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INFANT MORTALITY AND AVOIDANCE CLASSIFICATION: RESEARCHING CITIES OF THE 15 PARANA HEALTH REGIONAL

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ABSTRACT
This study evaluated the profile of infant mortality and avoidable deaths of children under one year old in the municipalities of the 15th Regional Health. There were investigated 74 deaths of children in 2008, in 15 cities of the 15th Heath Regional of the Paraná State. The data were collected from the records of the infant and fetal death prevention committee; these accounted for by means of frequency and simple percentages and presented in the form of table. Of the 74 investigated deaths, 51(69%) were neonatal and 23 (31%) were post-neonatal, highlighting the cities with less than 20 thousand inhabitants, where the neonatal mortality occurred in higher percentage, with 82%. Regarding the death avoidance, 82% could have been avoided, with higher percentage in cities with more than 50 thousand inhabitants. The causes of death found were related to the perinatal period and congenital malformations. According to the avoidance measures, in 30 (40,5%) of the classified deaths, the causes most found were those related to the attention provided to the pregnant woman. The main measures indicated by the committee were the promotion of health and primary prevention, 84 (34%) of the recommendations, highlighting actions towards health education, evaluation of gestational risk and family planning.

Keywords: Infant Mortality. Health Evaluation. Primary Health Care. Avoidability.

INTRODUCTION

Mortality statistics generally represent an important source of epidemiological information. Among these, the Infant Mortality Rate (IMR) is one of the indicators most commonly used to analyze the health status of a population, and effectiveness of health services [(1)].

IMR estimates the number of deaths of infants under one year of age per thousand live births, the population living in a particular geographic area and is classically divided into two periods: 1 - neonatal, which estimates the risk of death in first 27 days of life which is closely related to the conditions of pregnancy, childbirth, and bodily integrity of the child 2 - postnatal period, which estimates the risk of death between 28 days until the end of the first year of life and its determinants are strongly linked to the social and economic structure of a country [(2)].

Classification of deaths avoidable or not, is based on the concept of sentinel event introduced by Rutstein et al [(3)], and refers to an occurrence which could have been prevented due to the availability of medical technology enough to avoid her or something that should not occur if the health service to work properly.

In short, sentinel event is something that should not occur if the health service to work properly, since its occurrence enables fault detection from an investigation in order to correct or improve the operation of the health system. Such an analysis requires the evaluation process from a negative fact, ie, what was previously defined as something that should not occur [(4)].

Some instruments have been used to assess the performance of health services, the list of causes of preventable deaths to perinatal mortality. However the authors point out that, in Brazil, the scientific literature on the subject is still limited, making it necessary to deepen the theme of preventability in the Brazilian context[(5)].

The sentinel events present themselves as definers of preventable situations, indicating that the quality of care should be improved, and determines that the intervention occurred should be followed by interventions on possible areas: socioeconomic, environmental, cultural or genetic determinants that can be the situation found [(6)].

The mobilization of professionals and health services for the investigation of mortality in

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children an important initiative for the reduction of this fact and possible interventions more effective, because it can identify the relationship of death with the risk factors and the various aspects of care health and welfare of bottlenecks, and reveal problems in access, that contribute to the weakening process of care the child [7].

In recent years Brazil has promoted a 73% reduction of child mortality (under five years of age), much higher than the global average, which was just over 40%. In 1990, Brazil recorded 58 deaths per thousand births, a figure that was reduced to 16 in 2011. In the South and Southeast, the infant mortality rates are close to those considered low by the World Health Organization - up to 20 deaths per thousand live births.

However, compared to rates in other countries, Brazil still occupies an uneasy place in 107th in the deaths of children. In the Americas, Cuba and Canada lead the index with only 6 deaths per thousand, while Singapore, Slovenia, Sweden and Finland respectively lead the global ranking of fewer deaths (less than 3 per thousand). Still in the Americas, Haiti (70 per thousand) and Bolivia (51 per thousand) lead to more deaths, while Sierra Leone, Somalia, Mali and Chad have the worst global indexes [8].

And to collaborate with the evaluation processes, the present study aims to evaluate the profile of child mortality and preventability of these deaths that are indicative of the quality of care provided to children under one year in the municipalities of the 15th Regional Health, in order to assist health managers in planning actions that promote the reduction of infant mortality in the State of Paraná.

