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Profile of patients Admitted to Neonatal Care Unit, Babylon Teaching Hospital for Gynecology and Children

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Abstract

Introduction

We have undertaken this study to ascertain the predominant causes of morbidity and mortality in the neonates who are admitted Intensive Care Unit so as to find out the burden of preventable causes, which in turn will help in formulating strategies for control of neonatal mortality .

Objectives:

This study aimed to analyze the epidemiologic patterns of neonate critically ill patients presenting to the Neonatal Intensive Care Unit (NICU) and the etiologies of admission to this unit.

Material and methods:

This descriptive study on the total number of neonate aged less than one month who were presented to the NICU with critical illness was conducted in Babylon Teaching Hospital for Gynecology and Children from 2018-2019. All patients transferred to the NICU were included without distinction. Demographic data of critically ill neonate admitted to the NICU were collected and analyzed in various age groups.

Results:

There were 370 patients admitted to the NICU. The predominant age group of patients below one day of age. The hyaline membrane disease, birth asphyxia, pneumonia and septicemia diseases were common among NICU patients. The clinical outcome of patients 222 (60%) patients improved were transferred to neonatal ward and 148 (40%) patients died.

Conclusion:

Epidemiologic analysis of the pattern of patients admitted to NICU showed different etiologies for admission; on the top were prematurity with hyaline membrane disease. Clinical outcome more than the half of the patients improved. Most of the patients admitted to NICU stayed for (1-6) days .most of patients stayed for less than one day were died, and patients stayed for more than one month had poor outcome. Winter months showed increase in number of admission to NICU.

INTRODUCTION:

The neonatal period is a highly vulnerable time for an infant, who is completing many of the physiologic adjustments required for extra-uterine existence (1). The high neonatal morbidity and mortality rates attest to the fragility of life during this period; in the United States of all deaths occurring in the first year, two thirds are in the neonatal period (1). Approximately 3.1 million babies die worldwide in the first months of life, each year (2). Majority of these deaths occur in developing world, neonatal mortality accounts for 40% of total infant mortality rate (3). Yet, 24 million more newborns have been saved worldwide because of decline in neonatal mortality since 1990 (4).

The care of critically ill neonate remains the most demanding and significant aspect in the field of pediatrics. Optimum care in the neonatal critical care unit depends on the level of training and expertise of the health care personnel, the availability of the resources, and evidence-based management protocols (5).

surfactant was first approved in 1990. Incremental changes in clinical care have produced corresponding incremental improvements in survival especially among extremely preterm infants. Although increased survival initially led to larger numbers of infants with developmental impairments in the last two decades neurodevelopmental outcomes among extremely preterm infants have improved, however many still face a variety of sequelae from visual and hearing loss to cognitive impairments and social challenges to cerebral palsy (6).

We have undertaken this study to ascertain the predominant causes of morbidity and mortality in the neonates who are admitted in Intensive Care Unit so as fined out the burden of preventable causes, which in turn will help in formulating strategies for control of neonatal mortality.

Aim of study:

The aim of this study was to create a profile describing the demographics, diagnosis, and outcome of patients admitted to NICU of Babylon Teaching Hospital for Gynecology and Children. This would allow identifying the magnitude of each illness that needed intensive care.

Materials and methods:

In this cross sectional study data that were collected from patient`s medical record involved all patients admitted to neonatal intensive care unit (NICU) of Babylon Teaching Hospital for Gynecology and Children over one year from January 2018 - January2019.

Study setting:

The NICU involved in this study consider one sector of general pediatric intensive care unit, contains 7 incubators, for each incubator there is a mechanical ventilator and patient monitoring system.

All indicated patients from birth to 30 days of age are admitted to this unit.

The team of this unit composed of three pediatricians seniors, anesthetist, two residents and trained staff. In

addition to pediatric cardiologist, pediatric nephrologist, pediatric surgeon, neurologist, neurosurgeon and otorhinolaryngologist were on call.

The patients admitted to this unit are either referred from the emergency department, primary neonatal care unit of the hospital or from the other hospitals. The following variable were included in the study for analysis:

Age, gender, date of admission (month), length of stay, professional diagnosis, surgical intervention and outcome is classified as transfers to the main neonatal words (improvement) or death.

