ORIGINAL ARTICLE

Postneonatal infant mortality and quality of medical care: a case-control study

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Abstract
Objective: to identify the risk factors for postneonatal infant mortality caused by diarrhea and pneumonia in relation to the quality of medical assistance.

Methods: population-based case-control study of 277 postneonatal infant deaths caused by diarrhea and pneumonia occurring in the metropolitan area of Belo Horizonte, Brazil, between May/1991 and April/1992. The cases were compared with hospitalized controls, and matched by pathology, age and hospital. Information on cases and controls were collected from medical records and through home interviews. Some variables related to the quality of medical care were analyzed. McNemar test and conditional logistic regression were used to define the risk factors for postneonatal deaths.

Results: multiple logistic regression analysis showed the following factors independently associated with increased risk of postneonatal death induced by diarrhea and pneumonia: delayed immunization (OR = 2.48; 95% CI = 1.17-5.23), general status (serious) on hospital admission (OR = 10.94; 95% CI = 4.91-24.34), unaccomplished hospital procedures (OR = 10.08; 95% CI = 3.55-20.59) and malnutrition on hospital admission (OR = 3.58; 95% CI = 1.42-9.07).

Conclusions: the results indicate the low quality of medical assistance as an important risk factor for avoidable causes of postneonatal deaths. The authors highlight the lack of integration between the outpatient clinic and hospital activities as an important determinant of low quality. It is necessary that the performance of health services and their effect on avoidable infant mortality be widely discussed, also taking into consideration the preponderant role of socioeconomic variables.


Introduction
Child mortality has been frequently reported as a sensitive indicator of the quality of life of a population.1,2 Childhood represents, as a matter of fact, a particularly vulnerable stage of life, when the biological factors that can determine death are strongly related to the external conditions, whether they are related to social, economical, and environmental (home, nutrition, sanitary conditions, hygiene, and family relationships) factors or related to availability of healthcare services.

However, the worldwide marked decrease in child mortality rates in the past few decades has not been matched by a significant improvement in the quality of life, especially in developing countries. This fact has led some authors to

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Our study was financed by the Pan American Health Organization (PAHO) and by the Fundação de Amparo à Pesquisa do Estado de Minas Gerais (FAPEMIG).
question the real value of child mortality rates as an indicator of quality of life and emphasize the role of public healthcare measures for the survival of children. \(^3,^5\) Actually, the postneonatal component of child mortality rates, which is understood as more sensitive to sanitary interventions, was the component that underwent the greatest reduction in the past few decades in Brazil. Currently, there is a greater prevalence of child deaths during the neonatal period in most of the country. \(^2,^6\)

Child mortality is a very complex matter. To be sure, it is strongly related to social and economical conditions. \(^3,^7\) Nevertheless, the influence of public healthcare measures cannot be overlooked, considering the often times simple and low-cost actions that have allowed for the considerable reduction of child mortality around the world. \(^6,^8,^9\) The discussion regarding the trends and determinant factors of child mortality in the past few years is related to the limits of different types of intervention and, most of all, emphasizes the matter of quality of healthcare assistance. \(^9,^{10}\)

In Brazil, a country that still reports high mortality rates in both components of child mortality (rates that are even higher than those of other countries in Latin America) \(^4\) the better understanding of the role of healthcare actions in the process of determining child death is both a necessity and an ethical obligation. The accountability of the healthcare services is directly related to the concept of unnecessary untimely deaths, which is relatively old, \(^2\) but also relatively poorly studied in the scientific literature. \(^10\)

If, on the one hand, it is more difficult to interfere with the determinants of neonatal mortality, on the other, that is not the case of postneonatal mortality. In this sense, as long as most postneonatal deaths are attributed to the diarrhea-pneumonia-malnutrition triad, \(^13,^{15}\) whether these deaths could have been avoided should also be an inescapable responsibility of doctors and hospitals. If healthcare services that offer good quality of assistance, are accessible, and are effective cannot interfere with the process that causes a disease, they certainly should be capable to provide early diagnosis and adequate treatment. \(^10,^{12}\)

In the metropolitan area of the city of Belo Horizonte, state of Minas Gerais, Brazil, França\(^16\) studied the healthcare attention provided to sick children as a possible determinant of child mortality. The author reported a high and unexpected prevalence of deaths at home and a high prevalence of children who evolved to death soon after hospital discharge. The markedness of these factors refer back to the discussion about accessibility and quality of hospital services. Our objective is to identify some determinant factors of postneonatal child mortality due to diarrhea and pneumonia and associated to the quality of healthcare services; we also intend to identify aspects of the organizational structure and of the process of medical assistance that may be involved with unnecessary child deaths.

