Original Article

Pattern, causes and outcome of neonatal admissions in a Teaching Hospital, Multan, Pakistan

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Objective: To determine the frequency of different causes of neonatal admissions and mortality in relation to demographic characteristics at neonatal unit of Nishtar Hospital, Multan.

Methodology: It was a retrospective chart review, conducted at neonatal unit of Pediatric department, Nishtar Hospital, Multan from January 2016 to December 2016.

Results: Total neonates admitted in year 2016 were 3364. Sixty seven percent were males and 65.8% were low birth weight neonates. Main reasons of admission were birth asphyxia (34.27%), respiratory distress (27.44 %), neonatal infections (24.46 %) and prematurity (6.39 %). Fifty five percent newborns were admitted at <24 hours of age and 56.8% babies were born through spontaneous vaginal delivery. Significantly higher percentage (83%) of neonates were outborn (home or private clinic/hospital) compared to inborn. Highest number of admissions (51 %) was from Multan district. Fifty one percent of neonates were discharged with stable condition, 12.2% expired and 36.1% left against medical advice. The death rate was significantly higher in outborn as compared to inborn (~9.0 % vs. 3 %, p<0.001), and in babies with low birth weight in comparison to those with normal weight (~9.0 % vs. 3%, p<0.001). The predominant causes of deaths were respiratory distress syndrome (32.52 %), neonatal infections (29.37%) and birth asphyxia (19.17%).

Conclusion: The death rate was higher in preterm babies and in neonates with low birth weight. Steps to reduce neonatal deaths must be taken especially prompt referral of high risk pregnant mothers and newborns to tertiary care institutes, availability of trained attendant at the time of birth, proper management of preterm newborns and quick diagnosis with early appropriate antibiotic therapy. (Rawal Med J 201;43:289-293).

Keywords: Neonate, morbidity, mortality, asphyxia, sepsis.

INTRODUCTION

Neonatal life i.e. first 28 days of newborn's life is the most vulnerable time as newborns can have many avoidable diseases in this period. Each year, out of 130 million babies born worldwide and 4 million deaths occur in the neonatal life.[1] Seventy five percent of neonates die in the 1st week while one-fourth deaths occur before second day of life.[1,2] Just 10 countries (mostly Asian) contribute in two-thirds of the newborn deaths and Pakistan ranks 3rd.[3] In Pakistan, neonatal mortality rate was reported as 45.5/1,000 live births in 2015[4] and Pakistan contributes to 7% of global neonatal deaths.[5]

Morbidity and mortality data of neonatal units are reported with the rationale of creating understanding about burden of common neonatal diseases (preventable or non-preventable). It makes possible for policy makers to plan accordingly in future for improving nursery services on part of pediatricians as well as administration. In Pakistan, still home delivery contributes a lot towards many illnesses of newborns including sepsis, birth asphyxia and neonatal tetanus despite widespread Government programs for the health of mothers, neonates and children. We conducted this study to look into major problems of newborns in our unit, their admission pattern, outcome and determinants of mortality.

METHODOLOGY

We conducted one year (1st January 2016 to 31st December 2016) retrospective study on pattern of admissions of newborns at our neonatal unit. The

study population included newborns till 1 month of age (first 28 days of life for both term and preterm). Newborns with surgical issues are referred to pediatric surgery unit. We included data of admitted newborns in nursery whose complete biodata was documented in charts that were retrieved from the Statistics Department of Hospital. The confirmed diagnosis made by the visiting Pediatrician based on history, examination and laboratory tests was noted.

We collected following data from each patient: registration number, residence district, gender, age at admission, weight, mode of delivery, duration of stay, place of birth, gestational age, cause of admission (final diagnosis), and outcome.

WHO definitions were used for premature babies i.e. live born babies born before 37 weeks of gestation & low birth weight (LBW) i.e. babies with birth weight below 2.5kg. Jaundice Neonatorum (JNN) was labeled by estimation of bilirubin levels in the serum.

Meningitis and septicemia were confirmed on clinical basis with positive septic screen & cerebral spinal fluid examination. Birth asphyxia was labeled on clinical grounds with detection of asphyxia markers in the blood.

RESULTS

A total of 3364 newborns were admitted in neonatal unit in year 2016. Sixty seven percent (2275/3364) were males with male to female ratio of 2:1 and sex was not defined in 2 patients. Fifty five percent (1863/3364) presented before 24 hours of age; 73 % (1359/1863) of these were outborn and 27 % (504/1863) were inborn. Twenty five percent (856/3364) of the cases were preterm. 56.8% (1910/3364) babies were born through spontaneous vaginal delivery and rest through cesarean section. Percentage of LBW newborns was 54% (1826/3364). Significant number of newborns (2154/3364, 64%) was delivered at local/private clinics. Considerable percentage (36.1%) left against medical advice and 12.2% newborns were expired (Table 1). Cesarean section was the commonest mode of delivery (53.1%) at private hospitals.

