (2) MM is a problem that challenges public health around the world. In Brazil, these problems gained notoriety for prevention in 1994, 14 years after the creation of the Unified



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Health System (SUS) with the implementation of the Family Health Program, current Family Health Strategy (FHS), aiming to implement the principles of the SUS in health care practice. (3) Thus, the expansion of Primary Care (PC) in the country considerably reduced the Infant Mortality Rate (IMR), which went from 38 to 16 children for every 1000 live births between 1994 and 2010. (4,5)

Ordinance No. 1172, of June 15th, 2004, recommends that within the field of health care, Epidemiological Surveillance (ES) stands out, being the responsibility of the Municipal and State Health Departments to designate professionals responsible for ES and monitoring of deaths that occurred in the city and state. (6) Thus, the importance of improving health information systems and the investment in the academic and assistance community focused on public health is highlighted, as well as the training of thousands of professionals in the public network, aiming at qualified and prepared care for the demands of the pregnant woman and her family members.

The implementation of MM Study and Prevention Committees is one of the strategic actions to improve the death registration system and, consequently, to increase the quantity and quality of available information related to MM. With this, States and municipalities can build more effective policies for women's care in family planning, during pregnancy, in cases of abortion, childbirth and the puerperium. Some of these committees in the country investigated only reported maternal deaths and highly suspected or presumed ones. (2,4,5)

This study is justified in view of the importance of investigating and analyzing the prevalence of maternal deaths, as well as the risk factors related to them, in order to promote and discuss prevention strategies and qualify professionals to work in care, surveillance

and epidemiological monitoring. Therefore, this study aimed to analyze the prevalence of maternal deaths in São Luís, Maranhão, during 2008-2018.

METHOD

This is a descriptive, exploratory, cross-sectional study with a quantitative approach. The study sample consisted of records of 161 maternal deaths reported in the city of São Luís, Maranhão, during the period 2008 to 2018. The study was carried out based on the analysis of publicly accessible data on the website of the Department of Informatics of the System Health Service (DATASUS) whose data are freely available online (<http://datasus.saude.gov.br/informações-de-saude/tabnet>). Data collection was carried out in the 1st semester of 2021, between the months of April and May, by the responsible researcher. Only publicly accessible epidemiological data, published through the DATASUS website, on maternal deaths that occurred between 2008-2018 were included in the study.

Until the period of data collection in the DATASUS system, there were only records of cases of maternal deaths for the period 1996 to 2018. Even though the collection was carried out in the year 2021, there was no data for the period 2019 to the present year. A structured form, prepared in-house, based on the Death Certificate, was used as a data collection instrument, which included the following variables: types of deaths; month and year of death; color/race; place of occurrence; maternal age; marital status; maternal education; period of death; investigation and causes of death according to the International Classification of Diseases nº 10 (ICD-10).

Data were stored in the Statistical Package for Social Sciences (SPSS®), version 15.0, tabulated and presented in tables with absolute and relative frequencies, as well as Measures of Cen-

tral Tendency (MCT), namely: Mode (Mo), Median (Me), Arithmetic Mean (AM) and Standard Deviation (SD). Furthermore, the 95% Confidence Interval, with $p \leq 0,05$, was used for statistical analysis. The tables were created using the statistical program Microsoft Excel®, version 2010, and the data were statistically treated using univariate analysis.

As this data is in the public domain, it was not necessary to submit the research project for consideration and approval by the Research Ethics Committee (REC).

RESULTS

In the studied sample, there was a prevalence of women aged 20-29 years (50.3%), whose age with the highest sample repetition was 24 years and median age of 25 years, mean age of 24.65 years (± 2.79804). Still, most of the sample was single (59.0%), had between 8-11 years of schooling (47.8%) with equivalence between mode and median of nine years and average schooling time of 9.4 years (± 1.09417). There was a prevalence of self-declara-

Table 1 – Socioeconomic and demographic profile of maternal deaths in the city of São Luís, Maranhão, 2008-2018. (n=161)

Variable	n	%	Mo	Me	AM	SD
Age group (years)						
10-14	01	0,6	-	-	11	-
15-19	16	9,9	17	17	17,25	$\pm 1,34164$
20-29	81	50,3	24	25	24,65	$\pm 2,79804$
30-39	52	32,2	32	34	34,32	$\pm 2,63254$
40-49	11	7,0	43	43	44	$\pm 2,32379$
Marital status						
Single	95	59,0	-	-	-	-
Married	23	14,2	-	-	-	-
Widow	02	1,2	-	-	-	-
Other	30	18,6	-	-	-	-
Ignored	11	7,0	-	-	-	-
Education (years)						
None	04	2,4	-	-	0,0	-
1-3 years	07	4,3	03	03	2,4	$\pm 0,7868$
4-7 years	32	19,8	07	06	5,9	$\pm 1,11758$
8-11 years	77	47,8	09	09	9,4	$\pm 1,09417$
12 years and +	27	16,7	15	13	13,59	$\pm 1,18514$
Ignored	14	9,0	-	-	-	-
Ethnicity/Color						
White	29	18,0	-	-	-	-
Black	31	19,2	-	-	-	-
Brown	88	54,6	-	-	-	-
Ignored	13	8,2	-	-	-	-

