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Neonatal Mortality and Survival in a Cuban Hospital

Mortalidad y supervivencia de recién nacidos en un hospital cubano

Marlon Acosta Méndez [1] Mercedes Capote Lobo [2] Yuliana Hernández Pereira [2]
Niurka Mirabal Méndez [2] Eduardo Antonio Hernández González [3]

[1]Facultad de Ciencias Médicas Mayabeque. Güines, Cuba.
[2]Hospital Materno Infantil Comandante Manuel Piti Fajardo. Facultad de Ciencias Médicas de Mayabeque, Güines, Cuba.
[3]Universidad de Ciencias Médicas de Pinar del Río. Facultad de Ciencias Médicas Dr. Ernesto Guevara de la Serna, Pinar del Río, Cuba.

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RESUMEN

Introducción: La mortalidad neonatal comprende todo aquel fallecimiento del recién nacido antes de cumplir 28 días. Las cifras elevadas de mortalidad es un problema para el sector de la salud pública. Disminuyen las investigaciones referentes al tema, es por esto que se decide hacer este estudio.

Objetivo: Caracterizar la mortalidad y la supervivencia neonatal en un hospital cubano.

Método: Se realizó un estudio observacional, descriptivo, de corte transversal, con 16 072 nacidos vivos, en el periodo de enero de 2018 a diciembre de 2023, en el Hospital Materno Infantil, Comandante Manuel Piti Fajardo, en Mayabeque, Cuba. Se utilizaron las variables de nacidos vivos, acoplados a ventilación mecánica, peso inferior a 1500 gramos y sepsis. Los datos se procesaron mediante estadística descriptiva con números absolutos y frecuencia relativa como medida de resumen.

Resultados: El mayor número de neonatos vivos se registró en 2020 (3011; 18,73 %), con una mortalidad de seis casos (0,20 %) y una supervivencia de 3005 (99,80 %). La supervivencia más baja de los neonatos ventilados fue en 2018: 38 sobrevivieron (71,69 %) y 15 fallecieron (28,30 %). En 2021 se registraron 20 neonatos con peso menor de 1500 g (28,17 %), de estos, fallecieron 12 (60 %). Se diagnosticaron 309 casos de sepsis, con 39 fallecimientos (12,62 %).

Conclusiones: Se constata una reducción del número de nacidos vivos, con una tasa de mortalidad baja y un índice de supervivencia, en creciente evolución.

Palabras Clave: Mortalidad, neonatología, recién nacido, supervivencia

ABSTRACT

Introduction: Neonatal mortality includes all deaths of newborns before they reach 28 days of life. High mortality rates are a public health concern. Research on this topic has decreased, which is why this study was conducted.

Objective: To characterize neonatal mortality and survival in a Cuban hospital.

Method: An observational, descriptive, cross-sectional study was carried out with 16,072 live births between January 2018 and December 2023 at the Comandante Manuel Piti Fajardo Maternal and Child Hospital in Mayabeque, Cuba. Variables analyzed included live births, use of mechanical ventilation, birth weight below 1500 grams, and sepsis. Data were processed using descriptive statistics, with absolute numbers and relative frequency as summary measures.

Results: The highest number of live births was recorded in 2020 (3,011; 18.73 %), with a mortality rate of six cases (0.20 %) and a survival rate of 3,005 (99.80 %). The lowest survival rate among ventilated neonates was in 2018: 38 survived (71.69 %) and 15 died (28.30 %). In 2021, 20 neonates weighed less than 1,500 g (28.17 %), of whom 12 died (60.00 %). A total of 309 sepsis cases were diagnosed, with 39 deaths (12.62 %).

Conclusions: A decline in the number of live births was observed, along with a low mortality rate and an increasing survival trend.

Keywords: Mortality, neonatology, newborn, survival

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INTRODUCTION

The care of women and children is vital and is ensured by the highest institutional and governmental levels, supported by current legislation. In Cuba, there is a program encompassing various health strategies focused on women and children: the Maternal and Child Health Care Program (PAMI by its Spanish initials) under the Ministry of Public Health. Thanks to its implementation, significant achievements have been made, including a notable increase in newborn survival rates.[1]

Neonatology, as a branch of Pediatrics, is responsible for the care and medical attention of newborns during their first 28 days of life. Defining this period is crucial—though brief, it involves critical changes that can have long-term consequences into adulthood.[1] Therefore, specialized care during this stage is essential to improve survival rates and ensure good future health.[2]

