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A Cohort Analysis of Neonatal Hospital Mortality Rate and Associated Factors in Qalyubiya Governorate

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Abstract

Background: Neonatal infant mortality is defined as the loss of a neonate between the ages of 0 and 27 days. The first week of a baby's existence (between 0 and 6 days old) is the most dangerous time for their health. Specifically, this research set out to identify the factors that contribute to the high incidence of infant death in Qalyubiya Governorate's hospitals. Methods: All newborns (≤28 days) admitted to the NICU were included in this prospective cross-sectional study. There were 973 in the "alive" group and 164 in the "died" group. End result: Tragically, 86% of patients hospitalized to the neonatal intensive care unit (NICU) at Benha University Hospital who were 28 weeks or younger at the time of admission passed away. In the NICU at Benha University Hospital, 9.3% of patients hospitalized between 32 and 36 weeks of gestation died. All patients hospitalized to the neonatal intensive care unit at Benha Health Insurance Hospital who were between the ages of 28 and 32 weeks gestation perished, whereas all patients treated with a gestational age of 36 weeks or more showed improvement. At Benha Specialized Children Hospital NICU, every single kid admitted at a gestational age of 28 weeks or less perished. With a gestational age more than 36 weeks, 6% of children admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital died. 60% of infants hospitalized to the neonatal intensive care unit at Toukh Hospital died between 28 and 32 weeks of gestation, while 7.5% of those between 32 and 36 weeks of gestation perished. All patients hospitalized to the neonatal intensive care unit (NICU) at Kafr Shoukr Hospital who were born between 28 and 32 weeks gestational age perished. With a gestational age of 32–36 weeks, 8% of patients admitted to the NICU at Kafr Shoukr Hospital passed away. In summary: A greater mortality rate in the neonatal intensive care unit was associated with the following factors: short birth weight, low gestational age, cesarean section delivery, poor APGAR scores at 1 and 5 minutes, and length of stay in the NICU. In order to forecast the result of NICU hospitalization, it is helpful to measure the following parameters: leucocytes count, platelets count, CRP, AST, ALT, serum urea, serum creatinine levels, serum K, PT, plus INR.

Keywords: Neonatal mortality, NICU hospitalization, and associated factors are the main topics of this article.

Introduction

The The neonatal period, which lasts for the first 28 days of a baby's existence, is a very vulnerable time because of the intricacy of the newborn's adaptation process and the possibility of contracting potentially fatal infections. Nearly half of all deaths among children less than five were neonates, with an estimated 2.8 million fatalities in 2013 [1].

When a baby doesn't make it through the first 28 days of its existence, we call it a neonatal death (0-27 days). When a baby dies in the first week of life (between 0 and 6 days), it is considered early neonatal mortality [2]. When it dies between 7 and 27 days of age, it is considered late neonatal mortality.

From 2000 to 2013, there is evidence that the worldwide under-five death rate decreased at a faster pace than the worldwide newborn mortality rate (2.9% vs. 4.9% annually). Unresolved is the burden of Africa's newborn mortality rate (NMR), which stands at 41 per 1000 live births. This stands in stark contrast to industrialized nations, where the newborn mortality rate is four per thousand live births [1].

Many newborns do not survive their first month of life due to complications such as infections, premature delivery, low birth weight, or birth asphyxia. In the first week of life, known as the early neonatal period, the majority of newborn fatalities are caused by asphyxia and prematureness; in the seven days after delivery, known as the late neonatal era, infection is the leading cause of mortality [3]. Factors that contribute to newborn mortality include the mother's age, level of education, the location of birth, and the kind and timing of nursing, according to studies. Some research suggests that neonates born to females have a greater chance of surviving than those born to men [4].

It is critical to study the relationship between newborn mortality and these characteristics in nations with high NMRs [5] since the causes and risk factors of neonatal death vary with access, availability, and quality of health care.