Source: The authors, 2021. Mo = Mode. Me = Median. AM = Arithmetic Mean. SD = Standard Deviation

Table 2 – Prevalence of MM in São Luís, Maranhão, according to month and year of death during 2008-2018. (n=161)

Variable	n	%	SD	CI 95%	Limit
Death month					
					Superior Inferior
January	08	4,9	±4,21225	2,38326	15,79992 11,03340
February	08	4,9			
March	16	9,9			
April	20	12,4			
May	17	10,5			
June	17	10,5			
July	14	8,6			
August	18	11,1			
September	15	9,3			
October	09	5,5			
November	08	4,9			
December	11	7,5			
Death year					
2008	18	11,1	±5,64515	3,33601	17,97238 11,30035
2009	16	9,9			
2010	30	18,6			
2011	14	8,6			
2012	13	8,0			
2013	14	8,6			
2014	12	7,4			
2015	14	8,6			
2016	14	8,6			
2017	07	4,3			
2018	09	6,3			

Source: The authors, 2021.

Table 3 – Diagnosis profile of maternal deaths in São Luís, Maranhão, according to the subcategories of the International Classification of Diseases nº 10 (ICD-10), 2008-2018. (n=161)

ICD-10	Maternal death subcategory	n	%
B20	HIV disease resulting from infectious and parasitic diseases	01	0,6
B24	Unspecified HIV disease	01	0,6
O00	Ectopic pregnancy	05	3,1
O02	Other abnormal design products	01	0,6
O03	Miscarriage	01	0,6
O05	Other types of abortion	03	1,8
O06	Unspecified abortion	07	4,3
O07	Abortion attempt failed	03	1,8

tion of brown color (54.6%) among the women in the study (Table 1).

Regarding the month and year in which the death was notified, there was a prevalence of deaths in April (12,4%) and in 2010 (18,6%). It should be noted that there was no statistical association between maternal deaths and the variables “month” and “year”, considering that the p-value did not satisfy this condition (Table 2).

The deaths in this study had different obstetric causes, considering the subcategories of the International Classification of Diseases No. 10 (ICD-10), which had repercussions during pregnancy, childbirth and the puerperium. Thus, the most prevalent cause of death was eclampsia (9,3%), followed by death from any obstetric cause, which occurs more than 42 days, but less than 1 year after delivery (6,8%). However, it is noteworthy that a portion of 26,0% did not have a defined obstetric cause, but offered a risk of complications in pregnancy, childbirth and the puerperium (Table 3).

Maternal death (92,5%) was the most prevalent in the studied sample, but there was a minimal number of maternal deaths classified as late (7,5%). The prevalence of the causes of these deaths was mostly due to direct causes (65,1%), the place of occurrence of most of them was within the hospital environment (90,0%). It is noteworthy that these deaths were more recurrent during the puerperium, up to 42 days (45,3%). The investigation of deaths was carried out through the informed summary form (77,6%) (Table 4).

Socioeconomic, clinical and epidemiological aspects constitute important data during the investigation of maternal deaths. Pregnancy at an early age in women can predispose to events, especially cardiovascular, with a poor prognosis for women at risk of complications and consequent evolution to death. The notification of these cases provides us with a better investigation

O10	Pre-existing hypertension complicating pregnancy, childbirth and the puerperium	06	3,7
O13	Gestational hypertension without significant proteinuria	02	1,2
O14	Gestational hypertension with significant proteinuria	07	4,3
O15	Eclampsia	15	9,3
O16	Unspecified maternal hypertension	05	3,1
O21	Excessive vomiting in pregnancy	01	0,6
O23	Genitourinary Tract Infection in Pregnancy	01	0,6
O24	Diabetes mellitus in pregnancy	02	1,2
O26	Maternal care for other complications predominantly linked to pregnancy	02	1,2
O36	Assistance provided to the mother for other known or suspected fetal problems	01	0,6
O44	Placenta previa	01	0,6
O45	Premature abruption of the placenta	05	3,1
O46	Antepartum hemorrhage not classified elsewhere	02	1,2
O62	Uterine contraction abnormalities	05	3,1
O71	Other obstetric traumas	03	1,8
O72	Postpartum hemorrhage	03	1,8
O75	Other complications of labor and childbirth not classified elsewhere	03	1,8
O85	Puerperal infection	08	4,9
O88	Obstetric embolism	04	2,4
O90	Postpartum complications not elsewhere classified	04	2,4
O95	Obstetric death of unspecified cause	05	3,1
O96	Death from any obstetric cause occurring more than 42 days, but less than 1 year, after delivery	11	6,8
O97	Death from sequelae from direct obstetric causes	01	0,6
O98	Maternal infectious and parasitic diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	02	1,2
O99	Other maternal diseases classifiable elsewhere but complicating pregnancy, childbirth and the puerperium	35	26,0

Source: The authors, 2021.

