

# Mortality Pattern of Patients in Neonatal Intensive Care Unit at Indus Hospital, Karachi

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## ABSTRACT

**Objective:** To identify the most common causes of neonatal mortality in NICU of Sheikh Saeed Memorial Hospital.

**Study Design:** A retrospective study

**Place and Duration of Study:** This study was conducted at the NICU Sheikh Saeed Memorial Hospital, from 1<sup>st</sup> January 2020 till 31<sup>st</sup> December 2020.

**Materials and Methods:** All inborn neonates admitted in NICU were included in study. A demographic profile was documented, including information such as the gestational age, gender, birth weight, and cause of death. Data was entered and analyzed using SPSS version 25.0 Frequency and percentage was computed for all the categorical variables.

**Results:** From total 3964 neonates, rate of mortality was 180 (4.54%). From 180 neonates who died during study period, 115 (63.9%) were males and 65 (36.1%) were females. Mean gestational age of neonates was 32.37±4.92 weeks. Results presented that mean admission weight was 1.63±.84 Kg. Minimum weight was 0.64 kg and maximum was 3.70 kg respectively. Results of current study showed that most common cause of death was sepsis. 45 (25%) neonates has laboratory confirmed while 41 (22.8%) has culture confirmed sepsis. 33 (18.3%) neonates died because of other causes, 16.1% due to RDS, and 10% due to perinatal asphyxia.

**Conclusion:** The rate of mortality in neonates admitted in NICU as 4.5% in our study. This research also demonstrates that neonatal sepsis, neonatal RDS and perinatal asphyxia are the primary causes of morbidities in infants, and they are responsible for a high risk of death; however, sequence in which they occur is not the same.

**Key Words:** Neonatal Mortality, Neonatal Intensive Care Unit (NICU), Sepsis, Respiratory Distress Syndrome (RDS).

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## INTRODUCTION

The neonatal phase is most critical time in a person's life because of very high rates of morbidity and mortality that occur during this time<sup>(1)</sup>. Primary cause of newborn death in developed countries is non-avoidable, such as congenital defects, however in underdeveloped countries, the majority of illnesses are preventable<sup>(2)</sup>. According to WHO, out of 130 million babies, four million will die during the neonatal period, and fifty percent (50%) of neonatal fatalities occur during first twenty-four hours of life<sup>(3)</sup>.

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75% of newborn deaths occur in first 7 days of life while more than 25% occur in first 24 hours. These significant proportion of fatalities are avoidable<sup>(4)</sup>.

Risk factors related with newborn death are regarded as quality indicators for enhancing health care delivered in NICU and an indication of community health and welfare, yet the neonatal mortality rate continues to be a problem<sup>(5)</sup>. Although neonatal intensive care units (NICUs) serve to decrease preterm mortality, they are in short supply and place a significant financial strain on healthcare systems in underdeveloped nations. Improvements in obstetric practice, particularly in the areas of medical screening and monitoring, as well as greater neonatal expertise, have contributed significantly to a dramatic decrease in newborn death rates over the last two decades. However, newborn morbidity and mortality are mostly brought on by respiratory tract diseases, sepsis, and other forms of infection<sup>(6)</sup>.

Leading causes of newborn mortality in Pakistan include sepsis (45.4%), birth asphyxia (23.9%), RDS (13.3%), and congenital anomalies (4.9%). This is a problem all around the world, including Pakistan. The prevalence of newborn diseases changes over time and across regions<sup>(7)</sup>. Neonatal mortality has been shown to have decreased significantly over the previous several

decades, according to a new systematic review. Sub-Saharan Africa and South Asia, according to global trends, still have a long way to go before they reach the SDG target level of 2030<sup>(8)</sup>.

Because NICU admission rates change across time and space, there is a dearth of research examining newborn mortality and morbidity. However, this kind of research is essential for enhancing the quality of treatment, which is essential for ensuring efficient use of resources and valid comparison of health outcomes<sup>(9)</sup>. As a result, purpose of this study was to identify patterns and final outcomes of illness as well as the variables that mostly cause newborn mortality in the NICU.

## MATERIALS AND METHODS

This retrospective study was commenced after taking ethical approval from Institutional Review Board (IRB). Charts were reviewed at the NICU of Sheikh Saeed Memorial hospital over a period of one year. All inborn neonates admitted in NICU were included in study. Patients with multiple congenital anomalies, complex congenital cardiac anomalies, extremely preterm and incredibly low birth weight were excluded. A demographic profile was documented, including information such as the gestational age, gender, birth weight, and cause of death. In order to determine the prevalence of a wide range of morbidities within each category, additional subgroups were created based on gestational age and birth weight. Data was entered and analyzed using SPSS version 25.0 Frequency and percentage was computed for all the categorical variables like gestational age, gender, birth weight and length of stay in NICU. Mean and standard deviation was computed for age, weight, height, BMI.