One of the biggest problems in accurately assessing neonatal mortality rates in poor nations is the absence of trustworthy data. Finding solid findings has also been a problem with previous research due to their methodological flaws. As an example, despite having arguably of the world's poorest health and crucial event reporting systems, sub-Saharan Africa has the highest nuclear magnetic resonance (NMR). Babies often die unrecognized when they are born at home. Cluster sampling studies or surveys conducted in hospitals are therefore often used to extrapolate NMRs [6].

Finding the rate of newborn hospital mortality in Qalyubiya Governorate and the factors that contribute to it was the primary objective of this study.

Patients and Methods:

Study Design and patients:

This the Benha University Hospital's Faculty of Medicine performed a prospective cross-sectional study. Benha University Hospital and Benha Insurance Hospital's Neonatal Intensive Care Units were the sites of patient selection. In addition to the normal hospital in Toukh, there are specialist pediatric hospitals at Benha and Kafr Shokr.

The objective of the research was to include all newborns hospitalized to the NICU (≤28 days).

There were 973 in the "alive" group and 164 in the "died" group.

Study ethical clearance: All parents of the participants were asked to sign a written informed permission form. Benha University of Medicine's ethical committee on research involving human participants gave its stamp of approval to the project.

Babies whose parents or legal guardians objected to the study were not included.

Methods:

All the patients were subjected to: Demographics and present history taking [age at admission (days), Perinatal history, gender, birth weight, Mode of delivery, Maternal Risk Factors (DM, hypertension, and PROM), drug intake, need of respiratory support (CPAP, HFOV, Nasal cannula, and SIMV) APGAR scores at first and fifth minutes, resuscitation requirements, outcome of NICU admission], assessment of gestational age using NEW Ballard score, anthropometric measures, general examination, clinical examination, and laboratory investigations (Complete blood count (CBC), liver function test, Kidney function test, C-reactive protein (CRP), erythrocyte sedimentation rate (ESR) test, partial thromboplastin time (PPT) test, the prothrombin time (PT) test, the international normalized ratio (INR) blo

Statistical analysis:

The The examined variables were checked for normality of distribution using the Kolmogorov-Smirnov test, which assumes normality at P>0.05. For nonparametric data, the median and interquartile range (IQR) were used for data summarization. Using the proper nonparametric test, the Mann Whitney test for comparison between two groups was used to assess the statistical significance of the difference between the groups that were analyzed. We used the chi-square test (X2-value) to compare the categories of data between groups. The results of the NICU admissions were analyzed using logistic regression. The significance threshold for this research was established at $p < 0.05$, and all statistical tests used a two-sided method.

Results:

The The time of admission for the patients analyzed was 2.0(1.0-3.0) days, with 2.0 being the median (IQR) age. In this study, women made up 50.5% of the participants. Birth weight was 2.4 kg (1.6-2.5 kg) and the median (IQR) gestational age was 35.0(34.0-36.0) weeks among the individuals analyzed. CS was used for the delivery of 70% of the patients in the study. Maternal risk factors for newborn mortality were not present in 77.8% of the women surveyed, whereas 9.4% had diabetes mellitus and 7.3% had preeclampsia. An antibiotic regimen was followed by 66.5% of the individuals in the study. Inotrope use was low, at 16.9%. A nasal cannula was necessary for 29.6% of the patients, HFOV for only 1%, and respiratory assistance was unnecessary for 34.6%. Listing 1

after 1 minute, the patients' median (IQR) APGAR score was 8 (range: 8–9), and after 5 minutes, it was 10 (range: 10-10). With a range of 3-7 days, the median (IQR) length of stay in the NICU was 5. Out of the patients brought to the NICU who were examined, 85.6% showed improvement, while 14.4% passed away. Second Table

