

Neonatal Mortality In A Regional Hospital In Ghana: A Two-Year Preliminary Review

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Abstract

Introduction: The first 28 days of life is the neonatal period. It is the most vulnerable period for a child's survival. Children face the highest risk of dying in their first month of life at an average global rate of 17 deaths per 1,000 live births in 2019. This study aimed at investigating the pattern of, and reviewing neonatal mortality at the Neonatal intensive care unit (NICU) in the Greater Accra Regional Hospital (GARH) from January, 2019 to December, 2020.

Methods: Retrospective review was carried out and convenience sampling was employed in the data collection. Sample size of 300 was used. The data was retrieved from the NICU's admission and discharge books, monthly and annual mortality records. The data was analyzed with Statistical Package for Social Science (SPSS) and presented in tables and bar chart formats. Descriptive statistics (frequency and percentages) was applied to the data collected. Prevalence of various indicator were estimated with 95% confidence interval.

Introduction

Neonatal mortality is a public health issue that affects the world's poorest and lower middle-income countries the most. It is the death of a live-born baby within the first 28 days of birth.¹ In 2018, an estimated 2.5 million neonatal deaths occurred worldwide constituting about 7,000 new-born deaths every day. Of these, more than 1.1 million

Results: The study revealed a prevalence of 49.1 neonatal deaths per 1,000 live births during a two-year period; January 2019 to December 2020. Male neonates constituted 56.7% of neonatal mortalities recorded. Most neonatal mortalities (11%) were recorded in October and the least (6%) was in May. The major causes of neonatal mortality at GARH during 2019 and 2020-year period were prematurity (43.3%) and perinatal asphyxia (28.7%).

Conclusion: The neonatal mortality rate at the neonatal intensive care unit of the Greater Accra Regional Hospital (GARH) was 49 per 1000 live births as compared with the average world figure which is 19 per 1000 live births compared with average world figure. Preterm birth and perinatal asphyxia were the leading causes of neonatal mortality and the male gender was also linked with high risk of neonatal mortality.

Keywords: Neonatal mortality, morbidity, preterm birth, Ghana.

deaths were reported in sub-Saharan African countries.² In Ghana, neonatal deaths account for nearly half of deaths among under-five year olds.³ Even though significant progress has been made in lowering new-born mortality over the last three decades, further efforts are needed to meet the 2030 SDG target.⁴ In Ghana, a National New-born Health Strategy and Action Plan was launched in

2014 to reduce neonatal mortality rate from 32 per 1000 live births to 21 per 1000 live births in the country and to reduce the institutional neonatal mortality by at least 35%.⁵ However, despite the interventions and efforts aimed at maternal and new-born care, neonatal mortality rates in Ghana have remained steady. Studies conducted across the globe have identified different risk factors of neonatal deaths. Maternal health before, during and after pregnancy, conditions during labour, delivery and postnatal care of babies are reported to play a significant role in decreasing neonatal mortality.⁶ Similar studies also cited neonatal infection, preterm birth, low birth weight, and birth asphyxia as leading causes of neonatal deaths worldwide.⁷ There are also existing evidence that shows a relationship between maternal characteristics, including age, education and neonatal mortality. Since the risk of neonatal death may vary even within the same country depending upon the socioeconomic status of the regional population and access to health care services, it is thus crucial to determine the true burden of neonatal mortality, the causes of those deaths, and their characteristics in diverse communities and clinical settings as this is an important step to monitoring progress towards set goals. This study therefore seeks to investigate neonatal mortality rate and associated factors among newborns admitted to the Neonatal Intensive Care Unit of the Greater Accra Regional Hospital.

Methods

This was a retrospective study conducted at the Greater Accra Regional Hospital, Accra, Ghana. Kish statistical formulae was used to calculate the sample size.⁸ At a 95% confidence level and a significant rate of 0.05, 300 neonatal mortality cases were selected out of 707 cases using a systematic sampling technique. The inclusion criterion was all neonatal death cases that occurred from January, 2019 to December, 2020. A retrospective data abstraction form was used to collect data from case notes, admission and discharge books, and monthly and annual mortality report records. The information retrieved included date and time

of admission, date and time of delivery, mode of delivery, gender, birth weight, place of delivery, gestational age at birth, age at presentation, length of stay in hospital, date and time of death, age at death, year of admission, geographic location (place of current residence), provisional and final diagnosis, maternal ANC status, maternal age. Ethical approval was sought from the Community Health Dissertation Review Committee (CHDRC) of the University of Ghana Medical School for the commencement of this research at Greater Accra Regional Hospital (GARH). All information gathered was extracted into excel spreadsheet 2016 and cleaned. The cleaned data was exported into IBM SPSS statistics version 26 for analysis.

