Infant mortality in the state capital of Amazonas: analysis of preventable causes in the 2012 to 2014 triennium

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Abstract

Infant mortality is defined as death before the first year of life; in many cases such deaths could have been prevented. Therefore, this study aimed to analyze infant mortality and its components of residents of Manaus during the 2012-2014 triennium, according to preventable causes. This was a descriptive epidemiological study conducted in northern Brazil, where all deaths of children under one year old, based on data available in the Mortality Information System (MIS) and the Live Birth Information System (SINASC) were analyzed. For analysis criteria, descriptive statistics were used, and the List of Causes of Death that are Preventable by Interventions of the Unified Health System was applied, and then the Infant Mortality Coefficient (IMC) was calculated by year and by component. Given that public domain data were used and without any identification of the research participants, it was not necessary to submit a request to the Research Ethics Committee, according to Resolution 510 of April 7, 2016 of the National Health Council. The analysis showed that in the triennium of 2012-2014, 1791 deaths in children under one year were reported in Manaus, 59.9% were classified as preventable and the neonatal component concentrated over 60% of the deaths. It can be concluded that the infant mortality rate was stable, and more than 2/3 of the deaths were considered preventable. Therefore, the efforts needed to reduce avoidable deaths should focus on improving the quality and resolution of prenatal care, even in primary care.

Keywords: Child Mortality. Death. Unified Health System. Mortality Records. Causes of death.

INTRODUCTION

The infant mortality rate is an important indicator of the population's quality of life. Its relevance can be observed after reduction targets were set that became part of the Millennium Development Goals (MDG) agenda in 2000[1].

Infant mortality is defined for cases in which death occurs before completing the first year of life and is due to a series of factors[2]. Among the main ones are social, cultural, biological and health care quality factors. For didactic purposes, it is divided into two components: neonatal, where deaths occur up to 27 days of life, and post-neonatal, which corresponds to deaths occurring between 28 and 365 days of life[2].

In the 1970s and 1980s, several authors proposed lists of causes of death that could be prevented by the presence of effective health services[3–5]. In Brazil, under the coordination of

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the Health Surveillance Secretariat (HSS) and the Ministry of Health (MH), a list of the causes of death which could be prevented through interventions by the Unified Health System (SUS) was prepared in 2007 and is constantly being reviewed[6,7].

Understanding child mortality is of paramount importance to improve the interventions applied to this phenomenon, because, from such understanding, it is possible to develop coping, prevention and promotion strategies that can contribute to reducing the mortality of children under the age of one year; especially those considered to be preventable deaths. According to Rutstein, preventable deaths are those that could be prevented in the presence of effective health services[4].

Despite the increase in publications on child mortality in Brazil, a literature review revealed a lack of publication on the subject in the city of Manaus, resulting in a lack of information concerning this phenomenon. Thus, this study aimed to analyze infant mortality and its components of residents in Manaus in the 2012-2014 triennium, according to preventable causes.

METHODS

This was a descriptive epidemiological study, conducted in the municipality of Manaus, capital of the state of Amazonas, which has an estimated population, according to the last census conducted in 2007, of 1,6 million inhabitants, being the most populous municipality in northern region of the country. Its Human Development Index, 0.737, is considered high, but when compared to the other metropolitan regions, it occupies the second-to-last position[8].

All deaths of children under one year of age residing in Manaus from 2012 to 2014 were analyzed, totaling 1791 deaths. The databank sources used were the Mortality Information System (MIS) and the Live Birth Information System (SINASC) of the Ministry of Health.

For the analysis of preventable deaths, we used the List of Causes of Preventable Deaths through the Unified Health System Interventions, proposed by Malta in (2007) and revised in (2010). This list classifies deaths into 3 groups: preventable causes, poorly defined causes of death and other causes (not clearly preventable).

Initially, the Infant Mortality Coefficient (IMC) per year and by component was calculated, as well as the proportional mortality for the main cause groups per triennium and the percentage of variation during this period. The method used to calculate the IMC was the same as that used by the Interagency Health Information Network[6,7,9].