Among the patients hospitalized to the NICUs at Benha University Hospital and Kafr Shoukr Hospital, 23.2% and 14.6% of the total, respectively, passed away. Twelve percent of the patients hospitalized to the neonatal intensive care unit at Benha Specialized Children's Hospital, ten percent at Toukh Hospital, and five percent at Benha Health Insurance Hospital passed away. Tragically, 86% of patients hospitalized to the neonatal intensive care unit (NICU) at Benha University Hospital who were 28 weeks or younger at the time of admission passed away. In the NICU at Benha University Hospital, 9.3% of patients hospitalized between 32 and 36 weeks of gestation died. All patients hospitalized to the neonatal intensive care unit at Benha Health Insurance Hospital who were between the ages of 28 and 32 weeks gestation perished, whereas all patients treated with a gestational age of 36 weeks or more showed improvement. At Benha Specialized Children Hospital NICU, every single kid admitted at a gestational age of 28 weeks or less perished. With a gestational age more than 36 weeks, 6% of children admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital died. 60% of infants hospitalized to the neonatal intensive care unit at Toukh Hospital died between 28 and 32 weeks of gestation, while 7.5% of those between 32 and 36 weeks of gestation perished. All patients hospitalized to the neonatal intensive care unit (NICU) at Kafr Shoukr Hospital who were born between 28 and 32 weeks gestational age perished. With a gestational age of 32–36 weeks, 8% of patients admitted to the NICU at Kafr Shoukr Hospital passed away. Third Table

The mortality rate was 83.3% among patients hospitalized to the neonatal intensive care unit (NICU) at Benha University Hospital who were born with a weight less than 1 kilogram. Infants admitted to the neonatal intensive care unit at Benha University Hospital weighing 1.5 to 2.5 kg had a 13.1% mortality rate. All patients hospitalized to the neonatal intensive care unit at Benha Health Insurance Hospital who weighed less than 1 kilogram

per birth perished, while 1.7% of those weighing more than 2.5 kilograms each birth also passed away. Death occurred in 75% of children hospitalized to the neonatal intensive care unit (NICU) at Benha Specialized Children's Hospital who were born with a weight less than 1 kilogram. When admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital, 7.6% of infants weighing 1.5-2.5 kg perished. Toukh Hospital NICU accepted all patients with a birth weight less than 1 kg, while 3.8% of those with a birth weight between 2.5 and 3.5 kg perished. Everyone who was admitted to the neonatal intensive care unit at Kafr Shoukr Hospital with a birth weight less than 1 kilogram perished. 2.5 kg was the birth weight at which 2.8% of patients hospitalized to the neonatal intensive care unit at Kafr Shoukr Hospital died. There are several factors that can be used to predict the outcome of NICU admission, including the patient's age at admission, birth weight, gestational age, mode of delivery, maternal risk factors, APGAR scores at 1 minute and 5 minutes, length of stay in the NICU, leucocytes count, platelets count, CRP, AST, ALT, serum urea, serum creatinine levels, serum K, PT, and INR (p=.000). The fifth table

Table (1) Patient characteristics and distribution of perinatal history, maternal risk factors, medication consumption, and respiratory support among the patients studied

Variable		Studied patients N.= 1137
Age at admission (days)		2.0 (1.0-3.0)
Sex	Female	574 (50.5%)
	Male	563 (49.5%)
Gestational age (weeks)		35.0 (34.0-36.0)
Birth weight (kg)		2.4(1.60-2.50)
Perinatal history		
Mode of delivery	**CS**	796 (70%)
	VD	341(30%)
Maternal Risk Factors	**No**	885 (77.8%)
	DM	107 (9.4%)
	Hypertension	60 (5.2%)
	DM and hypertension	3(0.3%)
	PROM	85 (7.3%)
Drug intake		
Antiboitics		756 (66.5%)
Inotropes		192 (16.9%)
	None	394(34.6%)
	CPAP	298 (26.2%)
	HFOV	١١(١.٠%)
	Nasal cannula	338 (29.6%)
Conventional mechanical ventilation	**SIMV**	96(8.6%)
Investigation		
Leucocytes (109/L)		16.5 (15.7-17.9)
Hb (g/dL)		13.1(12.9-13.3)
Platelets(x10^3/µL)		150(48.0-200.0)
CRP		30.5(25.0-39.0)
AST		33.0(26.0-45.0)
ALT		31.0(25.0-39.0)
Urea (mg/dL)		47.0(39.0-55.0)
Creatinine (mg/dL)		.50(.30-.60)
Na (mmol/L)		134.0(133.0-135.0)
K (mmol/L)		3.7(3.5-3.8)
PT (Sec)		14.4(13.1-14.8)
PTT (Sec)		43.7(39.0-44.2)
INR		1.3(1.1-1.4)
ABG	**metabolic acidosis**	104(9.2%)
	normal	623(54.7%)
	respiratory acidosis	34(3%)
	not done	376(33.1%)

The data is shown using the median (IQR) or frequency (%).

