

Pattern of Neonatal Admission and Associated Maternal Morbidities at Delivery: A Single Center Observational Study

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Abstract

Aims:

1. To determine the common neonatal conditions which resulted in admission to the neonatal unit.
2. To establish the common maternal morbidities associated with the babies admitted to the neonatal unit.
3. To determine if maternal morbidities contributed to the admission into neonatal unit.

Method: The study was carried out at Royale Hayat Hospital (RHH), Kuwait, a level 3 neonatal unit in the private setting with 6000 deliveries per year and data was extracted from TrakCare hospital information system (HIS), clinical notes and medical discharge summaries.

Findings: Most babies who were admitted to the neonatal unit were either late preterm (34 - 36 weeks 45.5%) or at 37 weeks (16%) of gestation. The cesarean section rate was 69% for those born at 34 - 36 weeks of gestations and 54% of the babies of those born at 37 weeks gestation. The most common reasons for admission to the neonatal unit were respiratory distress (31.2%) followed by prematurity (16.1%). The most common morbidity in mothers of the study population was diabetes mellitus (19%). 77.6% of mothers whose babies were admitted to neonatal unit had no associated morbidities.

Conclusion: Most babies who were admitted to the neonatal unit were born at or below 36 weeks of gestation (66.2%). The most common maternal morbidity was diabetes mellitus (19%), but it is difficult to draw any association from the available data. Efforts should be made to decrease deliveries at lower gestation to reduce the admission to the neonatal unit and attendant consequences.

Keywords: Maternal; Neonatal; Pattern; Morbidities; Admissions

Abbreviations

RHH: Royale Hayat Hospital; HIS: Hospital Information System; NICU: Neonatal Intensive Care Unit; LSCS: Lower Segment Caesarean Section; HDNB: Hemolytic Disease of the Newborn; IUGR: Intrauterine Growth Retardation; IVF: *In-Vitro* Fertilization; HIV: Human Immunodeficiency Virus; IEM: Inborn Error of Metabolism

Introduction

The separation of the baby and mother soon after delivery or any admission to neonatal unit is not a desirable outcome for the family. RHH Kuwait, is a level 3 neonatal intensive care unit (NICU) with 6000 deliveries per year. We postulated high maternal morbidities may be linked with high neonatal admission rate and neonatal morbidity. Hence this study was performed:

1. To document the common neonatal conditions necessitating the admission to the neonatal unit.
2. To establish the common maternal morbidities associated with the babies admitted to the neonatal unit.
3. To ascertain if maternal morbidities contributed to the admission into neonatal unit.

Methods

The data was extracted from the TrakCare hospital information system, clinical case files and medical discharge summaries by the neonatal medical staff on the standardized data form. The study period was from July 2020 to December 2021. The study population involved mothers who delivered in RHH and whose babies came to the level 3 Neonatal unit. The data was analyzed by a statistician and the authors. The study was approved by the hospital’s ethics committee.

Results

The number of babies delivered in the 18 months period was 8404.

2908 (34%) were admitted to the neonatal unit for ongoing care 1659 (57%) males and 1249 (43%) females. Table 1 shows gestational age, table 2 delivery by lower segment Caesarean section (LSCS), table 3 indication for admission and table 4 associated maternal morbidities.

Variable	n = 2908
Gestational age	Numbers (Percentage)
Extreme preterm (26 - 27 weeks)	21 (0.72%)
Very Preterm (28 - 31 weeks)	150 (5.16%)
Moderately Preterm (32 - 33 weeks)	432 (14.9%)
Late Preterm (34 - 36 weeks)	1323 (45.5%)
Term 37 weeks	466 (16.0%)
Term 38 weeks	283 (9.7%)
Term 39 weeks	147 (5%)
Term 40 weeks	77 (2.6%)
Term 41 - 42 weeks	9 (0.3%)

Table 1: Number of neonates according to the gestational age.

1926 (66.2%) of the babies admitted to the neonatal unit were preterm of which 1323 (45.5%) were born as late preterm (34 - 36 weeks). Babies born at 37 - 42 weeks of gestation constituted 982 (33.8%) of all admissions to the neonatal unit. This shows a high number of admissions before 37 completed weeks of gestation.

Variable	n = 1374
Gestation	Born by LSCS
34 weeks - 36 weeks	913 (69%)
37 weeks	253 (54%)
38 weeks	139 (49%)
39 weeks	38 (25%)
40 weeks	31 (40%)

Table 2: Number of neonates according to gestational age, born by LSCS.