Given that public domain data were used and without any identification of the research participants, it was not necessary to submit it to the Research Ethics Committee, according to Resolution 510 of April 7, 2016 of the National Health Council[10].

RESULTS

In the 2012-2014 triennium, in the MIS, 1791 deaths in children under the age of one were reported by resident mothers, of which 1,113 (62.1%) were neonates and 678 (37.9%) were post-neonates. In SINASC, during this same period, 125,618 live births (LB) were reported. The IMC showed a slight increase in the studied period from 13.6 to 13.8/1,000 LB. The early neonatal component was the only one to show a decrease, from 6.5 to 6.2/1,000 LB, nevertheless it remains the component with the highest MIC (Table 1).

According to Table 2, of the total deaths, 1073 (59.9%) were classified as preventable; 693 (38.7%) unavoidable; and the causes for 25 (1.4%) deaths were considered poorly defined and could not be classified.

Table 3 presents preventable deaths according to the components of infant mortality, highlighting the early neonatal component, which represented 56.3% of deaths in the study period.

Within the group of preventable causes, it

is noteworthy that 40.6% of deaths could have been prevented if there was adequate attention given to women during pregnancy. In this group, there was a predominance of respiratory distress deaths among newborns, fetuses and newborns affected by maternal disorders, not necessarily related to the pregnancy at that time. Deaths related to adequate attention given to the fetus and newborn accounted for 22.9% of the total preventable causes. Newborn (NB) bacterial septicemia accounted for more than half of deaths in this group, as shown in table 4.

Table 1 – IMC per component. Manaus, 2012 to 2014.

Ano	Premature Neonatal (N=799)	Late Neonatal (N=314)	Post-neonatal (N=678)	Total (N=1791)
2012	6.5	2.1	4.9	13.6
2013	6.2	2.9	6	15.3
2014	6.2	2.4	5.1	13.8

Nota: IMC por 1000/NV.
Fonte: MIS e SINASC, 2012 – 2014

Table 2 – Proportional infant mortality from avoidable, unavoidable, and poorly defined causes. Manaus, 2012 to 2014.

Year	Preventable		Unavoidable		Poorly defined		Total deaths
	n	%	n	%	n	%	(n)
2012	323	57.7	224	40	13	2.3	560
2013	386	60.5	248	38.9	4	0.6	638
2014	364	61.4	221	37.3	8	1.3	593
Total	1073	59.9	693	38.7	25	1.4	1791

Source: MIS, 2012-2014.

Table 3 – Preventable deaths according to the components of infant mortality. Manaus, 2012 to 2014.

Component	2012	2013	2014	Total	
	N	N	N	N	%
Premature Neonatal	195	193	216	604	56.3
Late Neonatal	54	82	61	197	18.4
Post-neonatal	74	111	87	272	25.3
Total	323	386	364	1073	100

Fonte: SIM, 2012-2014.

Table 4 – Child deaths (nº, %, rate per 1000/LB), according to the Brazilian List of Preventable Deaths, Manaus, 2012 to 2014.

Preventable Causes	2012-2014		
	N	%	IMC
1.1. Immunization actions	9	0.8	0.07
A37 – Pertussis	8	88.9	0.06
1.2.1. Adequate attention given to women during pregnancy	436	40.6	3.47

to be continued...

...continuation - Table 4

Preventable Causes	2012-2014		
	N	%	CMI
P22 - Respiratory distress of the newborn	215	49.3	1.71
P00 - Fetus and newborn affected by maternal disorders	77	17.7	0.61
1.2.2. Adequate attention given to women at childbirth	123	11.5	0.98
P24 - Neonatal aspiration syndrome	41	33.3	0.32
P21 - Asphyxia at birth	29	23.6	0.23
P02 - Fetus and newborn affected by complications of placenta, umbilical cord and membranes	25	20.3	0.19
1.2.3. Adequate attention given to fetus and newborn	246	22.9	1.96
P36 - Bacterial septicemia of the newborn	131	53.2	1.04
P23 - Congenital pneumonia	41	16.7	0.32
1.3. Appropriate diagnostic and treatment actions	196	18.3	1.56
J18 - NE microorganism pneumonia	81	41.3	0.64
A41 - Other septicemia	46	23.5	0.36
1.4. Appropriate health promotion actions	63	5.9	0.50
A09 - Diarrhea and gastroenteritis of presumed infectious origin	25	39.7	0.19
E43 - Severe protein-caloric malnutrition of NE	7	11.1	0.05
W78- Inhalation of gastric contents	6	9.5	0.04
Total	1073	100	8.54