Data Analysis

Statistical analysis was carried out using SPSS version 21. Categorical variables were presented as frequencies and percentages. Pearson's chi square (X^2)and Fisher-exact tests were used to find the association between categorical variables. A *p*-value of $\leq$ 0.05 was considered as significant.

RESULTS:

The total number of patients who admitted to NICU from January 2018 – January 2019 were (370), 253 (68.4%) were males and 177 (31.6%) were females.

Patients aged less than one day were 186(50.3%), patients aged (1-7) days were 126(34.1%) and age group of (7-30) days constituted 58(15.6%).

Regarding length of stay in NICU the majority of patients were admitted (1-6) days 258 (69.7%) were the other patients staying for (7 days – 1 month) 108(29.2%) and who admitted for more than one month 4(1.1%).

Figure 1 shows the distribution of patients according to duration of admission. Highest percentage (69.7%) of patients remain in the ICU for (1-6) days.

The distribution of patients according to date (month) of admission, there was highest number 42 (11.4%) patients admitted to NICU during October, figure2.

Figure 2 shows the distribution of patients according to month of admission. Highest percentage(11.4%) of patients admitted during October.

Table (1) shows distribution of patients according to socio-demographic characteristics including (age and gender).

Table 1: The Distribution of patients according to socio-demographic characteristics

Socio-demographic Characteristics	N	%
Age		
Less than one day	186	50.3%
(1-7)days	126	34.1%
(7-30) days	58	15.6%
Total	370	100.0%
Gender		
Male	253	68.4%
Female	117	31.6%
Total	370	100.0%