### Methods

This paper is part of the study on determinants of child mortality for the metropolitan area of Belo Horizonte (MABH), state of Minas Gerais\(^16\). Data were collected in 13 different cities in addition to Belo Horizonte, for a total population of approximately 3,360,000 inhabitants with a 2% percentage of patients aged less than one year.

We analyzed all postneonatal death certificates of children residing in the MABH from May 1991 to April 1992. Initially, we selected for the investigation all death certificates reporting diarrhea, pneumonia, or malnutrition in addition to other certificates reporting factors that, after further investigation, may be related to the triad, such as anemias, septicemia, dehydration, and so on. During the study period, we carried out weekly investigations of child death certificates at the State of Minas Gerais Department of Planning, which is responsible for the collection of death certificates from all notary public offices. After investigation of the medical records and of the home of the deceased (interview with the family) we decided for the inclusion or not of each death certificate in the study in case it met the criteria. The cause of death was established by a doctor who supervised the field work after discussion of the case with the interviewer responsible for the collection of data; the causes of death were later reviewed and confirmed by two other pediatricians, independently. We did not assess agreement of the reviews. The frequency of disagreement between the reviews was minimal. In cases of disagreement, the coordinators of the study made the final decision. We excluded deaths associated with important congenital malformations, cerebral palsy, perinatal causes, or extreme prematurity; we also excluded deaths whose medical record and home investigation rendered inconclusive. Moreover, deaths that occurred at home or in public areas were not included, nor the deaths of patients whose hospital stay immediately before the moment of death was extremely short (a few hours). These latter criteria were applied considering that our assessment of the medical services also applies to hospital care.

During hospital investigation, we collected information on clinical status of the child, procedures adopted during care of the child, and conditions of accessibility to healthcare services up to the moment of admission to the hospital - when provided in the medical records. The questionnaire applied at the home interviews inquired into information on social and economical status and regarding the family; environmental conditions related to the house; characteristics of the gestation; delivery; health status of the child; and the evolution of the disease that caused the hospitalization. We utilized the information pertaining to the access to healthcare services and to the quality of the care provided by the doctor and the hospital. Other variables studied were birthweight (since it represents a measure of prenatal care) \(^17\) and nutritional status upon admission to the hospital, using the
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Our experimental group (cases) included postneonatal deaths (patients aged 20 days to less than one year) due to diarrhea (predominant clinical status of diarrhea that preceded other pathologies and that was established according to the clinical history of the patient) or to pneumonia (predominant clinical status of pneumonia that preceded other pathologies and that was confirmed by chest X-ray). We matched each case studied with one control (matched case-control study). Controls were children with the same pathology, with difference in age of up to two months, who were admitted to the same hospital and during the same period, and who had not evolved to death (neither during hospitalization nor during the course of the study).

We considered the medical records of the experimental group and controls as missing in case these records were not found in at least two separate visits to the hospital; we considered the addresses of relatives as not located in case they were not confirmed in at least two visits (or, when the address was confirmed, but the family was not located for the interview). Missing medical records resulted in the exclusion of the case (48 children were not investigated due to missing medical records); however, an unsuccessful attempt to interview the family was not considered as a criterion for exclusion of the case.

In order to carry out all stages of the collection of data, we relied on specifically trained teams (medical school students for the hospital investigation, social sciences students for home interviews). We also had carried out a pilot study, putting the questionnaire and the team of interviewers to the test. Some families were re-interviewed in order to control the quality of the information and to detect possible biases (5% of the interviews carried out in the first six months of the study and randomly selected).

Prior to accessing the medical records, we obtained the support and the consent from the hospitals; total confidentiality was guaranteed. Likewise, in the case of home interviews, we obtained the formal consent of relatives by providing a letter of introduction of the interviewers that guaranteed total confidentiality.

Statistical analyses of data were carried out using the Epi-Info software applying a 5% significance level for the statistical tests; for the assessment of variables associated with death, we applied the Odds Ratio (OR) and 95% confidence interval methods. Multiple logistic regression analysis was applied using the Multit software for the definition of variables that allows for both matched and unmatched analyses.