913 (69%) of the babies born 34 - 36 weeks of gestation and admitted to neonatal unit, were born by LSCS, the remaining 461 (31%) of these babies were normal or instrumental deliveries.

253 (54%) of the babies of 37 weeks of gestation who were admitted to the neonatal unit were born by LSCS. Since the number of babies admitted to neonatal unit were less in number at 39 - 40 weeks, it is difficult to draw any conclusion. Similarly, babies born below 34 weeks were admitted to the neonatal unit as per the standard unit guidelines, we have not drawn any conclusion.

Variable	Preterm	Term	Grand Total
Acute perinatal compromise	16 (0.8%)	47 (4.7%)	63 (2.1%)
Birth trauma	2 (1.7%)	6 (0.6%)	8 (0.2%)
Cardiovascular	33 (1.3%)	40 (4%)	73 (2.5%)
Congenital anomalies	26 (1.3%)	39 (3.9%)	65 (2.2%)
Early onset sepsis	10 (0.5%)	18 (1.8%)	28 (0.96%)
Encephalopathy	12 (0.6%)	14 (1.4%)	26 (0.89%)
Hemolytic disease of newborn	152 (7.8%)	98 (9.9%)	250 (8.5%)
Hypomagnesemia	27 (1.4%)	31 (3.1%)	58 (1.9%)
Intra uterine growth abnormalities	93 (4.8%)	45 (4.5%)	138 (4.7%)
Intraventricular hemorrhage	9 (0.46%)	1 (0.1%)	10 (0.34%)
Low birth weight	349 (18.1%)	46 (4.6%)	395 (13.5%)
Metabolic	219 (11.3%)	104 (10.5%)	323 (11.1%)
Pneumothorax	4 (0.2%)	9 (0.9%)	13 (0.44%)
Preterm	471 (24.4%)		471 (16.1%)
Respiratory distress	487 (25.2%)	422 (42.9%)	909 (31.2%)
No data	1 (0.05%)	29 (2.9%)	30 (1.03%)
Extracranial haemorrhage	7 (0.36%)	20 (2%)	27 (0.92%)
Others	8 (0.41%)	13 (1.3%)	21 (0.72%)
Grand total	1926 (66.2%)	982 (33.7%)	2908

Table 3: Indication for admission to the NICU.

**Others: Fatty acid oxidation, Sacral dimple, Right hydrocele, Retinopathy of prematurity, Probable IEM, Left adrenal complex lesion, Hy-pertremic dehydration with significant weight loss, Early onset sepsis, Early onset jaundice, Neonatal abstinence syndrome, Acute kidney injury, Hypocalcemia, Congenital renal anomaly, Dysmorphism, Neonatal hyperbilirubinemia.*

The table above shows that the top five common reasons for admission to neonatal unit were respiratory distress (31.2%), prematurity (16.1%), low birth weight (13.5%) metabolic causes (11.1%), hemolytic disease of newborn (HDNB) (8.5%). Respiratory distress was the most common indication for admission in both preterm (25.2%) and term neonates (42.9%). Prematurity (24.4%) without any other associated conditions and low birth weight (18.1%) were the most common reason for admission after respiratory distress in preterm babies while in the term neonates' metabolic conditions (10.5%) and HDNB (9.9%) were the other two common reasons for admission respectively. Many of these conditions mentioned in the above table were associated conditions rather than primary reasons for admission. For example, metabolic conditions (hypocalcemia, hypomagnesaemia and hypoglycemia) were predominantly associated conditions rather than the primary reason for admission.

Variable	N = 3324
Maternal diagnosis	Numbers
Diabetes mellitus	554 (19%)
Assisted conception	402 (13.8%)
Hypothyroidism	241 (8%)
Hypertension	211 (7%)
Asthma	109 (3.7%)
Autoimmune	62 (2%)
Urinary tract infection	48 (1%)
COVID-19	43 (1%)
Depression	28 (0.9%)
Hemoglobinopathy	20 (0.6%)
Chorioamnionitis	18 (0.6%)
Thyroid disease	9 (0.3%)
Systemic lupus erythematosus	7 (0.2%)
Malignancy	5 (0.1%)
Cardiac disease	4 (0.1%)
Intrauterine viral infection	4 (0.1%)
Autoimmune and chorioamnionitis	3 (0.1%)
Epilepsy	2 (0.06%)
HIV	2 (0.06%)
Hemoglobinopathy and IVF	1 (0.03%)
No associated morbidities	1551 (53.3%)

Table 4: Maternal morbidities.