Table (2) Neonatal Intensive Care Unit (NICU) admission outcomes, patient length of stay, and APGAR scores of the examined infants

Variable	Studied patients N.=1137
APGAR score at 1 min	8.00 (.0-9.0)
APGAR score at 5 min	10.00 (8.0 - 10.0)
Duration of NICU stay(days)	5.00 (3.0 -10.0)
Outcome of NICU admission	
Died	164(14.4%)
Alive	973(85.6%)

Table (3) The following table shows the breakdown of NICU admissions and deaths by unit:

	Number of total admitted cases	Number of died cases	Percentage (%)
Benha University Hospital	353	82	23%
Benha Health Insurance Hospital	199	10	5%
Benha Specialized Children Hospital	350	42	12%
Toukh hospital	105	11	10.4%
Kafr Shoukr hospital	130	19	14.6%
Total	1137	164	14.4%

Both median (IQR) and frequency (%) are used to illustrate the data.

Table (4) Results of neonatal intensive care unit admissions by hospital, broken down by gestational age and birth weight

Gestational age **Site of admission**	**≤28 weeks**	**28-32weeks**	**32-36 weeks**	**>36 weeks**
Benha University Hospital (N.=353)				
Number of cases (353)	21	53	129	150
Died (82)	18	28	12	24
Percent of death	86%	53%	9.3%	16 %
Benha Health Insurance Hospital (N.=199)				
Number of cases (199)	0	2	87	110
Died (10)	0	2	8	0
Percent of death	0%	100%	9.2 %	0%
Benha Specialized Children Hospital (N.=350)				
Number of cases (350)	7	50	85	212
Died (42)	7	18	8	13
Percent of death	100 %	36%	9.4%	6%
Toukh hospital (N.=105)				
Number of cases (105)	0	5	40	60
Died (11)	0	3	3	5
Percent of death	0%	60%	7.5%	8.3%
Kafr Shoukr hospital (N.=130)				
Number of cases (130)	2	4	50	74
Died (19)	2	4	4	9
Percent of death	100%	100%	8%	12.1%
Birth weight **Site of admission**	**<1 kg**	**1 - 1.499 kg**	**1.5-2.5 kg**	**>2.5 kg**
Benha University Hospital (N.=353)				
Number of cases (353)	24	41	145	143
Died (82)	20	25	19	18
Percent of death	83.3%	60.9%	13.1%	12.5%
Benha Health Insurance Hospital (N.=199)				
Number of cases (199)	2	4	80	113
Died (10)	2	3	3	2
Percent of death	100%	75%	3.7%	1.7%
Benha Specialized Children Hospital (N.=350)				
Number of cases (350)	4	47	92	207
Died (42)	3	16	7	16

Percent of death	75 %	34%	7.6 %	7.7%
Toukh hospital (N.=105)				
Number of cases (105)	3	10	40	52
Died (11)	3	4	2	2
Percent of death	100%	40%	5%	3.8%
Kafr Shoukr hospital (N.=130)				
Number of cases (130)	8	14	38	70
Died (19)	8	6	3	2
Percent of death	100%	42.8%	7.8%	2.8%

Table (5) NICU outcome and several factors in a univariate logistic regression model

