

# Preventable deaths in children under five in the Macro Norte region of the state of Minas Gerais, Brazil

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## Abstract

This is a descriptive epidemiological study, with objective of evaluating preventable deaths of children under the age of 5 years which occurred in 2013 in northern macro-region of Minas Gerais. There were 3,641 preventable deaths in Minas Gerais in year studied, 392 of them located in the northern macro-region. The study found a prevalence of preventable deaths in male children of brown colour. Deaths according to age group are also noteworthy.

**Keywords:** Cause of death-Disease. Infant mortality. Epidemiological studies. Epidemiology-Information.

## Resumo

### Óbitos evitáveis de menores de 5 anos na macrorregião Norte do estado de Minas Gerais, Brasil

Trata-se de estudo epidemiológico de caráter descritivo, com objetivo de avaliar óbitos por causas evitáveis de menores de 5 anos ocorridos em 2013 na macrorregião Norte de Minas Gerais. No ano estudado ocorreram 3.641 óbitos evitáveis em Minas Gerais, 392 deles localizados na macrorregião Norte. Constatou-se a prevalência de óbitos evitáveis em crianças do sexo masculino e de cor parda. Destacam-se também óbitos divididos por faixa etária.

**Palavras-chave:** Causas de morte-Doença. Mortalidade infantil. Estudos epidemiológicos. Epidemiologia-Informação.

## Resumen

### Muertes evitables de menores de cinco años en la macrorregión Norte del estado de Minas Gerais, Brasil

Se trata de un estudio epidemiológico de carácter descriptivo, con el objetivo de evaluar las muertes por causas evitables de menores de 5 años ocurridas en el año 2013, en la macrorregión Norte de Minas Gerais. En el año estudiado tuvieron lugar 3.641 muertes evitables en Minas Gerais, 392 de ellas localizadas en la macrorregión Norte. Se constató la prevalencia de muertes evitables de niños de sexo masculino y color de piel pardo. Se destacan también las muertes divididas por franja etaria.

**Palabras clave:** Causas de muerte-Enfermedad. Mortalidad infantil. Estudios epidemiológicos. Epidemiología-Información.

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Declararam não haver conflito de interesse.

Malta et al.<sup>1</sup> define “avoidable death” as the one that could be totally or partially prevented by the provision of effective health services to forestall disease, promote health, and treat conditions which are determinant of death. This concept led to the elaboration of a list of 90 avoidable causes of death in Brazil, divided into reducible/preventable: Adequate attention to women during pregnancy and childbirth, the newborn, diagnostic actions and appropriate treatment, health promotion linked to actions of attention - and ill-defined causes.

For Gorgot et al.<sup>2</sup>, “infant mortality” refers to the death of children who are younger than one year of age, and its rate is determined by every thousand children born in a given geographical area and year. Neonatal deaths are multifactorial. However, many of them are preventable. Global mortality rate statistics show that neonatal deaths are predominantly related to three causes: pre-term, birth asphyxia and infections<sup>3</sup>.

Avoidable infant mortality is one in which the health service could have intervened, reducing its incidence as Nascimento, Almeida and Gomes point out<sup>4</sup>. For Santos et al.<sup>5</sup>, the greatest difficulty to reduce it is due to deaths related to congenital malformation, because they are of unknown etiology. However, even in such cases preventive measures and early detection may be taken during prenatal consultations.

The Pacto Nacional pela Redução da Mortalidade Materna e Neonatal (National Pact for the Reduction of Maternal and Neonatal Mortality) was established in Brazil on 8th March 2004<sup>6</sup>. The reduction of 73% of the under-five mortality rate between 1990 and 2011 can be attributed to this Pact<sup>7</sup>. 14 deaths per 1,000 live births were reported in 2012, according to the Departamento de Informática do Sistema Único de Saúde - Datasus (Department of Information Technology of the Brazilian National Health System)<sup>8</sup>. This remarkable reduction was related to the improvement of health services and living conditions in the country. However, Careti, Scarpelini and Furtado<sup>7</sup> highlight a high risk of death of children from mothers with less than eight years of schooling and gestational age above 37 weeks.

Santos et al.<sup>5</sup> consider that the decline in the under-five mortality rate in Brazil is a result of improvements in several areas, highlighting the reduction of income inequality, the increase in schooling and the entry of women into the labor market. Despite this progress, currently more than half of the causes of under-five death are considered preventable.

In view of this context, the objective of this study was to describe the epidemiological data available in Datasus regarding deaths from preventable causes of

children under five years of age in the northern macro region of the state of Minas Gerais.

## Method

This is a descriptive epidemiological study. The data refer to 2013 and were collected on the Datasus website, accessed in October 2015. Because it is a public domain database, it was not necessary to submit the project to the Comitê de Ética em Pesquisa (Research Ethics Committee), but legal and ethical aspects that involve researches with human beings were respected, based on Resolution CNS 466/2012<sup>9</sup>.