Table 4 – Clinical profile of maternal deaths in São Luís, Maranhão, during 2008-2018. (n=161)

Type of death	n	%	AM±SD	CI 95%
Maternal	149	92,5	80,5±68,5	10,58098
Late Maternal	12	7,5		
Causes of death* (n=149)				
Direct obstetric Maternal	97	65,1	49,6±37,6	6,03828
Indirect obstetric maternal	47	31,5		
Unspecified obstetric maternal	05	3,4		
Place of occurrence of death				

and understanding of their causes, as well as the implementation of effective ways to reduce these deaths, providing a better quality of life for pregnant women and children.

DISCUSSION

The most prevalent socioeconomic and demographic profile in this study was women who declared themselves to be brown, single, aged between 20 and 29 years, and with intermediate education, with 8 to 11 years of schooling. Another scientific study obtained similar results in a survey that evaluated 5.675 maternal deaths in the Northeast region, which occurred between 2009 and 2018, whose data showed a prevalence of maternal deaths in the age group of 20 to 29 years (40,56%), brown (65,99%), with maternal education between 8 and 11 years of study (28,42%) and single (48,14%). (7)

Regarding the causes of MM, there was a prevalence of direct obstetric maternal death (65,1%), which occurs for obstetric reasons during pregnancy, childbirth or puerperium (up to 42 days postpartum) due to interventions, omissions, mishandling or a chain of events resulting from any of these causes, (8) compared to the lowest index of indirect causes (45,3%). A study carried out in Belém, Pará, between 2013 and 2015, corroborates the data of this research which informs that, according to the Maternal Mortality Ratio (MMR) for obstetric causes, a predominance of direct obstetric causes was identified, with RMM 90,7 in 2013, 78,6 in 2014 and 73,2 in 2015 a little more than the RMM of indirect obstetric causes (69,6; 57,4 and 48,8/100.000 live births in each period), with a variation of 15,19% (2014-2013); of 10,32% (2015-2014) and a significant variation of 23,94% when compared to 2015-2013. (9)

Among the direct obstetric causes, the most recurrent among the de-

Hospital	145	90,0	40,2±60,5	9,35728
Home	11	6,8		
Public hospital	02	1,2		
Others	03	2,0		
Death period				
During pregnancy, childbirth or abortion	47	29,1	26,8±25,3	3,90917
During the puerperium, up to 42 days	73	45,3		
During the puerperium, from 43 days to less than 1 year	22	13,6		
Not in pregnancy or the puerperium	04	2,4		
Inconsistent reporting period	05	3,1		
Not informed or ignored	10	6,5		
Investigated death				
With summary form informed	125	77,6	53,6±50,4	7,79543
No summary form informed	16	9,9		
Not investigated	20	12,5		

Source: The authors, 2021. *There were no causes of late maternal deaths.

aths studied was maternal death from eclampsia (9,3%). In a study with a larger sample, results of higher prevalence were obtained: of the 255 cases of maternal deaths included in the sample, 35 (13,7%) occurred due to eclampsia. (10) Likewise, other authors in their studies achieved a result of 76 deaths from eclampsia from a total sample of 586 maternal deaths (11) and, finally, with an even more significant sample of deaths (n=5.675), the study resulted in 906 (15,96%) deaths from eclampsia. (7)

Despite the wide knowledge about hypertensive disorders, these are still the main cause of MM worldwide, so the prevention of eclampsia should be started even in prenatal screening, with

regular measurement of blood pressure (BP) of the pregnant woman, who must be referred to high-risk prenatal care when diagnosed with preeclampsia. (12) This screening must be carried out efficiently and attentively in all prenatal consultations, always guiding the pregnant woman about the signs of pre-eclampsia and the importance of proper nutrition, good lifestyle habits and regular attendance at scheduled appointments. (13)

The importance of detailed and systematized prenatal and postpartum consultations is highlighted, which significantly contribute to the prevention of maternal deaths from direct obstetric causes. (14) The quality of prenatal care is an indicator of health and quality of

care that directly influences the evolution of the pregnant woman's clinical condition. (15) The assistance to pregnant women at the health unit must provide a safe space for the clarification of doubts and important guidelines for the health of the woman and the baby, the professional must ensure access to health services and citizenship of the pregnant woman and refer her to the high-risk prenatal care when the need is verified. (7)

CONCLUSION

There was a significant reduction in maternal deaths over a period of 10 years, but risk factors, especially cardiovascular ones, in young women were increased, requiring actions to identify and control complications. Therefore, qualified care and investigation, together with educational activities, can collaborate to the early detection of risk factors for obstetric complications in order to increase the chances of intervention in the care provided to pregnant women in order to avoid complications and death.

The findings of this study will involve the analysis of preventability of deaths, as well as the identification of preventable causes of maternal deaths and the necessary interventions in order to support further research in this area in order to reduce the prevalence of these deaths and, consequently, provide better quality of life of the mother and the child.

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