Variable	OR	95% C.I	P value
Age at admission (days)	1.43	1.22-1.69	<0.001*
Birth weight (kg)	2.25	1.97 - 2.58	<0.001*
Gestational age (weeks)	2.25	1.97-2.58	<0.001*
Mode of delivery			<0.001*
CS	.390	.226 - .676	
VD*	-	-	
Maternal Risk Factors			
No	.47	.11 - 2.00	.31
DM	.02	.006 - .10	<0.001*
Hypertension	.24	.046 - 1.31	.10
DM and hypertension	.000	.000 - .000	.99
PROM*	-	-	-
APGAR score at 1 min	6.89	4.65- 10.22	<0.001*
APGAR score at 5 min	13.05	8.96 -18.99	<0.001*
Duration of NICU stay(days)	.65	.59 - .71	<0.001*
Leucocytes	6.05	4.36- 8.40	<0.001*
Platelets (x10^3/µL)	1.03	1.02-1.03	<0.001*
CRP	.83	.79 - .86	<0.001*
AST	.88	.86 - .90	<0.001*
ALT	.95	.94 - .97	<0.001*
Urea (mg/dL)	.80	.77 - .83	<0.001*
Creatinine (mg/dL)	.001	.000 - .003	<0.001*
Na (mmol/L)	1.00	.98 -1.02	.532
K (mmol/L)	.004	.001 - .013	<0.001*
PT (Sec)	.08	.05 - .14	<0.001*
PTT (Sec)	1.01	.97 - 1.06	.447
INR	.000	.000 - .001	<0.001*

C.I. stands for confidence interval, * for significant p-value, and *for reference category.ON the other hand, the odds ratio

Discussion:

Neonatal infant mortality is a key indicator of a country's or region's perinatal healthcare system. Worldwide, around 43% of all infant fatalities occur in children less than 5 years old, out of a total of 3 million neonates. Developing nations account for the vast bulk of reports [7].

With 30·2 deaths per 1000 livebirths (90% uncertainty range 25·7-37·2) in west and central Africa in 2017, the annual NMR was highest, while in south Asia it was 26·9 deaths per 1000 livebirths (24·1-30·3). Compared to high-income nations, where the average number of fatalities per 1000 livebirths was 3.1–3.5, the yearly NMR in these areas was about nine times higher. A significant portion of the newborn mortality toll was borne by regions in sub-Saharan Africa and south Asia. Specifically, 38% of the toll was attributed to south Asia, 23% to west and central Africa, and 18% to east and south Africa (16-18). Annual NMRs varied between 44.2 and 0.9 fatalities per 1000 livebirths at the national level [8].

Caesarean sections (CS) were performed on 70% of the patients in our research. Only 9.4% of the women in the study had diabetes mellitus (DM), 7.3% had prelabor rupture of membranes (PROM), and 77.8% did not have any maternal risk factors for newborn mortality.

According to Abdel Hady et al., 70.4% of these babies were delivered by cesarean section, and 19.4% of their mothers had postpartum hemorrhage [9]. This aligns with our findings.

We found that 66.5% of the patients who were evaluated were on antibiotics. Inotrope use was low, at 16.9%. Only 1% of the patients surveyed required

high-frequency oscillatory ventilation (HFOV), whereas 34.6% did not need respiratory assistance and 29.6% required a nasal cannula.

However, according to Pantoja Gómez et al.'s research on clinical treatments in neonatal intensive care units, 80.6% of infants were given inotropes, and 79.6% were given mechanical ventilation. The reason for this variation was that his inclusion criteria were different; specifically, he included infants with neonatal acute kidney damage (AKI) who were 2–28 days old at the time of their first diagnosis. The number ten.

There were 16.5 (range 15.7-17.9) leucocytes in the subjects analyzed. 109/L. Patients in the study had a hemoglobin level of 13.1 (12.9-13.3) g/dl. The patients whose platelet counts were measured were 99.5 (48-120) (x10^3/µL). The individuals analyzed had a C-reactive protein (CRP) level of 30.5 (25-39). The patients' AST levels were 33 (25–45) U/L and their ALT levels were 31 (25–39) U/L. 54.7 percent of patients with ABG results were normal, 33.1 percent did not meet the criteria for ABG, and 3% suffered from respiratory acidosis.