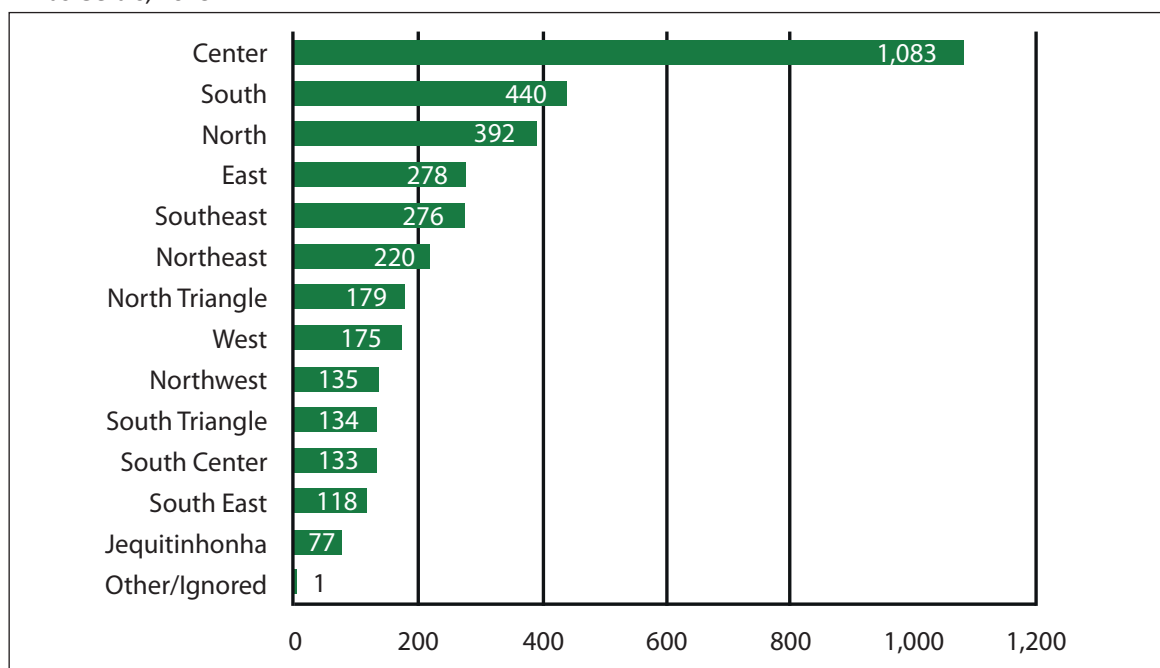
Datasus divides data from Minas Gerais into macro-regions: North, Southeast, East, West, Center, South, Northeast, North Triangle, Northwest, South Triangle, South Center, South East, Jequitinhonha, others / ignored. In 2013, deaths from preventable causes in that state totalled 3,641, of which 392 occurred in the northern macro-region.

The data obtained were analysed according to the number of avoidable deaths by region of the state in question, through the software Statistical Package for the Social Sciences, version 17. At the beginning, descriptive analyses were carried out in order to characterise the avoidable deaths in 14 regions, one of them being classified as other / ignored. The majority of avoidable deaths occurred in the central region. Among these results, some prevalences were associated, such as higher incidence of death among children of brown color, males, and the occurrence of death in the first six days of life.

## Results

Based on data from Datasus, it can be concluded that in 2013 there were 392 preventable deaths in children under five years of age in the northern macro region of Minas Gerais (Figure 1).

According to the percentage data of the research, the deaths classified by sex reveal a prevalence of males (59%). When divided by ethnic group or color, there was a prevalence of brown colour (31%), followed by white (13%), black (1%) and indigenous population (1%). No deaths were found in the researched age group of children classified as yellow, and the colour of 4% of those involved in the survey was ignored. Considering significant subdivisions in the age group, there was a prevalence of deaths of children up to six days old, representing 46% of the total number of deaths. Other intervals observed in this age group were from 7 to 27 days (13%), 28 to 364 days (22%) and from 1 to 5 years (16%).

**Figure 1.** Deaths due to preventable causes in children under five years of age by health macro-regions in Minas Gerais, 2013**Table 1.** Distribution of monthly deaths in the North macro region of Minas Gerais, 2013, 2013

Measures of Central Tendency	Results
Mean	32.66667
Median	32.5
Standard deviation	7.535773
Mode	37

## Discussion

The theme studied reveals its importance given that the deaths could be avoided simply by improvements in health services. There is a high under-five mortality rate in Brazil, and its reduction is a great challenge for these services. According to Menezes et al.<sup>10</sup>, achieving this result depends on direct actions of public health policies, with improvement of primary health care services.