## RESULTS

This retrospective study was carried out in department of NICU Sheikh Saeed Memorial Hospital. 1 year data from January 2020 to December 2020 was retrieved from hospital record. The analysis of the collected data revealed that there were 3,964 newborns admitted to NICU during the period of one year. From total 3964 neonates, rate of mortality was 180(4.54%). From 180 neonates who died during study period, 115(63.9%) were males and 65(36.1%) were females. Mean gestational age of newborns admitted to the NICU was determined to be 32.37±4.92 weeks. The newborns' gestational age ranged from 24 weeks to 40.1 weeks, respectively. Patients were divided into two groups on the basis of gestational age. From total 180 neonates, gestational age of 113 (62.8%) was <33 Weeks, 12(6.7%) neonates were of 33-36 Weeks and 55(30.6%) of neonates was of ≥37 Weeks gestational age. The results demonstrate that mean weight of the neonates was 1.63±.84 Kg. The minimum weight of the neonate was .64Kg and maximum was 3.70 kg respectively. Neonates were divided into 3 categories

on the basis of weight. Majority (48.9%) of the neonates were of weight (1-2.5kg), followed by 34.4% of the neonates with weight <1 kg. The data regarding comorbidities in mothers showed that 89 (49.4%) of the mothers were normal, GDM was the most common comorbidity that was found in 29(16.1%) mothers. Demographic and clinical characters of neonates who died in NICU are shown in table 1.

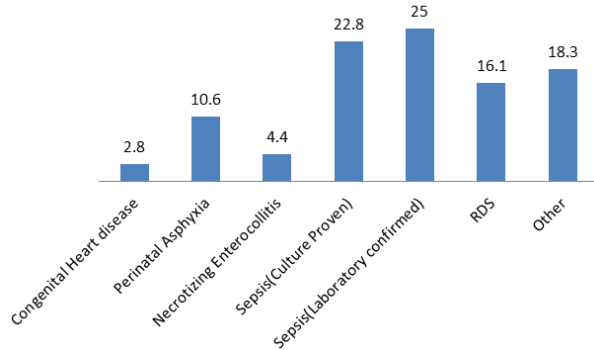
The results of current study showed that most common cause of death was sepsis. 45(25%) neonates has laboratory confirmed while 41(22.8%) has culture confirmed sepsis. 33(18.3%) neonates died because of other causes, 16.1% due to respiratory distress syndrome (RDS), 10% due to perinatal asphyxia., 4.4% has Necrotizing Enterocolitis and 2.8% died because of congenital heart disease as shown in table 2.

**Table No.1: Demographic and clinical Features of Neonates**

	Frequency	Percent
<b>Gender of Neonates</b>		
Male	115	63.9
Female	65	36.1
<b>Gestational Age at Birth</b>		
<33 Weeks	113	62.8
33-36 Weeks	12	6.7
≥37 Weeks	55	30.6
<b>Birth Weight</b>		
<1Kg	62	34.4
1-2.5Kg	88	48.9
>2.5Kg	30	16.6
<b>Maternal Co-Morbidities</b>		
Nil	89	49.4
GDM	29	16.1
PIH	23	12.8
Leaking	15	8.3
Other	24	13.3
<b>Total</b>	<b>180</b>	<b>100.0</b>

**Table No.2: Cause of Death in Neonates admitted in NICU**

	Frequency	Percent
Congenital Heart disease	5	2.8
Perinatal Asphyxia	19	10.6
Necrotizing Enterocolitis	8	4.4
Sepsis(Culture Proven)	41	22.8
Sepsis(Laboratory confirmed)	45	25.0
RDS	29	16.1
Other	33	18.3
Total	180	100.0



**Figure No.1: Graphical representation of cause of death in Neonates**

## DISCUSSION

The rate of neonatal death is regarded as common criteria for assessing a nation's level of health. The neonatal phase is the most critical time in a person's life due to very high rates of morbidity and mortality that occur during this time. Risk factors linked with newborn death are important signs for improving health care given in NICU. The number of newborns that die before 28 days/1,000 live births in a specific year is known as neonatal mortality rate. Neonatal mortality makes up 65% of newborn mortality and is greatest in the first 24 hours of life<sup>(10)</sup>. Premature birth, birth asphyxia and newborn infections are three of numerous neonatal diseases that make up worldwide burden of neonatal illness<sup>(4)</sup>.

In this research, newborns admitted to the NICU at Sheikh Saeed Memorial Hospital were examined for the incidence rate of neonatal death and its determinants. Rate of mortality was 180(4.54%) in current study. Results displayed that mortality rate is lower than other studies. In a research carried out in Ethiopia, the total newborn death rate was 14.3%<sup>(4)</sup>, a study carried out in Nigeria showed mortality rate of 14.2%<sup>(11)</sup> and South Africa<sup>(12)</sup> (13.8%) but and Bangladesh 20.6%<sup>(13)</sup>. The mortality rate in our study is lower than another Pakistani studies which showed mortality rate of 6.2%<sup>(12)</sup> and 8.1%<sup>(14)</sup>. This variance in pattern of death could be due to factors related to each study as well as quality of care given by the centres.

Our study displayed that sepsis was most prevalent cause of death. 45 (25%) neonates have lab-confirmed sepsis, and 41 (22.8%) have sepsis that has been confirmed by culture. 33(18.3%) neonates died because of other causes, 16.1% due to RDS and 10% due to perinatal asphyxia. These causes are also reported in national and international studies as well<sup>(7, 15-17)</sup>

## CONCLUSION

The rate of mortality in neonates admitted in NICU as 4.5% in our study. This study also demonstrates that neonatal sepsis, RDS and perinatal asphyxia are the

leading causes of morbidity and death in newborns, but in a different order. Understanding why babies who are admitted to the NICU get sick or die is helpful for planning and optimizing health services, reallocating resources, and making care better.

### Author's Contribution:

Concept & Design of Study: Iqrar Ali Kanhar  
 Drafting: Sahira Ahsan, Saeed Nazir  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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