The APGAR scores of the patients analyzed were 8 (8-9) at 1 minute and 10 (10-10) at 5 minutes. The child spent five (ranging from three to seven) days in the neonatal intensive care unit. Out of the patients brought to the NICU who were examined, 85.6% showed improvement, while 14.4% passed away. On the other hand, 35.9% of the newborns surveyed by Workineh and Workie et al., 2022 had an Apgar score below 7 between the first and fifth minutes of life [11].

A total of 23.2% of patients admitted to Benha University Hospital's NICU and 14.6% to Kafr Shoukr Hospital's NICU perished throughout the course of the study. 12.0% of patients hospitalized to the neonatal intensive care unit at Benha Specialized Children's Hospital, 10.5% at Toukh Hospital, and 5.02% at Benha Health Insurance Hospital passed away. Nearly 90% of patients hospitalized to the neonatal intensive care unit (NICU) at Benha University Hospital with a gestational age of 28 weeks or less experienced maternal mortality. In the NICU at Benha University Hospital, 9.3% of patients hospitalized between 32 and 36 weeks of gestation died. At Benha Health Insurance Hospital NICU, every single patient whose gestational age was between 28 and 32 weeks passed away, whereas every single patient whose gestational age was more than 36 weeks made a full recovery. At Benha Specialized Children Hospital NICU, every single kid admitted at a gestational age of 28 weeks or less perished. With a gestational age more than 36 weeks, 6% of children admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital died. At Toukh Hospital NICU, 60% of patients hospitalized between 28 and 32 weeks of gestation died, and 7.5% of those admitted between 32 and 36 weeks of gestation died as well. Every single patient admitted to the neonatal intensive care unit (NICU) at Kafr Shoukr Hospital who was born between 28 and 32 weeks gestation perished. With a gestational age of 32–36 weeks, 8% of patients admitted to the NICU at Kafr Shoukr Hospital passed away.

The purpose of the case-control research conducted by Workineh and Workie et al., 2022 was to determine the causes of bad newborn outcomes. In terms of days, the neonates' ages were recorded as <1 day, 1-3 days, 4-6 days, and 7-28 days in 3.8%, 63.5%, 25.0%, and 5.8% of the cases, respectively [11].

Death occurred in 83.3% of patients hospitalized to the neonatal intensive care unit (NICU) at Benha University Hospital who were born with a weight less than 1 kg. From 1.5 to 2.5 kg at birth, 13.1% of patients hospitalized to the neonatal intensive care unit at Benha University Hospital died. All patients hospitalized to the neonatal intensive care unit at Benha Health Insurance Hospital who weighed less than 1 kilogram per birth perished, while 1.7% of those weighing more than 2.5 kilograms each birth also passed away. Seventy-five percent of infants admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital who were born with a weight less than one kilogram per delivered perished. When admitted to the neonatal intensive care unit at Benha Specialized Children's Hospital, 7.6% of infants weighing 1.5-2.5 kg perished.

Toukh Hospital NICU accepted all patients with a birth weight less than 1 kg, while 3.8% of those with a birth weight between 2.5 and 3.5 kg perished. Everyone who was admitted to the neonatal intensive care unit at Kafr Shoukr Hospital with a birth weight less than 1 kilogram perished. 2.5 kg was the birth weight at which 2.8% of patients hospitalized to the neonatal intensive care unit at Kafr Shoukr Hospital died. Consistent with this, a prior meta-analysis conducted by Zhang et al. found that the greatest death rate was seen in neonates whose birth weight was between 1.0 and 2.5 kg and whose gestational age was between 28 and 32 weeks [12].

Of those who passed away, 58% were victims of sepsis, 29.8% of pneumonia, 6.1% of congenital abnormalities, and 6.1% of sepsis and meningitis combined.

The three leading causes of death among 480 newborns hospitalized were respiratory distress syndrome (RDS), infections, and birth defects, according to Xu et al. [13].

By admission age, gestational age, and birth weight, there was a statistically significant difference between the living and the dead groups. The mortality group had a much younger average age at admission compared to the live group. The gestational age of the deceased was much lower than that of the living. The birth weight of the group who died was far lower than that of the group that lived.