The same authors, when classifying children deaths in Belo Horizonte using an updated list of causes of preventable deaths recorded in the *Sistema Único de Saúde* (Unified Health System -SUS), observed that in the period between 2006 and 2011, there was a prevalence of death occurred in the 0-6 days of life (67 , 2%) followed by deaths between 7 and 27 days of life (32.7%)<sup>10</sup>. The most common causes were congenital problems, factors of the

mother's health and complications during pregnancy and childbirth. The results are similar to those of the present study, where there is also a predominance of deaths in the age range from 0 to 6 days (46% of the cases, which is considered a high value).

Prenatal care makes it possible to detect possible changes from the onset of pregnancy to the time of delivery, according to the Ministry of Health<sup>6</sup>. Santana et al.<sup>11</sup>, when reporting information on children mortality, revealed that 59% of pregnant women attended the first prenatal visit in the first trimester of pregnancy. However, they also reported records of some pregnant women who started consultations only in the third trimester, which brought complications to the delivery.

A study carried out in five Brazilian cities, representing each region of the country, highlighting Recife and Porto Alegre, showed a predominance of the death of children of black and brown colours<sup>12</sup>. This result differs from the data found in this study, where there is prevalence of brown color (31%), followed by white (13%). However, these numbers can be influenced directly by different characteristics of the regions and the population of these places, given the varied ethnic origins of the Brazilian people.

Data presented by the 2010 Census<sup>13</sup> showed an increase in the number of people declaring themselves as black or brown in Minas Gerais (from

38.5% to 43.1%), which may also explain the high rates of black / brown. It should be noted that the characterisation of ethnic identity can vary according to several factors, including subjectivity. However, we emphasise that the black population consists of the sum of browns and blacks, resulting in 32% of the total of under-five deaths analysed, more than twice the white population.

Maia, Souza and Mendes<sup>12</sup> also present colour as a determinant of children under five years of age mortality, considering its relationship with socioeconomic conditions, as well as the ethnic differences between blacks and whites as risk variables. Therefore, it is necessary to implement public policies of inclusion, thus restricting racial inequalities.

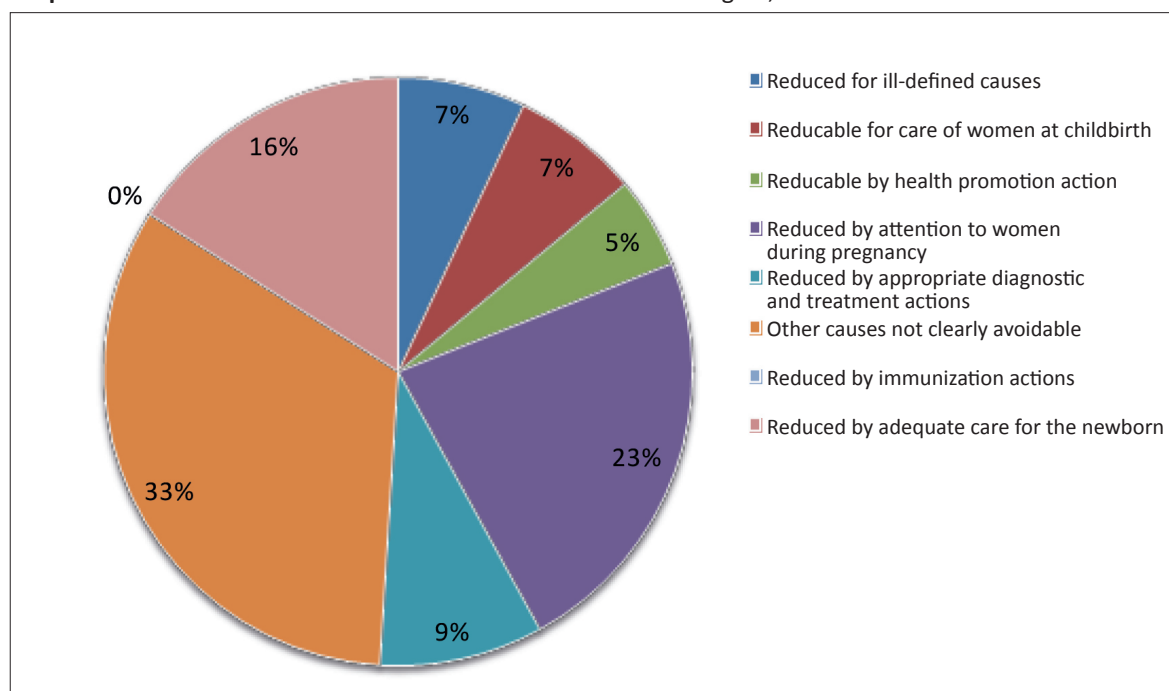
Graph 1 presents the percentage of deaths that could be avoided by actions related to the main causes of mortality identified in the age group covered in the study. It is worth highlighting that some of the solutions for reducing deaths are associated with adequate care for women during pregnancy and delivery and for an improved maternal and child health care promoted by the *Estratégia Saúde da Família* (Family Health Strategy - ESF), a program implemented in the region since 1994. The ESF has contributed to reduce the under-five mortality rate, but it is necessary to further improve the actions of disease