This study was approved by the Ethics Committee of the School of Medicine of the Universidade Federal de Minas Gerais (1988) and by the Ethics Committee of the Pan American Health Organization (PAHO) (1989); the study received financial support from both the PAHO and the FAPEMIG, the foundation for the support of research studies of the state of Minas Gerais.

Results

During the study, we selected 665 postneonatal deaths. After the hospital investigation, 154 deaths were excluded due to being related to other pathologies (n=35), to being associated with important congenital malformations (n=32), or to presenting inconclusive (n=47). We also excluded deaths of twin siblings (only one of the twins was included; n=6) and of institutionalized children, children not residing in the MABH, or children whose initial inclusion was considered inadequate (n=34). Out of the remaining 511 deaths, we further excluded the deaths at home (n=136). In another 50 cases, further investigation indicated that they were associated with other severe pathologies (bacterial meningitis, for example) or that their match was not satisfactory. Forty-eight cases of death were excluded due to missing medical records. As a result, our study is based on the assessment of 277 pairs of matched cases and controls.

Home interviews (mother or guardian) were carried out in 240 of the cases, which allowed for the confirmation of most of the information collected at hospitals and for complementing the data not found in medical records. In turn, in the case of controls, we were able to carry out 139 home interviews (due to logistic reasons, we determined that home interviews with controls would be carried out only during the first six months).

The distribution of deaths according to hospitals was the following: 80.1% in private hospitals contracted by the Brazilian Public Healthcare System (SUS), 14.8% in public hospitals, and 5.1% in philanthropic hospitals.

The age average of babies who evolved to death was 4.9 months with a median of 4.0 months. In the group of controls, the age average was 4.8 months also with a median of 4.0 months. We studied 143 pairs of children whose baseline pathology was diarrhea (cases and controls) and 134 pairs of children whose baseline pathology was pneumonia. There was a prevalence of male patients in both groups (66.8% of cases and 62.5% of controls).

The duration of the disease prior to hospitalization (according to information provided by the mother or guardian) was similar in both groups (median of three days for both cases and controls, and averages of 6.0 and 6.3 days, respectively; P = 0.709). The median for the hospital stay was similar for both the experimental and control groups (seven days), but the average hospital stay for children who evolved to death was higher (11.4 days) in comparison to controls (9.1 days) (P = 0.008).
The data on use of medication and laboratory examinations indicated that wide-spectrum antibiotics were more widely administered to patients in the experimental group; likewise, patients in this group were also submitted to more laboratory examinations. The most frequently requested laboratory examination was hemogram (76.9% of cases and 62.1% of controls). Microbiological examinations were carried out in few patients (28.2% of cases and 15.2% of controls).

Table 1 presents information on the diet prescribed on admission and on the diet used more predominantly during hospital stay. In both the groups of cases and of controls, the main criterion for not applying a diet (zero calorie diet) was medical criterion, and not refusal by the patient. The duration of zero calorie diet was significantly longer for cases in comparison to controls (averages of 21.6 h and 14.8 h, respectively). Likewise, the specific assessment of children whose baseline pathology was diarrhea indicated that the patients in the experimental group were administered zero calorie diet for a significantly longer period of time (average of 23.5 h for cases and 14.5 h for controls), also according chiefly to medical recommendation.

Table 2 presents the results of the bivariate analysis for variables related to the quality of healthcare assistance for both groups. Data were analyzed in pairs. We were not able to obtain information on some variables neither from the medical records nor from the mother (home interviews); this resulted in a smaller number of pairs for the analysis. During the first stage, the following factors were significant: report of previous medical assistance that resulted on patient being indicated for hospitalization; history of previous hospitalization; delayed vaccination; no BCG vaccination; neglecting hospital procedures; severe clinical status on admission; and malnutrition on admission.

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In relation to the variables presented in Table 2, it is important to emphasize a few points. Approximately 51.3% of cases and 38.5% of controls were submitted to medical assistance prior to hospitalization. Both experimental and control group patients sought healthcare services more frequently at hospital outpatient clinics or emergency services (75.8% and 73.3%, respectively); in turn, healthcare service centers were sought sparingly (9.7% of cases and 14.9% of controls). Other services (private offices, clinics, transference from other hospitals) were also reported (14.5% of cases and 11.8% of controls).

The hospital procedures that were most frequently not carried out were (according to medical records): laboratory and radiological exams (45.1%); admission to intensive care unit (25.0%); surgical interventions, such as taps, drainages, venous dissections (15.0%); administration of medications (especially antibiotics) or hemoderivatives (10.2%); and others, such as physical therapy, other exams or interventions (4.7%).