Source: MIS, 2012-2014.

DISCUSSION

During the study period, the IMC showed a slight increase, from 13.6 to 13.8/1000 live births, a percentage variation of 1.5%. This IMC is lower than that recorded throughout the country in 2014, which was 14.4/1000 live births and similar to the rate found in the state of Pernambuco; which was 14/1000 live births[11]. When compared to more economically developed countries (MEDCs), such as Italy and Japan, which have rates of 2/1000 live births, Manaus has rate that is 6 times higher[12].

The neonatal component accounted for more than 60% of deaths - a trend observed in other studies[13–15] - highlighting a reduction in the early neonatal component and an increase in the late neonatal component. This fact brings Manaus closer to the mortality profile of MEDCs, whose neonatal component is predominant[16].

This study points out that almost 60% of deaths under one year of age could be prevented, a fact observed in other studies[17,18]; most of them in the early neonatal component. This indicates that there are difficulties in intensive care for the newborns.

Through the preventability classification adopted in this study, it was possible to identify that the majority of deaths were related to the groups of reducible causes. The adequate attention given to the woman during pregnancy, in which death due to the respiratory syndrome of the newborn, and the adequate attention given to the fetus, with bacterial septicemia as the main cause of death, stand out. This phenomenon has also been observed in other studies[13,18,19] and suggests poor quality prenatal care, cases of prematurity and inadequate neonatal intensive care, requiring improved professional qualification and strengthening primary care.

The group of reducible causes by giving

adequate attention to women during childbirth and taking adequate actions of diagnosis and treatment occupy the intermediate zone when it comes to preventable deaths in the reality of Manaus' residents. The deaths related to respiratory problems are highlighted, which indicates difficulties in accessing health services at delivery. This is demonstrated by the poor coverage and logistical difficulties, as well as unfavorable socioeconomic conditions when it comes to deaths due to the lack of diagnosis and treatment[14,20].

This study points out that the smallest portions of deaths were attributed to the reducible cause groups of immunoprevention and health promotion actions. This result may be related to the National Immunization Program, as well as the expansion of the Family Health Strategy and Epidemiological and Sanitary Surveillance actions. It is noteworthy that despite the advances, infant deaths from pertussis and rubella were still recorded, demonstrating that these diseases require constant surveillance[21–23].

Since this is a capital city with almost 2 million inhabitants and considering that health information systems have better quality in more developed regions, the city of Manaus presents considerably adequate and vital information[24,25]. However, studies involving secondary data, such as information on deaths and live births, should always consider the quality of filing as a limitation. It is worth remembering that health information systems have been improved throughout the Brazilian territory, and their use allows studies to be conducted, fostering discussions and supporting the planning of health actions.

CONCLUSION

The results of this study show that the infant mortality rate showed stable behavior, below the national average, with a variation of 1.5% during the surveyed period. Manaus displayed a rate that is 6 times higher than developed countries, which highlights the importance of an improved coverage of the phenomenon.

More than two thirds of the deaths were considered preventable, with the reducible cause groups giving adequate attention to women during pregnancy and to the fetus and newborn, presenting the highest rates. The early neonatal component continues to have the highest number of deaths, which reinforces the importance of higher quality hospital care and improved quality and resolution of prenatal care, even in primary care, while integrating care primary care to hospital care. Patients should have at least 7 consultations, seeking early diagnoses and treatments of infections that occurred during pregnancy, childbirth and birth.

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