Frequency and percentages was used to describes maternal and neonatal characteristics. Prevalence of mortality causes was determined with proportions and the confidence interval was set at 95%. Results were presented in charts, tables and narrations.

Results

There were 14,390 live births and 707 neonatal deaths during the period from January 2019 to December 2020 at GARH. The prevalence of neonatal deaths was thus 49.1 per 1,000 live births. Out of the 300 neonatal mortality cases examined in the study, 158 (53%) died in 2019 and 142 (47%) died in 2020. From the results, 87/158 (55%) neonates who died in 2019, were males while 71 (45%) were females. In the year 2020, 83/142 (59%) mortality cases were males and 59 (42%) were females. Characteristics of mothers and neonates are shown in table 1.

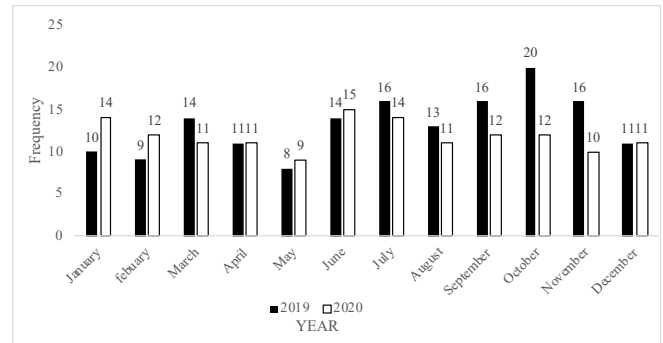
In the 2019 chart review, 124 mothers (79%) were within the ages of 14-29 years at the time of delivery and 34 mothers (22%) within 30-45 years at the time of delivery. In 2020, 95 mothers (67%) were within the ages of 14-29 years at the time of delivery and 47 mothers (33%) within the ages 30-45 years.

Table 1 Characteristics of mothers and neonates

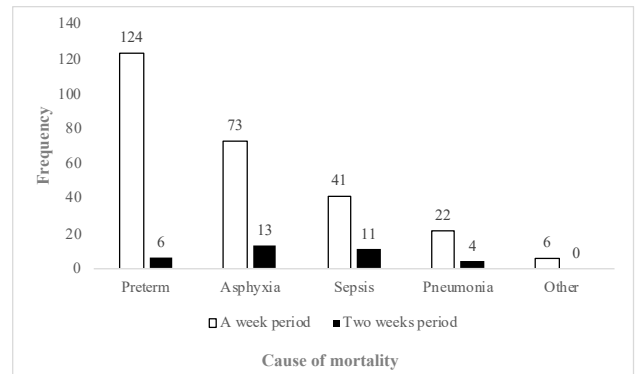
Characteristics	Frequency	Percentage
Maternal Age		
14-29	219	73.0
30-45	81	27.0
Maternal ANC Status		
Attendant	152	50.7
Non-attendant	148	49.3
Geographical location		
Within Accra	276	92.0
Outside Accra	24	8.0
Mode of delivery		
SVD	132	44.0
C/S	168	56.0
Gender of Neonate		
Female	130	43.3
Male	170	56.7
Resuscitation at delivery		
Yes	254	84.7
No	46	15.3
Length of stay		
1 week	266	88.7
2 weeks	34	11.3
Gestation at birth		
Normal	253	84.3
Not normal	47	15.7
Apgar Score		
0-3	69	23.0
4-6	196	65.0
7-10	36	12.0

Abbreviations: ANC, Antenatal clinic; SVD, Spontaneous vaginal delivery; C/S, caesarean section

In year 2019, neonatal mortality was highest in the month of October 20 cases (13%) and lowest in May with 8 cases (5%). In year 2020, neonatal mortality was highest in June with 15 deaths (11%) and lowest in May with 9 cases (6%) (Figure 1).