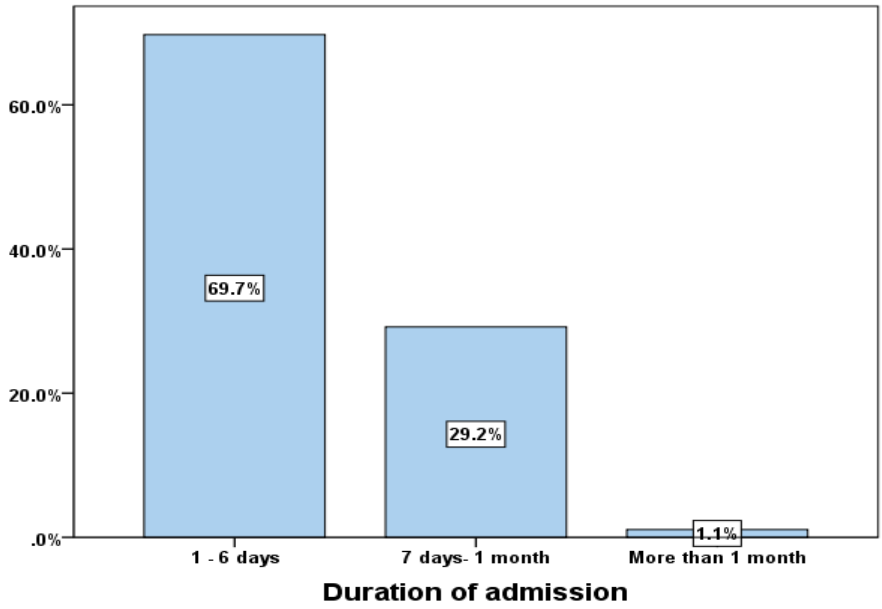

Figure 1: Distribution of patients according duration of admission

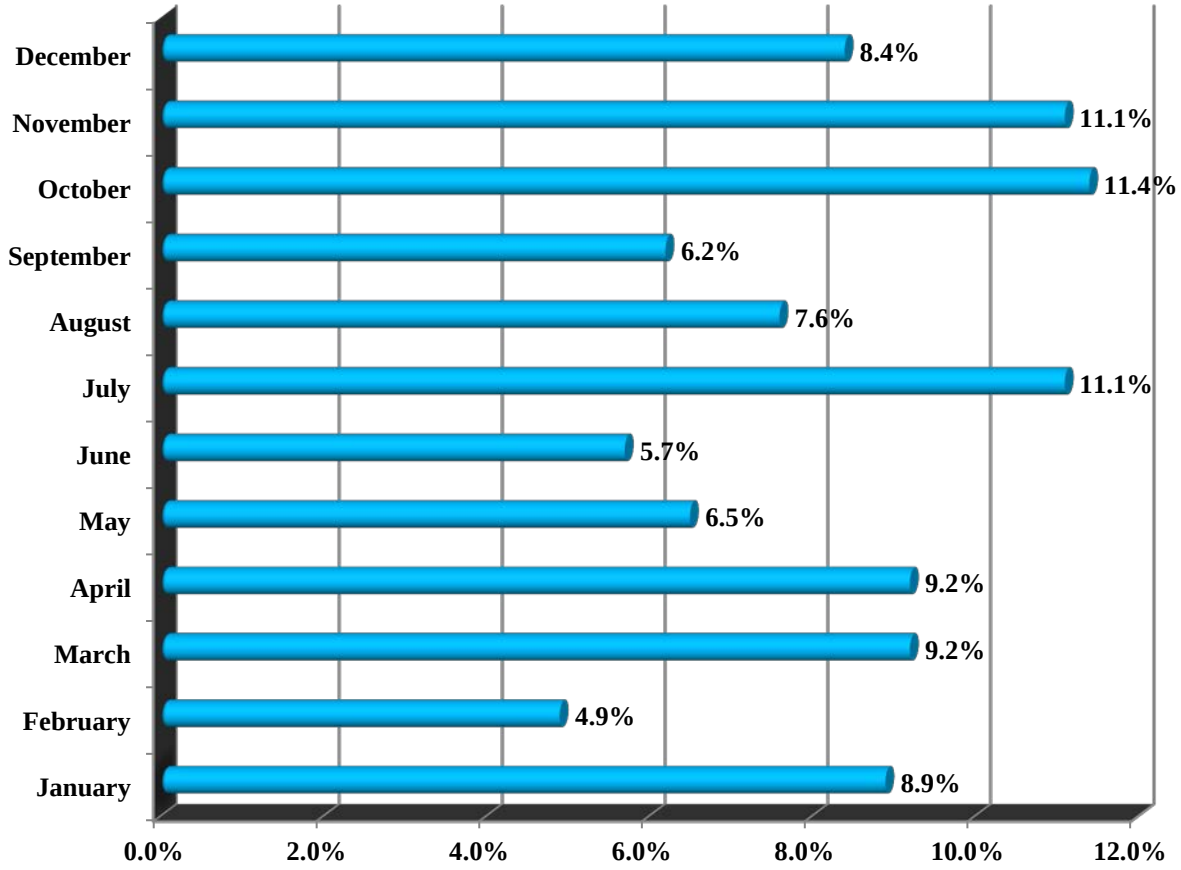

Figure 2: Distribution of patients according month of admission

Table 2 : The Distribution of patients according to study variables

Study variables	N	%
Outcome of patients		
Death	148	40.0%
Improve and discharge	222	60.0%
Total	370	100.0%
Surgical intervention		
Present	51	13.8%
Absent	319	86.2%
Total	370	100.0%

Regarding patients who don't need surgical intervention 319 (86.2%) while the clinical outcome 222(60%) patients improved were transferred to the general neonatal ward and 148(40%) patients died table 2.

Table 2 shows distribution of patients according to study variables including (outcome of patients and surgical intervention).The mortality represent (40.0%) of patients admitted to ICU, patients need surgical intervention represent (13.8%).

About the professional diagnosis of the patient admitted to NICU highest number 117(31.6%) patients premature with hyaline membrane disease (table 3).

Table 4 shows the association between outcome of patient admitted to ICU and study variables including(age, gender, duration of admission in ICU , month of admission and surgical intervention). There was significant association between outcome of patient admitted to ICU and study variables including (age, duration of admission in ICU and surgical intervention).

Table 5 shows the association between outcome of patient admitted to ICU and diagnosis. There was significant association between outcome of patient admitted to ICU and diagnosis.

Table 6 shows the distribution of patients admitted to ICU according to diagnosis, age and duration of admission.