Neonatal mortality includes all deaths occurring before 28 days of age. Due to its significance, it serves as an indicator linked to a nation's development. By analyzing and generating relevant data, effective actions can be implemented within the healthcare system to reduce mortality rates. [2,3]

Neonatal morbidity and mortality are among the Sustainable Development Goals (SDGs by its English initials), aiming to reduce mortality to fewer than 12 deaths per 1,000 live births. Achieving this requires understanding the specific characteristics of each country's healthcare system and establishing surveillance and control programs. [3]

Globally, there has been a significant decline in neonatal deaths—from 5 million in 1990 to 2.4 million in 2019. According to the Pan American Health Organization (PAHO), in 2019, the Americas reported a neonatal mortality rate of 7.7 per 1,000 live births, with variations ranging from 2.3 to over 30 across different countries in the region.4 Cuba's Health Statistical Yearbook[5] reported rates of 2.2 and 2.0 per 1,000 live births in 2022 and 2023, respectively, with Mayabeque province showing similar figures in the most recent year.

High mortality rates remain a major challenge for public health, with significant repercussions. In Mayabeque province, there is a lack of research on this topic. For these reasons, this study aims to: Characterize neonatal mortality and survival in a Cuban hospital.

METHODS

An observational, descriptive, and cross-sectional study was conducted in the Neonatology Service of the Comandante Manuel Piti Fajardo Maternal and Child Hospital in Mayabeque, Cuba. The study population included all live births (n = 16,072) from January 2018 to December 2023.

The variables analyzed were: live births, newborns on mechanical ventilation, low birth weight (<1500 grams) and neonatal sepsis (with associated mortality and morbidity during the study period). All variables were classified as quantitative.

Data were collected from medical records in the Neonatology Service and entered into a Microsoft Excel 2016 database. Descriptive statistics were applied, and results were summarized in simple tables using absolute frequencies and relative percentages for clarity.

This research adhered to ethical guidelines per the Declaration of Helsinki[6], ensuring compliance with principles of beneficence, non-maleficence, justice, and autonomy. Access to data was restricted to authorized researchers, and information was used solely for scientific purposes. No financial expenses were declared.

RESULS

The year with the highest number of live births was 2020 (18.73 %), which also recorded the lowest mortality rate (0.20 %) and the highest survival rate (99.80 %). A declining trend in births was observed from 2021 to 2023, with the lowest number of live births recorded in 2023 (13.50 %) Table 1.

Table 1. Neonatal Mortality and Survival Trends at the Comandante Manuel Piti Fajardo Maternal and Child Hospital (2018-2023)

Año	Nacidos vivos		Fallecidos		Supervivencia	
	No.	%	No.	%	No.	(%)*
2018	2903	18,06	16	0,55	2887	99,45
2019	2845	17,70	11	0,39	2834	99,61
2020	3011	18,73	6	0,20	3005	99,80
2021	2839	17,66	21	0,74	2818	99,26
2022	2304	14,34	13	0,56	2291	99,44
2023	2170	13,50	13	0,60	2157	99,40
Total	16 072	100	80	0,50	15 992	99,50

Source: Statistics Department of Manuel Piti Fajardo Hospital

*Relative frequencies based on total cases for each year

Analysis of ventilated neonates' survival and mortality rates revealed the lowest survival percentage in 2018 (71.69 %), with the highest mortality rate (28.30 %). In 2021, 20.51 % of neonates required mechanical ventilation Table 2.

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Table 2. Mortality and Survival Rates of Ventilated Newborns

Año	Nacidos vivos		Fallecidos		Supervivencia	
	No.	%	No.	%	No.	%
2018	53	19,41	15	28,30	38	71,69
2019	37	13,55	8	21,62	29	78,38
2020	37	13,55	6	16,22	31	83,78
2021	56	20,51	12	21,43	44	78,57
2022	40	14,65	11	27,50	29	72,50
2023	50	18,32	9	18	41	82
Total	273	100	61	22,34	212	77,66

*Relative frequencies as a proportion of total annual cases

In 2021, the highest number of live births weighing less than 1500 grams was recorded, accounting for 28.17 % of the total, along with the highest number of deaths (60.00 %), resulting in a survival rate of 40.00 % Table 3.