For the multivariate analysis, we included all variables that presented a P of less than 0.20 in the bivariate analysis. After the adjustment, the unmatched variables that showed greater association with postneonatal death were: history of delayed vaccination; severe clinical status on admission; neglecting hospital procedure; and malnutrition on admission (Table 3).

Discussion

The set of determinants of child death is considerably far-reaching and complex, and among these determinants there is a network of interactions that needs to be better understood. The present study was aimed at assessing some

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**Table 1 -** Major diets prescribed and their percentage of use in cases and controls, Metropolitan Region of Belo Horizonte, May/91 through April/92

<table>
<thead>
<tr>
<th>Diets</th>
<th>Cases</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>Diet prescribed on admission:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero calorie diet</td>
<td>112</td>
<td>40.4</td>
</tr>
<tr>
<td>Breastmilk</td>
<td>3</td>
<td>1.1</td>
</tr>
<tr>
<td>Unrestricted diet according to age</td>
<td>53</td>
<td>19.1</td>
</tr>
<tr>
<td>Restricted diet</td>
<td>97</td>
<td>35.0</td>
</tr>
<tr>
<td>Other</td>
<td>12</td>
<td>4.3</td>
</tr>
<tr>
<td>Diet used more predominantly during hospital stay:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zero calorie diet</td>
<td>52</td>
<td>36.4</td>
</tr>
<tr>
<td>Breastmilk</td>
<td>2</td>
<td>1.5</td>
</tr>
<tr>
<td>Unrestricted diet according to age</td>
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<td>16.1</td>
</tr>
<tr>
<td>Restricted diet</td>
<td>52</td>
<td>36.4</td>
</tr>
<tr>
<td>Other</td>
<td>13</td>
<td>9.2</td>
</tr>
</tbody>
</table>
of the least studied variables related to the quality of healthcare services. Similar studies have been successful in setting a new standard for the role of healthcare services in avoiding child death, in indicating the co-responsibility of outpatient and hospital services, and in making evident the need for specific departmental interventions.\textsuperscript{10} The unnecessary untimely characteristics of child deaths by diarrhea and pneumonia have been emphasized for years. Moreover, these events are considered the sentinels of failures in the healthcare system.\textsuperscript{12} Timely and adequate measures directed toward healthcare services that are easily available and provide universal access are the premises of good quality; these measures can allow for a successful intervention on the process of child mortality.

Our study design (matched case-control), which included assessment of medical records and home interviews, allowed for improved reliability in establishing the baseline causes of death and in assessing factors as determinant variables. More specifically, in the MABH, where the prevalence of underreported deaths is not significant,\textsuperscript{21} death certificates can be considered a reliable source of information from a quantitative point of view.

The matched case-control study design represented a means to eliminate, a priori, possible confounding factors. Matching the pathologies prevented, for example, the comparison of a clinical status of diarrhea (established as a self-limiting process) with that of pneumonia. In like manner, matching patients for age also allowed for more reliable