El-Ganainy et al., who sought to determine the likelihood of newborn death in neonatal intensive

care units, corroborated our earlier results and reported that 46.6% of neonates whose gestational age was less than 37 weeks perished, in contrast to 12.7% of neonates whose gestational age was more than 37 weeks. Newborns weighing less than 2.5 kg had a mortality rate of 62.7%, whereas those weighing more than 2.5 kg had a mortality rate of just 11.6%. Neonatal problems were associated with a mortality rate of 41.8% [14].

When looking at parameters related to the mother's health and the method of birth, there was a statistically significant difference between the two groups. CS delivered 84.8% of the deceased group. Among the mothers who passed away, 50.6% had diabetes. The antibiotic, inotrope, and respiratory support use rates were significantly different across the study's dead and living groups (p=0.000). Out of the group who passed away, 100% had a history of antibiotic use, whereas 91.5% had inotrope uptake. Respiratory assistance was not necessary for 40.5% of the living, but 66.5% of the dead required CPAP.

When comparing the two groups based on antibiotic usage, inotrope use, and respiratory assistance, there was a very significant difference. Out of the group who passed away, 100% had a history of antibiotic use, whereas 91.5% had inotrope uptake. While breathing assistance was not necessary for 40.5% of the living group, 66.5% of the dead group required a nasal cannula. After comparing the two groups based on APGAR scores at 1 and 5 minutes as well as length of time spent in the NHCU, a statistically significant difference was found. The APGAR score at 1 minute was much lower in the dead group compared to the living group. Compared to the living group, the dying group had a much lower APGAR score at 5 minutes. Compared to the living group, the duration of the NICU stay for the dead group was much longer. Lab tests showed a statistically significant difference between the two groups: those who died and those who survived. The number of white blood cells in the dead group was much lower than in the living group. Less hemoglobin was found in the dead group compared to the living group. The living group had a much higher platelet count than the dead group. The CRP level was much greater in the dead group compared to the living group.

Based on their renal and liver function tests, the study group that died differed significantly from the living group. AST levels were much greater in the dead group compared to the living group. The ALT levels of the deceased were much greater than those of the living. The urea level was much greater in the dead group compared to the living group. The levels of creatinine in the dead group were significantly greater than those in the living group. Consistent with earlier findings, there was a statistically significant difference between neonates who did not survive and those who did, when it came to ALT, Urea, and Creatinine, as measured in the research by El-Ganainy et al. Surviving neonates had an average ALT of 49.92%, whereas the deceased had an average ALT of 65. Surviving neonates had an average Urea level of 35.37, whereas the dead had an average of 44.90. Surviving neonates had a mean creatinine of 0.67, whereas those who did not make it had a mean of 1.56% [14].

The results of the blood tests showed a statistically significant difference between the two groups. The dead group had a much longer prothrombin time (PT) than the living group. There was a statistically significant difference between the groups in terms of partial thromboplastin time (PTT). The international normalized ratio (INR) for the dead was much greater than that of the living. In comparison to the living group, the dead group's Na level was much lower. The K level was much greater in the dead group compared to the living group. Metabolic acidosis was seen in 57.3% of the dead group whereas normal ABG was found in 60% of the living group.

Certain factors that can be used to predict the outcome of NICU admission include the patient's age at admission, birth weight, gestational age, mode of delivery, maternal risk factors, APGAR scores at 1 and 5 minutes, length of stay in the NICU, leucocytes count, platelets count, CRP, AST, ALT, serum urea, serum creatinine levels, serum K, PT, and INR. The most common poor neonatal outcomes were low birth weight (61.5%), preterm delivery (53.7%), and a low Apgar score at 5 minutes (53.9%), which is in line with the results of the earlier research by Workineh and Workie et al. [11].

Conclusions

A greater mortality rate in the neonatal intensive care unit was associated with the following factors: short birth weight, low gestational age, cesarean section delivery, poor APGAR scores at 1 and 5 minutes, and length of stay in the NICU.

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