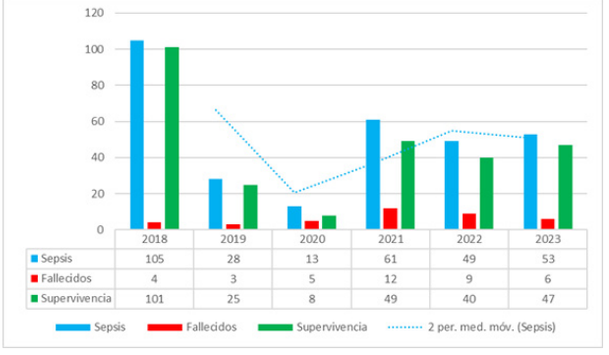
Table 3. Mortality and survival of newborns weighing less than 1500 grams

Año	Menores de 1500 gramos		Fallecidos		Supervivencia	
	No.	%	No.	%	No.	%
2018	6	8,45	4	66,67	2	33,33
2019	9	12,68	4	44,44	5	55,56
2020	11	15,49	1	9,09	10	90,91
2021	20	28,17	12	60	8	40
2022	11	15,49	5	45,45	6	54,55
2023	14	19,72	5	35,71	9	64,29
Total	71	100	31	43,66	40	56,34

*Relative frequencies as a proportion of annual cases

Out of the 16,072 live births included in the study, 309 presented sepsis as a complication, with 39 resulting in death. In 2018, septic patients accounted for 33.98 % of cases. However, the highest neonatal mortality occurred in 2021, with 19.67 % of septic newborns deceased Figure 1.

Figure 1. Incidence of Infections, Mortality, and Survival in Newborns



DISCUSSION

Birth rates reflect the current global demographic phenomenon of declining neonatal populations.[7] This study demonstrates a trend toward reduced birth numbers, consistent with findings by Garzón Morales G, et al. (15.6 %).[8]

Neonatal mortality rates remain low, aligning with results reported by Calle-Munzón JS, et al[9] . This decline in birth patterns is largely attributable to complex sociocultural models shaped by country-specific socioeconomic factors across time periods. These patterns exhibit strong intergenerational transmission, making reversal challenging due to their multicausal origins.

Neonatal mortality rates among ventilated infants vary significantly across studies. While this study recorded rates below 28 %, Álvarez-Alonso et al.[10] reported 40% mortality. Survival rates for ventilated newborns in our analysis exceeded 70%, mirroring data from Suárez Quinde C, et al.[11] Neonates with comorbidities often require invasive procedures like mechanical ventilation, which carry inherent risks of fatal complications.

Low birth weight newborns (under 1500 grams) significantly contribute to neonatal mortality. In Cuba, the observed trends differ from those reported by Rayo Centeno HS, et al.[12], who documented a high overall mortality rate of 56.6%. Conversely, Navarro Durand A, et al.[13] reported lower mortality rates than those found in the present study. Survival rates among these neonates demonstrate progressive improvement, aligning with findings by Domínguez Dieppa F, et al.[14]

These outcomes reflect advancements in perinatal medicine, including refined minimally invasive protocols to promote development in optimal environments and progress in Neonatal Intensive Care Units (NICUs). Such improvements enhance the management of high-risk neonates, reducing associated complications and increasing survival rates.

Martínez Lemus O, et al.[15] and Sánchez Chávez JL, et al.[16] reported sepsis-related mortality rates exceeding 20%, contrasting with the data presented here. This discrepancy may be attributed to standardized diagnostic protocols for neonatal sepsis (e.g., evidence-based flowcharts for infection screening) and timely empirical antibiotic therapy in suspected cases.

A key limitation is the inability to compare these results with recent data from the studied

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municipality due to a lack of prior research on this specific topic

CONCLUSIONS

The study confirms a decline in live births, accompanied by low mortality rates and progressively improving survival rates. Higher numbers of ventilated neonates correlate with increased mortality. The incidence of infants weighing <1500 g has risen, though survival rates in this group have also improved. Sepsis incidence has decreased, with notably high survival outcomes.

SCIENTIFIC CONTRIBUTION

This study provides the first analysis of neonatal mortality and survival trends in Mayabeque province, addressing a gap in prior research. The findings establish a foundational dataset for future comparative studies in this region.

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CONFLICT OF INTEREST

The authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

MAM: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Supervision, Validation, Writing - original draft, Writing - review & editing.

MCL: Conceptualization, Methodology, Project administration, Supervision, Validation, Writing - original draft, Writing - review & editing.

YHP: Conceptualization, Methodology, Project administration, Supervision, Validation, Writing - original draft, Writing - review & editing.

NMM: Investigation, Methodology, Supervision, Validation, Writing - original draft, Writing - review & editing.

EAHG: Investigation, Methodology, Supervision, Validation.