\begin{tabular}{|l|l|l|l|l|l|l|}
\hline
Variable & Cases & Controls & P & OR & 95%CI & \\
\hline
\textbf{Antecedentes à doença atual} & & & & & & \\
\textbf{Previous history of current disease} & & & & & & \\
Birthweight & & & & & & \\
\textless 2,500g & 71 & 54 & 0.086 & 1.49 & 0.95–2.33 & \\
\geq 2,500g & 151 & 168 & & & & \\
Delayed vaccination & & & & & & \\
Yes & 109 & 58 & 0.001 & 2.96 & 1.86–4.74 & \\
No & 128 & 179 & & & & \\
BCG vaccination & & & & & & \\
No & 79 & 35 & 0.001 & 3.20 & 1.89–5.46 & \\
Yes & 150 & 194 & & & & \\
Previous hospital admission & & & & & & \\
Yes & 126 & 97 & 0.009 & 1.66 & 1.12–2.45 & \\
No & 106 & 135 & & & & \\
Weight on admission & & & & & & \\
\textless - 2.0 Z score & 152 & 94 & 0.001 & 5.83 & 3.07–11.32 & \\
\geq - 2.0 Z score & 91 & 149 & & & & \\
\textbf{Associated with current disease} & & & & & & \\
Medical care prior to current hospital admission & & & & & & \\
Yes & 96 & 72 & 0.009 & 1.89 & 1.16–3.09 & \\
No & 91 & 115 & & & & \\
Time of hospital admission & & & & & & \\
Night & 76 & 73 & 0.845 & 1.06 & 0.71–1.58 & \\
Day & 154 & 157 & & & & \\
Day of hospital admission & & & & & & \\
Weekend & 65 & 67 & 0.918 & 1.04 & 0.68–1.59 & \\
Weekday & 212 & 210 & & & & \\
Clinical status on admission & & & & & & \\
Severe & 207 & 72 & 0.001 & 10.64 & 6.01–19.20 & \\
Moderate/ good & 70 & 205 & & & & \\
Neglected hospital procedure & & & & & & \\
Yes & 74 & 9 & 0.001 & 9.13 & 4.25–20.43 & \\
No & 203 & 268 & & & & \\
\hline
\end{tabular}
data, considering that young infants are widely perceived as being more vulnerable. Patients were also matched according to hospitals in order to avoid assessment of different hospital structures in one and the same group. All of the referred restrictions possibly rendered the matched cases and the controls very similar. This overmatching may have affected our analysis, either by decreasing the statistic potential of the study considering the increase in losses, or by hindering variables from presenting significant, since they were closely related with the variables used in the matching criteria. Actually, choosing to carry out a matched case-control study on child mortality and with hospitalized controls (matched according to hospital units) is in itself a restriction to the external validity of the study. Theoretically, only one social group was analyzed: hospitalized patients. However, it seems that there would be no other way to carry out a study emphasizing quality of healthcare services and, especially, the process of healthcare assistance. Our assessment is in agreement with the classical approach proposed by Donabedian, who suggests a qualitative analysis of medical care by considering three elements: settings in which care occurs, the processes of care, and the outcomes of care.

Our results allow us to infer that patients who evolved to death arrived at the hospitals presenting with more severe clinical status and which remained severe: this inference can be made based on the finding that wide-spectrum antibiotics, or those used in more severe pathologies, were more frequently administered in this group of children. The prevalence of use of penicillin, however, was greater in the group of controls. The use of bronchodilators was similar among the population of patients who evolved to death may also be an indicator of the greater severity of their status.

The following variables were associated with postneonatal death by diarrhea and pneumonia after the multivariate analysis: severe clinical status on admission; delayed vaccination; neglecting hospital procedures; and malnutrition on admission. Low birthweight, which is well-established as being associated with greater risk of death during the first year of life, was not associated with death in our study. This finding may be explained by the number of cases excluded in relation to this particular measure, since information on low birthweight was reliable only for 222 pairs; hence, this represented a loss of almost 20%.

The variable severe clinical status on admission was already indicated by others as a prognostic factor of increased lethality in children aged less than one year with diarrhea and pneumonia. The authors emphasized that, despite the fact that they were reporting an obvious situation, further studies are required; the authors also suggested a few mechanisms to explain their finding, as follows: a) the family cannot perceive the severity of the clinical status of the patient and does not seek timely help; b) the family can perceive the severity but cannot get healthcare assistance (difficult access); c) the doctor does not evaluate the clinical status of the patient correctly and does not hospitalize the child; d) the child presents other subjacent factors (low weight, malnutrition, other associated diseases) that help to rapidly deteriorate the pathology. In our study, we were able to show that, at least in the cases of the most prevalent pathologies related to postneonatal child death, the mothers...
can identify the need for medical intervention at a very early stage, considering that the average duration of the disease was similar for both the patients who evolved to death and for controls (starting at identification of the problem by the mother up to the moment of hospitalization). It was also clear that access to hospital care was not a determinant factor for death, since those who evolved to death were hospitalized longer than controls. This latter fact indicates a third alternative as being the most probable: children do arrive at medical services, but do not receive proper care (their needs are not met nor the risks anticipated). In relation to possible subjacent factors, our study emphasized that malnutrition is, at least, a variable relevantly associated with death; however, it acts independently, considering that it was still present in the final model. In this sense, malnutrition or any other subjacent factor identifiable during a medical appointment should suggest an even earlier intervention. We believe that this emphasizes even more the matter of quality of care (seemingly the children who need care are the ones who are being neglected). This finding refers back to the discussion regarding the need, demand, and supply of care and to the inverse care law, which emphasizes that there is an unequal distribution of medical care inversely proportional to the needs of the population.28 It is understood that needs are related to basic priorities and are expressed in the form of demand, in case services are available. If the healthcare service is available, however, it is not effective (good quality), it does not act as a strategy of sanitary intervention, and, in the end, it does not meet the needs of the population of reference. The lack of response in these cases is usually associated to poor organization of the network of healthcare services, and it presents clear and disastrous effects.

