ANALYSIS OF THE SPATIAL DISTRIBUTION OF INFANT MORTALITY CASES
ANÁLISE DA DISTRIBUIÇÂO ESPACIAL DE CASOS DE MORTALIDADE INFANTIL DE UM MUNICÍPIO

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ABSTRACT
Objective: analyzing the spatial distribution of cases of infant mortality. Method: a descriptive study of a quantitative approach of epidemiological profile characterized as population-based study of secondary data referring to the year 2011. All deaths had records stored in the database of the Mortality Information System - SIM of the Municipal Health of João Pessoa/PB. Results: in relation to gender, the female represented 41.54% of the cases while the male 58.4%. The distribution of infant mortality in João Pessoa is presented heterogeneously, and infant mortality has predominance in the period characterized as early neonatal. From the total of 142 deaths, 85 cases occurred in considered low socioeconomic status neighborhoods. Conclusion: from the mapping of the infant deaths it is possible to perform evaluation of the territorial health situation and outline intervention strategies in the most affected communities seeking to reduce child mortality.

Descriptors: Infant Mortality; Epidemiology; Information System.

RESUMO
Objetivo: analisar a distribuição espacial dos casos de mortalidade infantil. Método: estudo descritivo de abordagem quantitativa de perfil epidemiológico, caracterizado como estudo de base populacional de dados secundários, referente ao ano de 2011. Todos os óbitos tiveram registros armazenados na base de dados do Sistema de Informação de Mortalidade - SIM da Secretaria Municipal de Saúde de João Pessoa/PB. Resultados: em relação ao sexo, o feminino representou 41,54% dos casos enquanto que o masculino 58,4%. A distribuição da mortalidade infantil em João Pessoa se apresenta de forma heterogênea, sendo que a mortalidade infantil apresenta predominância no período caracterizado como neonatal precoce. Do total de 142 óbitos 85 casos ocorreram em bairros considerados de baixo nível socioeconômico. Conclusão: a partir do mapeamento dos casos de óbitos infantis é possível realizar avaliação da situação de saúde territorial e traçar estratégias de intervenção nas comunidades mais acometidas buscando a redução da mortalidade infantil. Descritores: Mortalidade infantil; Epidemiologia; Sistema de Informação.
INTRODUCTION

Infant mortality is one of the main health indicators, representing the living and health conditions, access to health services and the performance of programs aimed at its reduction. In recent decades, several programs have been developed by the Ministry of Health with strong potential role in reducing infant mortality, among them are: Immunization Program to Encourage Breastfeeding Program, Integral Assistance Program for Women’s Health Child, Reduction Program of Infant Mortality, the National Pact to Reduce Maternal and Neonatal Mortality and the Stork Network.1

According to the surveys, infant mortality has shown decline worldwide and in Brazil, occurring heterogeneously, reflecting the existing health inequalities between regions and states of the Federation.2 Thus, the reduction of child mortality in the country is a permanent challenge.

Infant mortality is an indicator that is related to socioeconomic and environmental conditions, such as basic sanitation, nutrition, medical care, pregnancy and childbirth conditions and access and quality of prenatal and perinatal care, which have close relationship with the geographic space. In this context, the Infant Mortality Rate (IMR) is considered one of the most sensitive indicators of social change, and the study of their spatial behavior contributes to the reduction in their levels.3

The TMI represents the probability of a child come to death in its first year of life. The post-neonatal component reflects the living conditions and health care, and the quality of available resources for preventive and curative health care. Mortality in the neonatal period reflects the socioeconomic conditions and mother’s health, the quality of care provided in care for prenatal, during birth labor, and newborn care.4

Despite the decline, the TMI are still high in Brazil, with differences in the distribution among Brazilian regions. There is a higher concentration of deaths in the Northeast and Legal Amazon. Moreover, these regions present the biggest problems in the adequacy of vital information, reflecting the relationship between infant mortality levels, socio-spatial conditions and quality of data on deaths and births.2,5