MATERIALS AND METHODS

This is an evaluation research, descriptive and exploratory, of quantitative approach, part of the dissertation [9] titled "Deaths of children under one year and quality of primary health care: researching municipalities of the 15th Regional Health Paraná". This work, in turn, is part of a broader project of Evaluation of Primary Care in municipalities of the 15th Regional Health Paraná state, funded by Araucaria Foundation, formed by 23 researchers, who evaluated the deaths in children under one year in the municipalities belonging to this Regional.

The 15th Regional is located in the northwest of the state and consists of 30 municipalities. The study included 15 (50%), nine of them with less than 20.000 inhabitants, four between 20.000 and 50.000 inhabitants, and two with more than 50.000 inhabitants (one with 84,650 and the county seat of the Regional with 335.512 inhabitants).

Besides the division into strata, the municipalities were also selected by the managers' interest in participating in the research. This interest manifested itself through a workshop, where all 30 managers were invited to participate.

The concern in working with most of the municipalities with less than 20.000 inhabitants, occurred, since 75% of Brazilian municipalities, 78% of municipal districts and 73% of the municipalities of the 15th Regional Health have a population of less than 20.000 inhabitants.

We investigated all deaths in 2008 occurred in children under one year, totaling 74 deaths. The decision for this period was due to the possibility of obtaining more complete information. The data were collected in March and April 2011.

The 23 researchers were divided into three groups, and each group was responsible for collecting data from five counties. Prior to collecting data, all had an approach to the topic by discussing texts on assessment and evaluation methodologies.

For the investigation of deaths in children under one year, we used the records of the Committee for the Prevention of Fetal and Infant Death, which consists in a survey of data from the entire health care for the pregnant and carried the child. In addition, the committee holds within its routine operations, household interview that provides information not recorded in the medical records, such as difficulty in recognizing family health risks, difficulties in accessing services, seeking better understanding of the contextual elements to beyond the service offered.

To determine the actual cause of death was used to cause of death corrected by CPMI (Committee for the Prevention of Infant Mortality), after the investigation of the same, as the basic cause of this in the Death Certificate (DO) can be changed by Regional committees

and the State Committee, depending on the evidence obtained in the investigation and analysis of the event [10].

For a description of the criteria for preventability, we used a list of criteria evitability of Children, used by the State Committee for the Prevention of Infant Mortality in the 15th Regional Health of Paraná, which it considers as appropriate, the actions and measures taken as health recommended by the Ministry of Health[11]. This list allows you to identify which causes of death were possible to profit over time and in what situations is no need to invest in a performance fit.

The data were identified by township, grouped in Excel, accounted for by frequency and simple percentages, analyzed and presented in the form of tables. Infant mortality was analyzed taking into account the infant mortality rate.

The procedure of the proposed study followed the recommendations by Resolution 196/96-CNS, about the research involving humans. Thus were fulfilled the requirements of ethical approval for the coordination of epidemiology and director of the 15th Regional Health, the State Health Department, obtaining opinion nº 289/2011 and the Standing Committee on Ethics in Research involving Humans, State University of Maringa, getting the opinion nº 648/2009, and having been applied a Term of Consent.

RESULTS AND DISCUSSION

Regarding the preventability of deaths analyzed in this study, it was possible to highlight that these could be avoided almost entirely (82%) considered sentinel events, with no significant difference between the preventability of population sizes. But the largest percentage was concentrated in municipalities with a population over 50,000 inhabitants, with 85,4%.

In this classification, 13 deaths were found in the category yet unavoidable, also without presenting important difference between the population sizes (Figure 1). The deaths considered unavoidable included situations such as: meeting of twins, and the two fetuses were incompatible with life, seven with congenital malformation and multiple unspecified, fetus affected by premature rupture of membranes, fetus affected by drugs used by the mother, fetus affected by oligohydramnios and congenital diaphragmatic hernia.