Table 3: The Distribution of patients according to diagnosis

Diagnosis	Number	Percent
Premature and hyaline membrane disease	117	31.6%
Birth asphyxia	51	13.8%
Pneumonia	34	9.2%
Septicemia	37	10.0%
Congenital heart disease	28	7.6%
Intestinal obstruction	19	5.1%
Tracheo-osphageal fistula	12	3.2%
Pneumothorax	12	3.2%
Brain hemorrhage	11	3.0%
Multiple congenital anomalies	10	2.7%
Omphalocele	7	1.9%
Imperforated anus	6	1.6%
Neonatal convulsion	5	1.4%
Diaphragmatic hernia	5	1.4%
Lung collapse	3	0.8%
Hydrocephalus	3	0.8%
Renal failure	2	0.5%
Inguinal hernia	2	0.5%
Intestinal perforation	2	0.5%
Premature and septicemia	1	0.3%
Anal abscess	1	0.3%
Brain tumor	1	0.3%
Encephalitis	1	0.3%
Total	370	100.0%

Table 4 Association between outcome of patient admitted to ICU and study variables.

Study variables	Outcome of patient		χ^2	P-value
	Death	Improve and discharge		
Age				
Less than one day	86 (58.1)	100 (45.0)		
(1-7) days	40 (27.0)	86 (38.7)	6.69	0.035*
(7-30) days	22 (14.9)	36 (16.3)		
Total	148 (100.0)	222 (100.0)		
Gender				
Male	98 (66.2)	155 (69.8)	0.533	0.465
Female	50 (33.8)	67 (30.2)		
Total	148 (100.0)	222 (100.0)		
Duration of admission				
1-6days	115 (77.7)	143 (64.4)		
7days -1 month	30 (20.3)	78 (35.1)		0.002* f
More than 1 month	3(2.0)	1 (0.5)		
Total	148 (100.0)	222 (100.0)		
Month of admission				
January, February and March	36 (24.3)	49 (22.1)		
April, May and June.	29 (19.6)	50 (22.5)	5.709	0.127
July, August and September, October,	45 (30.4)	47 (21.2)		
November and December	38 (25.7)	76 (34.2)		
Total	148 (100.0)	222 (100.0)		
Surgical intervention				
Present	11 (7.4)	40 (18.0)	8.373	0.004*
Absent	137 (92.6)	182 (82.0)		
Total	148 (100.0)	222 (100.0)		

*p value ≤ 0.05 was significant. f: Fisher-exact test.

Table 5 Association between outcome of patient admitted to ICU and diagnosis.

Diagnosis	Outcome of patient		χ^2	P-value
	Death	Improve and discharge		
Congenital heart disease	14 (9.5)	14 (6.3)	**34.49**	**<0.001***
Pneumonia	5 (3.4)	29 (13.1)		
Septicemia	22 (14.9)	15 (6.8)		
Multiple congenital anomalies	9 (6.1)	1 (0.5)		
Birth asphyxia	24 (16.2)	27 (12.2)		
Intestinal obstruction	4 (2.7)	15 (6.8)		
Tracheo-osphageal fistula	2 (1.4)	10 (4.5)		
Premature and hyaline membrane disease	42 (28.4)	75 (33.8)		
Brain heamorrhage	5 (3.4)	6 (2.7)		
Pneumothorax	4 (2.7)	8 (3.6)		
Other	17 (11.5)	22 (9.9)		
Total	148 (100.0)	222 (100.0)		

p value ≤ 0.05 was significant.Other: include (Omphalocele , Imperforated anus, Neonatal convulsion, Diaphragmatic hernia, Lung collapse, Hydrocephalus, Renal failure, Inguinal hernia, Intestinal perforation, Premature and septicemia, Anal abscess, Brain tumor and Encephalitis)

Table 6 distribution of patients admitted to ICU according to diagnosis, age and duration of admission