The use of geographic space on public health is evident in several areas, such as assessment, planning, monitoring, among others, supporting the studies of physical structure rental and services, distribution of diseases and health problems and their determinants, making imperative the need to local management for prioritization of financial resources and maximizing results.6

Among the actions recommended by the Ministry of Health, in order to foster strategies to support planning for reducing mortality, there is the analysis of population variations, geographical and temporal child mortality by identifying trends and inequality situations that require specific actions and studies.6

The geoprocessing and spatial analysis, associated with the management of socio-demographic data from census tracts made available by the Brazilian Institute of Geography and Statistics (IBGE) and epidemiological information in the Area of Health of the municipalities; it may be useful in order to add to the study the characteristics of geographical space: how, where and why certain areas have higher risk and deaths clusters. The study of these spatial correlations expands the understanding of the determinants of deaths, assists in building management and planning tools, enabling the development of policies that favor unevenly affected areas and thus contributes to the reduction of child mortality.3

OBJECTIVE

● Analyzing the spatial distribution of the cases of infant mortality.

METHOD

It is a descriptive study, of a quantitative approach, of epidemiological profile, characterized as a study of secondary data. All deaths have records stored in the database of the Mortality Information System – SIM, of the Municipal Health Department of João Pessoa/PB, for the year 2011, featuring the study as a population-based and secondary data. To develop the research it was considered essential the variables “address” and “neighborhood” for association with the cartographic base.

The study was developed in the city of João Pessoa, capital of the State of Paraíba, located in the northeast of the country. It has 99.6% urbanization rate, a territorial extension area of 211.475 Km² and a population of 723.515 inhabitants. The
council consists of 64 districts, registering that 10.57% of the population resides in the Mangabeira neighborhood, the most populous. The Mussuré neighborhood is less sparsely populated.

The software used for geo-referencing of information was the ArcGIS 9.3. Spatial information (cartographic base) was crossed with the reporting data. The scale used is expressed graphically in the maps for better visualization of spatial reality. The collected data were entered into the Excel for Windows®, in which the standardization of the names of neighborhoods and streets was held as well as the creation of cartographic points in ArcGIS Geographic Information System, according to the division of the five Health Districts.

Infant mortality was analyzed according to the periods of deaths: less than 7 days old (early neonatal); 7-27 days old (late neonatal); 28 days old to less than 1 year old (post-neonatal) and with the distribution of infant deaths by neighborhoods in five Health Districts according to the areas covered by them. This study was based on secondary data, public access, not constrained population groups and/or individuals, the confidentiality of information gathered.

RESULTS

João Pessoa city is geographically divided into five Health Districts (DS) in order to ensure better access to health services, both Primary Care as the Specialized Care and Hospital.

According to the IBGE Census, the illiteracy rate in João Pessoa city was 8.1% for people aged 15 or older, a little below the average Brazilian index, which was 10% in the same year. But the Human Development Index (HDI) of the municipality in 2010 was estimated at 0.763, situated just above the national index was 0.730 in the same period. It should be noted, however, that the contents within the urban context, differ widely among districts, ranging from maximum rates in the most economically developed districts until the contents of the old communities or neighborhoods of semi-rural edge, which have the lowest human development indexes in the intra-urban context.

In the year 2011 there were reported to the Municipal Health Secretariat 142 cases of infant deaths, of these, 65 deaths were children under 07 days old, characterized as early neonatal infant death, 28 cases from 07-27 days old, characterized as late neonatal infant death, and 49 infant deaths in children aged 28 days old to under 01 year old, characterized as post-neonatal infant death. Mangabeira was the district with the highest incidence, whose territory belongs to the Sanitary District III. To better visualize the geographic cases of infant mortality spatial distribution of the cases was made, as shown in Figure 1.
Early neonatal infant death was the most prevalent type, accounting for 45.77% of the deaths, followed by post-neonatal infant death with 34.51%. The late neonatal infant death was the least prevalent, accounting for only 19.72% of the total.