Most of the families who sought medical assistance before hospitalization did so in hospitals. Frequently, this type of service is carried out in a punctual manner, which is dismembered from the process of medical care as a whole.29,30 There is no doubt that this type of medical care is not in agreement with the concept of providing integral services, and it represents a breach in the hierarchical duty at the basis of a healthcare assistance model. If the seeking of this type of care represents an option made by the family, it may be an indication that hospitals respond better than basic healthcare units (at least in the opinion of users) or that there is a difficulty in the access to the network of basic healthcare services.

In our study, delayed vaccination was a factor related to death, even after the adjustment for the multivariate analysis. Delayed vaccination should be considered an indicator of access to healthcare centers. Access to healthcare has been considered as one of the main components of the quality of care.31,32 The concept of access includes not only the geographical and organizational availability of healthcare services, but also the acceptance of services, which depends on the evaluation that users make of the service.31 In the case of pediatric care, this evaluation is related to full attention that meets the needs of the family. It is also related to healthcare support that is easily available and to an opportunity to learn about the particularities of a developing human being. If the above aspects are neglected, it is difficult to obtain the trust of the family. Moreover, the basic healthcare units are usually dismembered from networks of more complex healthcare services and have little (if any at all) propedeutic resources. Consequently, delayed vaccination indicates the unavailability of services, a lost opportunity to provide integral services through the basic healthcare units, and even a disbelief of the population in relation to the basic healthcare units by preferring the care provided at outpatient clinics and emergency services of hospitals.

In relation to in-hospital care, we observed that neglecting hospital procedures was a determinant factor for predicting death. The main neglected procedures underscore the deficient structure of hospitals (both in terms of material and organization). This factor affords evidence against the quality of the services. It is also possible to infer that despite the fact that admission to ICUs was not carried out in only 25% of cases, this percentage underestimates the real need for intensive care. We were able to observe, specially, that 35% of cases had no record of any medical assistance at the time of death, including resuscitation maneuvers.

Finally, another determinant factor in predicting death was malnutrition on admission. This variable was previously discussed by Post et al.,27 who also included a brief discussion on the possible biases, associated dehydration, and the phenomenon of reverse causality. Since our criterion for the assessment of malnutrition was the relation weight-for-age, this relation may be false considering cases of dehydration on admission; however, the data were previously adjusted for level of dehydration. The reverse causality represents a temporal bias that occurs if malnutrition on admission is actually a result of a pathology that was more severe or that presented longer duration. That possibility was eliminated in our study since the average duration of the disease was similar for both patients who evolved to death and controls, and since the eligibility criteria excluded patients with associated severe pathologies in both groups.

Adequate growth probably represents, isolatedly, the best indicator of quality of life for children. Protein-calorie malnutrition, commonly assessed by the relation weight-for-age, represents a progressive involvement of the growth process. Due to the potential synergy between infectious diseases and childhood malnutrition, the latter is naturally associated with child mortality: childhood malnutrition is also well-established as a major public healthcare concern for developing countries.18 This association should not result simply in the understanding of malnutrition as a social pathology; rather, it should be the obligation of healthcare services to anticipate measures of nutritional recovery and timely care, thus avoiding complications resulting from common pathologies such as diarrhea and pneumonia. Moreover, the fact that we used a cutoff point of 2 Z scores...
to indicate severe malnutrition may have caused our assessment to overlook cases of mild and moderate child malnutrition.

In conclusion, the importance of this study was to indicate, precisely, the poor quality of medical care (both in terms of assistance and organization) as a determinant factor of postneonatal death, thus attempting to provide support for the families that grieve the loss of their children. It is beyond our objectives to discuss the organizational aspects of the healthcare network more deeply, but we hope to increase the awareness of professionals involved in the provision and management of healthcare and to make healthcare services more aware of their responsibility in relation to child deaths (sentinel events). It is also important to emphasize, however, that our findings do not attempt to deny the social, cultural, and economical factors related to child mortality; but rather to make healthcare professionals and institutions more directed toward providing adequate and good-quality services.

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