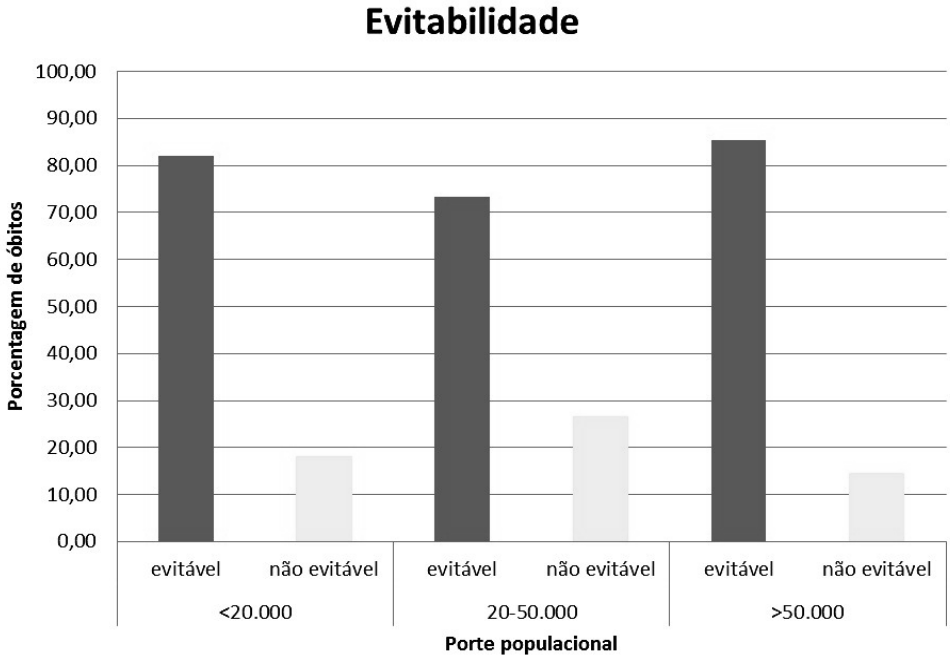

Figure 1. deaths investigated according to avoidability in 15 municipalities in the 15th Regional Healthcare; Paraná-2008.

Table 1 shows that the distribution of deaths reveals the predominance of early neonatal component (49%) of the total deaths, especially for municipalities with less than 20.000

inhabitants where neonatal mortality occurs in the highest percentage (82%). The reduction of neonatal mortality is slower because it is composed of avoidable causes which are more difficult these actions require specialized physicians, obstetricians, nurses, pediatricians, neonatologists, advanced technology and excellent organization of health services [(12)].

Although the approach difficult and complex neonatal mortality is directly related to preventable causes, and access and utilization of health services, and the quality of prenatal care, childbirth and newborn (NB). In this group, the Paraná highlight prematurity and its complications such as respiratory distress of newborn or hyaline membrane disease, neonatal sepsis and neonatal bronchopulmonary aspiration [(13)].

The prevalence of infant death in male children may occur for the largest number of births that sex, as well as their greater susceptibility to death. (Table 1).

Studies indicate that male sex is a risk factor for neonatal mortality, and emphasize that this happens due to the lower speed of global greening and especially the lungs, affecting boys with a higher incidence of hyaline membrane disease, and this the leading cause of morbidity and mortality in this group of children studied[(14)].

Table 1. Distribution of deaths by child variables; 15th Regional Health PR, 2008.

Child variables		**Population size**							
		<20.000		20 - 50.000		> 50.000		TOTAL	
		N	%	N	%	N	%	N	%
Gender	Male	5	46	8	54	26	55	39	53
	Female	6	54	7	46	22	45	35	47
Age	0 to 6 days old	7	64	8	53	21	44	36	49
	7 to 27	2	18	2	13	11	23	15	21
	28 to 365 days old	2	18	5	34	16	34	23	31

Perinatal causes were the primary cause of death in the counties of the 15th Regional Health, reaching a rate of approximately 50% of all causes, followed by congenital anomalies and other accidental risks related to respiration or inhalation of gastric contents, it is unclear the significant difference between the population size in relation to the cause of death (Table 2).

The analysis of groups of causes of death, performed in less than one year between 1996 and 2007, based on the chapters of the ICD 10, indicates that perinatal conditions remain the first cause. In Paraná congenital anomalies ranked second since 1999, and for the first time in 2007, diseases of the respiratory system will represent the third leading cause of infant death in the place of infectious parasitic diseases [(15)].

In Brazil prevalent as causes of perinatal mortality and intra-partum intrauterine asphyxia, low birth weight, respiratory diseases of the newborn, infections and prematurity in comparison to those developed countries where extreme prematurity and congenital malformations, deaths you cannot prevent, are the main causes of death[(16)].