As we can see in Figure 2, the Sanitary District I had the highest percentage of cases of infant mortality, 29% of all deaths, followed by the Sanitary District II with 23% of cases. The Sanitary District III concentrated 21.1% of the municipality's deaths, while the Health District V presented 16.1%. The Health District IV focused the lowest percentage of deaths, with only 10.8% of cases.
The results show that regarding gender, the female represented 41.54% while the male 58.46%, similar result occurred in a survey in which recorded higher proportion of male deaths (64.70%); Also among them there was observed almost twice the risk of dying than those between the female. 8

Regarding the distribution, infant mortality in the municipality of João Pessoa is presented heterogeneously and showed dominance in the period characterized as early neonatal. The mortality in this age group is associated with the complex combination of biological, socioeconomic and health care factors, the latter related to care for pregnant women and newborns. Thus, the majority of neonatal deaths could be prevented through the quality of care in prenatal care, but also the conditions of assistance to childbirth and immediate care after birth. Furthermore, the fact that the proportion of post-neonatal deaths in Singapore be less than neonatal verified is the same throughout the country and is a worldwide tendency. 9,10 On the other hand, with regard to the post-neonatal, this has not reduced significantly. So, it turns out that these deaths have focused on places of high social vulnerability, with high rates of violence and influence of the drug trade in the city of study.

From the total of 142 deaths 85 cases occurred in considered neighborhoods of low socioeconomic status, especially in communities or close to them. Income inequality has direct effects on the living conditions and health of the population, and has been considered a useful indicator to analyze internal differences in the countries. 11 In similar studies, the conditions of unfavorable lives influenced the increase in infant mortality. 4,8

In the country, the reduction in mortality is a major challenge for health services, government and society, the high current rates concentrated in the poorest regions and populations. From this perspective, it is necessary that managers and workers employ efforts in implementing the evaluation of health services, aimed at improving care and accountability and the commitment of the professionals of health services on the population of the area ascribed. 12,13

Although the neighborhood with the highest incidence has been Mangabeira, whose territory belongs to the Sanitary District III, the districts with highest percentages were the Districts I and II, respectively 29% and 23%, worth pointing out that these districts have in their area, mostly, low-income neighborhoods.

According to IBGE, from 2000 to 2010, the infant mortality rate fell from 29.7% to 15.6%, representing a decrease of 47.6% over the past decade. 14 With fall of 58.6%, the Northeast led the decline in infant mortality rates in the country, going from 44.7 to 18.5 deaths of children under one year per thousand live births, but is still considered the region with the highest indicator. In addition, the IBGE points out that the main economic and social determinants of infant mortality that acted in the historic drop in this indicator in Brazil are linked to interventions in the area of public policies, especially in the field of preventive medicine, sanitation, expansion of programs health and vaccination campaigns.

In João Pessoa, it is observed that there was a reduction of the infant mortality coefficient in the years 2006/2007 and 2008; however, with a small increase in 2009, when the infant mortality rate was 14.1/1.000 live births. Data from 2010 point to a downward trend, with an infant mortality rate of 12.48/1.000 live births. Actions aimed at reducing child mortality in the municipality of João Pessoa focused on investments in the care network with maternity beds, the implementation of the Intensive Care Unit beds (NICU), extension specialists to the hospital network, conducting studies for the development of interventions, health education for professionals in the health care network, addressing issues relevant to child care, prenatal care, delivery care and care for newborns. 15

Given the above, this study showed that information systems are an important support tool in care management because it allows to generate knowledge of the territory by obtaining the information, thus helping in decision making according to the needs of each location. 16
CONCLUSION

The results show how the socio-demographic and economic aspects reflect on infant mortality levels. Despite the reduced variable of this study, it becomes valid to present areas of risk for infant mortality.

From the spatial distribution of cases of infant deaths it is possible to perform evaluation of the territorial health situation and enable the monitoring of cases and outline intervention strategies in the most affected communities seeking to reduce child mortality.

Moreover, in the context of health care and the logic of integrated planning, information obtained through the mappings can be valuable tools for discussion of actions on the quality of prenatal care, professional training and investment in child mortality reduction programs.

REFERENCES


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