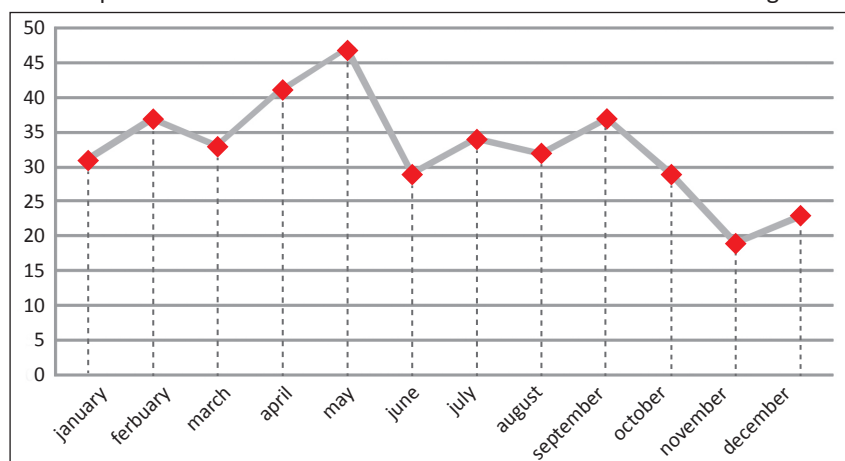
prevention, health promotion and recovery, the program's main objectives, as emphasised by Santana, Aquino and Medina<sup>14</sup>.

Another hypothesis concerns the quality of life and health determinants of the population, presented by Malta et al<sup>1</sup>. These authors report that a large part of avoidable deaths are directly associated with health care and socioeconomic factors, such as income, access to education, among others. They point out that the greater the access and adherence of the population to basic services, the greater will be the contribution of health care services to improve the living conditions of users, resulting in the decline of avoidable deaths.

In data recorded in the Sistema de Informações sobre Nascidos Vivos (Information System on Live Births -Sinasc) in October 2015, there was a high rate of live births in the Northern Macro region in May 2013 (2,016 births). The high birth rate may explain the high under-five mortality rate in the same month, shown in Graph 2. It is also important to consider that the higher demand for the service implies a greater need for beds and infrastructure for care, which are not always offered to the population. On the other hand, it was possible to observe that in November 2013 a lower birth rate was recorded than in the other months of the year, which may explain the lower under-five mortality rate in that month<sup>8</sup>.

**Graph 1.** Reduced deaths for health actions in the North macro-region, 2013



**Graph 2.** Deaths due to preventable causes in children under five in the North Macroregion for months in 2013

### Final considerations

The under-five mortality rates identified in this study reflect the reality of care for children under five years of age in situations of vulnerability. Children classified in these situations are the ones born in families that have difficulty to access social services, health and education. Families with low quality of life and income are also included. The reduction in preventable deaths in the year studied may be related to efforts undertaken in the region to improve basic care, with programs such as the ESF. However, the increase in avoidable deaths in the months of the highest birth rates demonstrates the fragility of services, both in terms of infrastructure and human resources, emphasising the connection between demand and risk.

With specific reference to the epidemiological data consolidated in this investigation, it is evident that the early neonatal mortality was configured in the year studied as a serious problem, occupying

the central position in the components of mortality. Therefore, it is possible to assert that there is a need to intensify investment in health in order to reduce the mortality of children from zero to six days of age. To do this, we suggest actions aimed at the perinatal context, such as improving prenatal care, equipping and expanding transportation infrastructure, care and hospitalisation, with an increase in the number of beds in neonatal intensive care units.

Further studies are needed to deepen the discussion and investigate the relationship between avoidable deaths and public health investment, as well as new research that relates factors associated with the persistent high avoidable mortality rates in children under seven days of age. It is also noted that the position of the North macro region in third place in the category of avoidable deaths indicates the need to improve access to education for the population and to implement public policies that seek to attend to all, as well as specific policies aimed at the eradication of ethnic-racial segregation.

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#### Participation of the authors

Ingride Salles Silva de Oliveira and Rodrigo Silva Torres designed the study and analysed the data. Fernanda Cardoso Rocha participated in the design of the project, corrected the manuscript, formatted it according to the norms of the magazine and sent it for submission. Fernanda Cardoso Rocha and Tadeu Nunes Ferreira coordinated all stages of the research and reviewed the article. All authors collaborated with manuscript writing, study planning, data collection and interpretation.