Analyzing the cases of malformations, there was a predominance of unspecified malformations of the heart, other congenital malformations not specified and multiple congenital malformations. Congenital malformations, in Brazil, are the second leading cause of infant mortality, causing 11,2% of these deaths, confirming the findings of this research, in which the malformations constitute the second cause of death.

Some preventive measures and low cost can be taken in relation to congenital malformations such as in folic acid, which reduces the incidence of open neural tube defects, control of maternal diabetes, vitamin supplementation, which can help reduce the occurrence of defects resulting from uncontrolled diabetes, also the use of corticosteroids is indicated in most cases be associated with malformation related to prematurity [(17)].

Table 2. Distribution of deaths in children under one year, living in 15th Regional Health, according to the underlying cause of death (ICD chapters - 10) PR-2008.

Main CID after investigation of Committee's Death	N (total =74)
Perinatal causes	**35 (47%)**
Congenital malformation	**10(13,5%)**
Inhalation of gastric contents	**4 (5,4%)**
Neonatal aspiration of meconium	**3 (1,3%)**
Inhalation and ingestion of food causing obstruction of respiratory tract	**3 (4,0%)**
Unspecified Pneumonia	**3 (4,0%)**
Meeting of twins	**2 (2,7%)**
Traffic accident	**1 (1,3%)**
Asphyxia not specs. during medical and surgical care	**1 (1,3%)**
Severe asphyxia at birth	**1 (1,3%)**
Atresia of oesophagus without fistula	**1 (1,3%)**
Atresia of cracks of luschka and foramen of magendie	**1 (1,3%)**
Acute bronchitis non-specified - bronchiolitis	**1 (1,3%)**
Discordant atrial ventricular communication	**1 (1,3%)**
Degenerative disease of nervous system, unspecified	**1 (1,3%)**
Necrotizing Enterocolitis	**1 (1,3%)**
Acute Myelogenous Leukemia	**1 (1,3%)**
Other prerequisite term newborns	**1 (1,3%)**
Son of a diabetic mother syndrome	**1 (1,3%)**
Permeability of patent ductus arteriosus	**1 (1,3%)**
Tetralogy of Fallot	**1 (1,3%)**

Of avoidable deaths, 42 (68%) were neonates and 19 (32%) post-neonatal. According to the measures of preventability (reducibility), prevention activities were the most frequent. Causes of preventable by adequate care to women during pregnancy, there were 30 deaths (Table 3). The diagnoses were found in this category: fetus affected by hypertensive disorders, maternal kidney diseases and urinary tract and premature rupture of membranes. Note that, if there were diagnosis and timely treatment of the problems presented in maternal pregnancy as premature rupture of membranes or maternal diseases kidney and urinary tract diseases, power would prevent at least a portion of infant deaths.

Then highlight the deaths avoidable through adequate diagnosis and treatment, with 11 deaths. In this subgroup are those respiratory diseases such as pneumonia and diseases of the central nervous system.

During the period of 2005 and 2006 the Committee for the Prevention of Mortality of the 15th Regional Health, gave a higher percentage of infant deaths for reducibility of adolescent mothers, mothers who had not received prenatal care, mothers with up to seven years of schooling and race / color black or Mixed [18].

Table 3. Distribution of preventable causes, according to the classification of Malta et al (2007), by age of death, 15th Regional Health, Paraná-2008.

Preventable causes	Neonatal deaths	Infant deaths-late
	Until 28 days old	(28 days old to 1 year old)
1. Avoidable by proper care for women during pregnancy	27	3
2. Avoidable for proper care to women at birth	6	1
3. Avoidable through diagnosis and early treatment	4	7
4. Avoidable through proper care, guidance and care to the child.	1	5
5. Death linked to risk for congenital malformation	1	1
6. Death by congenital malformations	3	2
Total (n=61)	**42 (68%)**	**19(32%)**

After the investigation, the committee shall hold discussions with all professionals involved in the care of the child, to comprehensive and detailed analysis of each case. The purpose is not to blame people or services, but to prevent deaths from similar causes in the future, promoting a joint reflection on the prevention of death.

Performed all the analysis of death, committees suggest some measures of prevention and intervention, presented in Table 4, and include the measures suggested for deaths that occurred in the 15 cities surveyed. These aim to elucidate the circumstances of infant deaths, identify risk factors and propose measures to improve the quality of health care in reducing mortality.