The most common morbidities in the mothers of the babies admitted to neonatal unit were diabetes mellitus babies (19%), hypothyroidism (8.32%), hypertension (7.25%) and bronchial asthma (3.7%). Mothers of 53.3% of babies admitted to neonatal unit had no associated morbidities.

Discussion

Most babies who were admitted to the neonatal unit were preterm. 1926 (66.2%) were preterm of which 1323 (45.5%) were born as late preterm (34 - 36 weeks). Babies born at 37 - 42 weeks of gestation constituted 982 (33.8%) of all admissions to the neonatal unit. The cesarean section rate was (69%) of those born at 34 - 36 weeks of gestations and (54%) for those born at 37 weeks of gestation.

A G demise., *et al.* [1] reported hypothermia, sepsis and prematurity as the common indications for neonatal admissions whereas, Syed R Ali., *et al.* [2] reported prematurity and infections as the main causes of admission to the neonatal unit followed by birth asphyxia and by neonatal jaundice. In our study, the most common reasons for admission to neonatal unit were respiratory distress (31.2%) in preterm and term neonates followed by prematurity (16.1%). However, these referenced studies were conducted in a different setting and cannot be compared to our study.

This study shows that delivery at and below 38 weeks, particularly below 37 weeks is associated with significant maternal and neonatal morbidity in terms of increased cesarean section rate, admission to neonatal unit with consequent separation of the baby from the mother and we speculate its economic implications for the family. This is consistent with findings by Claudia Correia [3] which showed that late preterms remained at risk for adverse respiratory outcomes, particularly newborns delivered after 35 weeks, whose mothers are not given antenatal corticosteroids and still have considerable morbidity. Caesarean section was an independent risk factor for respiratory morbidity and efforts should be undertaken to reduce this procedure rate [3-5].

Mothers of 53.3% of babies admitted to neonatal unit had no associated morbidities. The most common morbidities were diabetes mellitus (19%) followed by hypothyroidism (8.32%), hypertension (7.25%) and bronchial asthma (3.7%). Although it is difficult to draw any conclusion, our data suggests that maternal morbidities may not contribute significantly to neonatal admissions in the study unit.

Limitation of the Study

There are several limitations to this study, data regarding maternal morbidities in the babies who were not admitted to neonatal unit was not available and comparable data from neonatal and maternity services similar to the study unit were not available.

Conclusion

Our study shows that most babies admitted to the neonatal unit were born at or below 37 weeks of gestation and were delivered by cesarean section. The indications for admission to neonatal unit were common conditions at these low gestations, with respiratory distress being the most common. Diabetes Mellitus was the predominant maternal morbidity, but it was difficult to draw any association between maternal morbidities and neonatal admissions, as the incidence in the mothers whose babies were not admitted to neonatal unit was not available. Our study emphasizes the need to reduce the delivery at lower gestational ages in order to decrease neonatal admissions with its attendant consequences for the baby and the family.

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Conflicts of Interest

None.

Bibliography

1. Demisse Abayneh Girma., *et al.* "Patterns of admission and factors associated with neonatal mortality among neonates admitted to the neonatal intensive care unit of university of Gondar hospital, Northwest Ethiopia". *Pediatric Health, Medicine and Therapeutics* 8 (2017): 57-64.
2. Ali Safdar., *et al.* "Disease patterns and outcomes of neonatal admissions at a secondary care hospital in Pakistan". *Sultan Qaboos University Medical Journal* 13.3 (2013): 424-428.

3. Correia Cláudia., *et al.* "Respiratory morbidity in late preterm infants". *Minerva Pediatrics* 70.4 (2018): 345-354.
4. Thomas J., *et al.* "The neonatal respiratory morbidity associated with early term caesarean section - an emerging pandemic". *Journal of Perinatal Medicine* 49.7 (2021): 767-772.
5. Ahimbisibwe Asa., *et al.* "Respiratory morbidity in late preterm and term babies born by elective caesarean section". *JOGC/Journal of Obstetrics and Gynaecology Canada* 41.8 (2019): 1144-1149.

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