**Figure 1 Monthly distribution of neonatal mortality**

One hundred and thirty (43%) of neonates included in the study died as a result of preterm delivery, 86 (29%) died as a result of Neonatal Asphyxia. Other causes included sepsis 52 (17%), 26 (9%), Pneumonia and other diagnosis 6 (2%). Preterm death dominated in the first week (Figure 2).

**Figure 2 Causes of mortality**

Out of the 158 neonatal mortality cases recorded in 2019, 52 (33%) were spontaneous vaginal delivery (SVD) and 106 (67%) were delivered through Caesarean Section (C/S). In 2020, neonatal mortality cases recorded, 80 neonates (56%) were delivered through SVD and 62 neonates (44%) were delivered through C/S.

Prevalence of maternal and neonatal characteristics associated with mortality

Variables		Prevalence	PM (95%C.I)	COR95% C.I)
Mode of Delivery	C/S	0.0200	0.44(0.38-0.50)	1.01(0.78-1.27)
	SVD	0.0261	0.56(0.50-0.62)	1
Maternal ANC status	Attendants	0.0237	0.51(0.45-0.56)	1
	Non attendants	0.0231	0.49(0.44-0.55)	0.99(0.78-1.26)
Apgar score	0-3	0.0107	0.23(0.19-0.28)	1.65(0.54-1.98)
	4-6	0.0304	0.65(0.59-0.7)	2.01(0.66-2.34)
	7-10	0.0056	0.12(0.08-0.16)	
Length of stay	1 week	0.0415	0.89(0.84-0.92)	1
	2 weeks	0.0053	0.08(0.053-0.12)	1.03(0.69-1.50)
Maternal Age	14-29 years	0.0341	0.73(0.63-0.78)	1.18(0.9-1.55)
	30-45 years	0.0126	0.27(0.22-0.32)	1

Abbreviation: PM, proportion of neonatal mortality; COR, Crude odds ratio; C/S, caesarean section; SVD, spontaneous vaginal delivery

Discussion

Findings of the study revealed a higher prevalence of neonatal mortality; 49.1 neonatal deaths per 1,000 live births at the Greater Accra Regional Hospital compared with the world average of 22.9 deaths per 1,000 live births and the national average of 29 per 1000 live births. The prevalence is also high compared to similar studies conducted in Navrongo and Kintampo which recorded 18.0 and 12.5 per 1000 live births respectively.⁸ This contradicts reports that neonatal deaths in urban residence is low compared to rural residence.⁹ The higher prevalence of neonatal mortality could also be attributed to this facility being the regional referral center in the capital city and manages challenging cases transferred from the district hospitals.

Neonatal deaths were high among male babies (57%), similar to a research study in Nigeria indicating high neonatal mortality in male babies.¹⁰ It is reported that boys may be at higher risk of death in the neonatal

period due to lower birth weight or a higher proportion of preterm deliveries.

Contrary to reports that Asphyxia was the leading cause of death among hospital birth on the day of birth, this study found preterm birth as the leading cause of death in the first week.¹¹ Lack of adequate maternal and neonatal care at health facilities in critical times has been argued to be linked to deaths within the first day of life.¹² A systematic review reported that over three quarters of intrapartum-related deaths occurred in settings with weak health systems.⁶ Although the quality of delivery services was not examined in this study it could influence the risk of neonatal deaths in the first week of the child's life. Perinatal asphyxia was the second leading cause of death and the highest in the second week of the newborns in this study. These research findings are in line with studies that revealed preterm births with its complications and perinatal asphyxia as the major causes of neonatal mortality.^{1,2} It is reported that fatal consequences of asphyxia are avoidable meaning a significant burden of neonatal mortality is preventable.

From the study, it is also observed that a higher maternal age of 40 years or more was also linked to a higher risk of neonatal mortality. A relatively higher number of neonates who died in the study were delivered through caesarean section. This may be linked to the maternal condition that necessitated the Caesarean section in the first place, as the study site is a regional referral center managing severe cases referred from the districts.

Conclusion

The study revealed a neonatal mortality rate of 49.1 death per every 1000 live birth. Preterm birth and perinatal asphyxia were the leading causes of neonatal mortality. Male gender was also linked with high risk of neonatal mortality. Ghana's over all neonatal death is above global average and there is the need for context specific interventions towards neonatal mortality reduction despite the significant national progress.

Conflict of interest

Authors declare that they have no competing interest.

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