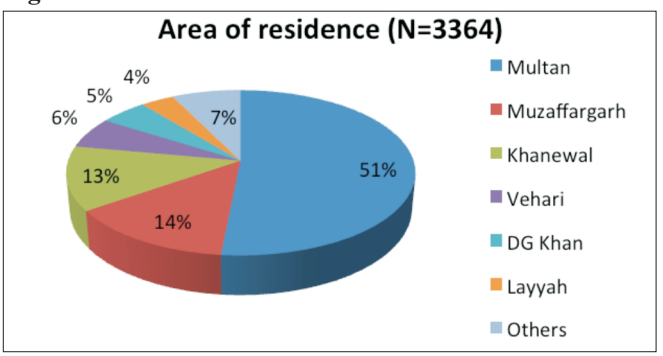
Table 1. Demographic characteristics and outcome of neonates admitted during Year 2016 (N = 3364)

Characteristic	Number	(%)
Age on admission		
< 24 hours of age	1863	(55.4)
24 – 72 hours of age	710	(21.1)
4 – 7 days of age	299	(8.9)
> 7 days of age	492	(14.6)
Gestational age (in weeks)		
< 28	34	(1.01)
28 – 31	270	(8.03)
32 – 36	552	(16.41)
≥ 37	2508	(74.55)
***Gender**		
Male	2270	(67.5)
Female	1092	(32.4)
Weight (in kg) mean, SD	2.32	(± 0.64)
< 1	47	(01.40)
1 – 1.5	402	(12.00)
1.6 – 2.4	1377	(40.90)
2.5 – 3.5	1465	(43.50)
> 3.5	73	(02.20)
Duration of hospital Stay (days) (mean ± SD)	3.37	(±2.62)
Mode of delivery		
Spontaneous Vaginal delivery	1910	(56.8)
Caesarean section (C/Sec)	1454	(43.2)
Place of Birth		
Home	632	(18.79)
Government Hospital (Inborn)	578	(17.18)
Private Hospital / clinic	2154	(64.03)
Outcome		
Discharged	1739	(51.7)
¥LAMA	1213	(36.1)
Expired	412	(12.2)

*In 2 cases sex not confirmed, ¥Left against medical advice

Area of residence in majority of cases was Multan and Muzaffar Garh (Fig. 1).

Fig 1. Area of residence.



Major reasons of admission were birth asphyxia, respiratory distress, neonatal infections and prematurity. Of neonatal infections, neonatal sepsis was documented in highest percentage i.e. 81.65 % (Table 2).

Respiratory distress syndrome, neonatal infections, birth asphyxia & prematurity were the vital contributors of newborns deaths with case fatality rates of 22.56, 14.70, 6.85 and 21.39, respectively (Table 3).

Table 2. Disease pattern of neonates admitted (N = 3364)

Diagnosis	Number	(%)
Prematurity	**215**	**(6.39)**
Neonatal Infections	**823**	**(24.46)**
Sepsis	672	(81.65)
Pneumonia	48	(5.83)
Meningitis	14	(1.70)
Tetanus Neonatorum	03	(0.36)
Necrotizing enterocolitis	86	(10.45)
Birth Asphyxia	**1153**	**(34.27)**
Respiratory distress	**923**	**(27.44)**
RDS*	594	(64.35)
Transient tachypnea	196	(21.24)
Meconium aspiration syndrome	133	(14.41)
Neonatal Jaundice	**150**	**(4.46)**
Congenital anomalies	**43**	**(1.28)**
¥Others	**57**	**(1.69)**

*RDS respiratory distress syndrome ¥Others Infant of diabetic mother = 13,
IUGR = 5, Meconium stained liquor = 28, Hemorrhagic disease of newborn = 11

Table 3. Main reasons of neonatal mortality (n = 412)

Cause	Deaths n %	Case fatality rate %
Respiratory distress syndrome (n=594)	134 (32.52)	22.56
Pre-maturity (n=215)	46 (11.17)	21.39
Neonatal Infections (n=823)	121 (29.37)	14.70
Birth asphyxia (n=1153)	79 (19.17)	06.85
Others (n=579)	32 (07.77)	05.53

Table 4: Factors linked with the outcome of neonates (N=3,364)

Associated factors	Outcome			p-value*
	Expired	Discharge	LAMA	
Gender of the patient				
Male	248	1,206	816	0.010
Female	164	532	396	
Place of Birth				
Inborn	111	322	145	< 0.001
Home / Private clinic	301	1417	1068	
Mode of delivery				
SVD	253	925	738	< 0.001
C - section	159	814	475	
Gestational age				
Pre-term (< 37 weeks)	228	358	270	< 0.001
Full term(≥ 37 weeks)	184	1381	943	
Birth weight				
LBW (<2.5kg)	307	847	672	< 0.001
Normal birth weight (≥ 2.5kg)	105	891	541	

*Chi-square test

Out of the total deaths in nursery, male to female mortality ratio was 1.5:1. Main bulk of mortality was found in neonates born at preterm gestation (55.3%), low birth weight (74.5%), delivered through SVD (61.4%) and in outborn (73%) cases (Table 4).