Diagnosis	Age			Duration of admission		
	< 1 day	1-7 days	7-30 days	1-6 days	7 days-1 month	> 1 month
Congenital heart disease	13 (7.0)	9 (7.1)	6 (10.3)	25 (9.7)	3 (2.8)	0 (0.0)
Pneumonia	6 (3.2)	15 (11.9)	13 (22.4)	26 (10.1)	7 (6.5)	1 (25.0)
Septicemia	10 (5.4)	14 (11.1)	13 (22.4)	24 (9.3)	13 (12.0)	0 (0.0)
Multiple congenital anomalies	2 (1.1)	5 (4.0)	3 (5.2)	9 (3.5)	1 (0.9)	0 (0.0)
Birth asphyxia	28 (15.1)	18 (14.3)	5 (8.6)	26 (10.1)	24 (22.2)	1 (25.0)
Intestinal obstruction	4 (2.2)	10 (7.9)	5 (8.6)	12 (4.7)	7 (6.5)	0 (0.0)
Tracheo-osphageal fistula	5 (2.7)	6 (4.8)	1 (1.7)	7 (2.7)	5 (4.6)	0 (0.0)
Premature and hyaline membrane disease	90 (48.4)	26 (20.6)	1 (1.7)	89 (34.5)	28 (25.9)	0 (0.0)
Brain hemorrhage	5 (2.7)	4 (3.2)	2 (3.4)	6 (2.3)	5 (4.6)	0 (0.0)
Pneumothorax	10 (5.4)	2 (1.6)	0 (0.0)	8 (3.1)	4 (3.7)	0 (0.0)
Other	13 (7.0)	17 (13.5)	9 (15.5)	26 (10.1)	11 (10.2)	2 (50.0)
Total	186 (100.0)	126 (100.0)	58 (100.0)	258 (100.0)	108 (100.0)	4 (100.0)

Other: include (Omphalocele, Imperforated anus, Neonatal convulsion, Diaphragmatic hernia, Lung collapse, Hydrocephalus, Renal failure, Inguinal hernia, Intestinal perforation, Premature and septicemia, Anal abscess, Brain tumor and Encephalitis).

DISCUSSION:

The total numbers of patients admitted to NICU through one year (370) the study showed male patients were more than females patients, male versus female was 253 (68.4%) versus 177(31.6%), this result agrees with that reported by Shikha Malik et al (7) (63%) male versus (37%) female and Prateek (52%) male versus female (48%) (8).

Patients aged less than one day were 186(50.3%) similar to study done by Prinja et al (50%) (9) while the patients aged (1-7) days (34.1%) and those patients who aged (7 day- 1 month) 15.6% could be attributed to our NICU received patients directly from delivery rooms and theater of the same hospital.

About the duration of admission this study show majority of patients were admitted for (1-6) days 258(69.7%) which is related to the types of diseases admitted at that year and copy to the criteria of discharge from NICU to meet with guidelines for Developing and Admission and Discharge Policies (10).

The highest NICU admission rate was during October, the reflect the possibility of that droplet infection is predominant which may cause respiratory diseases and exacerbation of cardiac disease.

Clinical outcome 222(60%) of patients improved and 148(40%) died which is in agreement with study conducted by Klingen berg et al (11) and goes with high percentage of neonatal mortality rate in developing countries in addition to poor facilities in our NICU comparing with more classified and organized NICU in other developing countries like India where in study done by Bora JK. et al (12).

The highest percentage of patients admitted have a prematurity and hyaline membrane disease 117(31.6%) this finding is consistent with that reported by Omoigberalae et al (13).

There was a significant association between outcome of patients admitted to NICU and study variables including age, duration of admission and surgical intervention, were is less age group patients who less than one day(58.1%) death rate while(14.9%) with those aged (7-30) days which attributed to that patients(31.6%) with hyaline membrane disease and unfortunately surfactant was not available at time of study, this agrees with El-Nawawy study (14).

Also in this study a significant association between outcome of patients admitted to NICU and diagnosis which is attributed to complicated and end stage disease of patients who reach to our NICU.

In addition to that there is a significant association between age, diagnosis and duration of admission where is the high percentage of death with more time of admission and the consistent with Caroline et al (15).

CONCLUSION:

Epidemiologic analysis of the pattern of patients admitted to NICU showed different etiologies for admission, on the top were respiratory system disease. Males predominate in NICU and general outcome more than half of the patients improved.

Most of patients stayed for(1-6) days.

Most of patients admitted for less than one day were died and patients stayed for more than one month had poor outcome.

Winter months showed increase in number of admission to NICU.

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