Preventive measures best suited for CPMI were health promotion and primary prevention, with 84 (34%) measures (Table 4). Highlights included actions related to health education, risk assessment and gestational family planning.

FINAL CONSIDERATIONS

Improve the quality of prenatal care, the quality of care delivery and newborn in an attempt to reduce the IMR, neonatal mainly requires large investment in hospitals and maternity wards, including maternity reference to pregnant women at risk. Moreover, it is also necessary: training permanent professional nursing, physicians and obstetricians. Therefore, there were several factors that contributed to the occurrence of these preventable deaths, organizational factors, structural and professional practices.

The results of this study show the importance of the organization of health care of women and children in Paraná. It is hoped that this study will contribute to municipal planning, directed attention to the mother and the child, the results provide important feedback for the redirection of actions and discussions of measures to change the reality.

MORTALIDADE INFANTIL E CLASSIFICAÇÃO DE EVITABILIDADE: PESQUISANDO MUNICÍPIOS DA 15 REGIONAL DE SAÚDE PARANÁ

RESUMO

O objetivo deste estudo foi avaliar o perfil da mortalidade infantil e a evitabilidade dos óbitos das crianças menores de um ano nos municípios da 15ª Regional de Saúde. Foram investigados 74 óbitos de crianças no ano de 2008, em 15 municípios da 15a Regional de Saúde do Estado do Paraná. Foram coletados dados dos registros do comitê de prevenção do óbito infantil e fetal, estes contabilizados por meio de frequência e porcentagens simples e apresentados na forma de tabela. Dos 74 óbitos investigados, 51 (69%) foram neonatais e 23 (31%) pós-neonatais, com destaque para os municípios com menos de 20 mil habitantes, onde a mortalidade neonatal ocorreu em maior percentual com 82%. Quanto à evitabilidade dos óbitos, 82%, poderiam ser evitados, com percentual maior nos municípios acima de 50 mil habitantes. As causas de morte encontradas

foram relacionadas ao período perinatal e as malformações congênitas. Segundo as medidas de evitabilidade, em 30 (40,5%) dos óbitos assim classificados, as mais encontradas foram às relacionadas com atenção à mulher na gestação. As medidas mais indicadas pelo comitê foram as de promoção de saúde e prevenção primária, 84(34%) das recomendações, com destaque para ações de educação em saúde, avaliação do risco gestacional e planejamento familiar.

Palavras-chave: Mortalidade Infantil. Avaliação em Saúde. Atenção Primária à Saúde. Evitabilidade.

MORTALIDAD INFANTIL Y CLASIFICACIÓN DE EVITACIÓN: INVESTIGANDO LOS MUNICIPIOS DE LA 15ª REGIONAL DE SALUD PARANÁ

RESUMEN

El objetivo de este estudio fue evaluar el perfil de la mortalidad infantil y la evitabilidad de los óbitos de niños menores de un año en los municipios de la 15ª Regional de Salud. Fueron investigados 74 óbitos de niños en el año de 2008, en 15 ciudades de la 15a Regional de Salud del Estado de Paraná. Fueron recolectados datos de los registros del comité de prevención del óbito infantil y fetal; éstos contabilizados por medio de frecuencia y porcentajes simples y presentados en la forma de tabla. De los 74 óbitos investigados, 51 (69%) fueron neonatales y 23 (31%) post neonatales, resaltando las ciudades con menos de 20 mil habitantes, donde la mortalidad neonatal ocurrió en mayor porcentaje, con 82%. En cuanto a la evitabilidad de los óbitos, 82% podrían ser evitados, con porcentaje mayor en las ciudades con más de 50 mil habitantes. Las causas de muerte encontradas fueron relacionadas al periodo perinatal y a las malformaciones congénitas. De acuerdo con las medidas de evitabilidad, en 30 (40,5%) de los óbitos así clasificados, las más encontradas fueron las relacionadas con la atención a la mujer embarazada. Las medidas más indicadas por el comité fueron las de promoción a la salud y prevención primaria, 84 (34%) de las recomendaciones, con destaque para las acciones de educación en salud, evaluación del riesgo gestacional y planificación familiar.

Palabras clave: Mortalidad Infantil. Evaluación en Salud. Atención Primaria a la Salud. Evitabilidad.

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