DISCUSSION

In our study, total newborn admissions were 3364, which outnumbered the total admissions (3107) in general medical ward of pediatric department in the same year. In our study, male predominance (67.5%) was found, similar to the results of a study from Peshawar.[6] The reason can be due to cultural factors of our society where parents of male babies seek more medical care as compared to female babies. Majority of admissions (n=2573, 76.5%) were of age less than 72 hours and 1863 (55.4%) neonates were below 24 hours of age. Neonates admitted within 24 hours of life included 504 inborn (27.05 %) and 1359 (72.95 %) outborn neonates. This is comparable to a study from a tertiary care hospital of Abbotabad.[7]

In present study, 51% patients were residents of Multan. A considerable number of babies presented from districts of Muzaffar Garh and Khanewal. Many patients were referred cases from local health centers and physicians. Some of them were from areas of Dera Ghazi Khan, Layyah, Vehari, Baluchistan and Waziristan. So this hospital drains

patients from wide geographical area.

Overall frequency of spontaneous vaginal delivery (56.8%) was higher as compared to cesarean section (43.2%) in our study. In a study from Rawalpindi Pakistan, in 79.1% cases had spontaneous vaginal delivery (SVD).[8] Significant percentage of neonates (17.2%) were delivered in the same hospital (inborn) while 18.79% were delivered at home and 64.03% at private hospitals/local health care centers. So frequency of home deliveries was less compared to deliveries at health care centers. This is similar to a study from Khyber Teaching Hospital Peshawar where 62.3% were referred cases and 27% were home deliveries.[9]

C-Section delivery was found as major mode of delivery in hospital setting. In inborn cases, 52.4% neonates were delivered through C-Section and in local hospitals, 53.1% were delivered through C-Section. It supports the fact that public hospitals have crossed the 15% ratio of C-Section set by World Health Organization by alarming 40-50% causing serious risks to the lives of babies and mothers.[10]

Our study showed that preterm deliveries still occupy considerable space (25.45%) among admitted neonates. According to WHO, the rate of premature deliveries in Pakistan is 15.8/100 live births and Pakistan comes fourth in 10 countries with highest number of preterm births.[11] Birth asphyxia (34.27%), respiratory distress (27.44 %), neonatal infections (24.46 %) and prematurity (6.39 %) were the major reasons of admission in the present study. In developing world including Pakistan, birth asphyxia contributes with an incidence of 100-250/1000 live births as compared to 10/1000 in the developed areas.[12] Only careful supervision of high-risk pregnancies, proper and timely referrals and if needed adequate resuscitation at the time of delivery are essential to decrease the burden of mortality related to birth asphyxia. A descriptive cross-sectional study at Hyderabad Pakistan has shown 25% frequency of birth asphyxia (600/2400 neonatal admissions).[13]

A study at teaching hospital in Northern Nigeria reported similar findings where common causes for admission were birth asphyxia, neonatal septicemia and prematurity (27%, 25.3%, 16%, respectively).[14] Quddusi et al found birth asphyxia (34.5%), sepsis (28.3%) and prematurity (10.4%), as the main causes of admission out of total 3560 neonates.[15]

This is at variance with the results shown in a study at secondary care hospital in Pakistan in 2009 where prematurity (27.9%) and infection (20.3%) were the main causes of admission followed by birth asphyxia (13%).[16] According to a study at National Institute of Child Health Karachi, sepsis was the main reason of admission (45.21%) followed by birth asphyxia (18.85%) and jaundice neonatorum (13.15%).[17]

Regarding the birth weight of neonates included in our study, 54.28% of patients were of weight below 2.5kg (1.4 % below 1 kg, 12% in weight range of 1-1.5 kg, 40.90% had weight in the range of 1.6-2.4 kg). A study from North Nigeria showed that 951 out of 2963 (32.1%) babies were of LBW.[14]

Mortality rate in our study was 12.2% (412/3364) while 1739 (51.7%) neonates were discharged and 1213 (36.1%) left against medical advice (LAMA). Among expired babies, majority were males (60.1%), born at preterm gestation (55.3%), had LBW (74.5%), delivered through SVD (61.4%) and were outborn (73%) cases. Neonatal mortality rate was documented 14.8% (Peshawar),[9] 25.8% (Karachi),[16] 34% (Lahore),[18] and 38% (Larkana).[19] The percentage of expired neonates was 23.4%, only 3.55% left against medical advice (LAMA) and 61.6% were males among expired neonates in a study from tertiary hospital in Rawalpindi.[8] Infant mortality rate is reportedly high in males than females in most areas of the world due to boys being biologically weak and more vulnerable to earlier death.[20]

Likely reasons for such high percentage of LAMA (36.1%) in our study were financial constraints, discomfort of hospitalization, dissatisfaction about management and hopelessness for the outcome of serious illness but further studies are required to elucidate the reason for LAMA.

The commonest reasons of death in our study were respiratory distress syndrome followed by neonatal infections with increased percentage in outborn cases who were delivered mainly through SVD. The possible cause for increased mortality was that, mostly preterm babies (more at risk of RDS)

delivered in local hospitals or at homes by Dai in villages, where access to well-equipped setup becomes difficult. So such babies reach tertiary settings mostly in serious conditions either with sepsis or with some other complication of prematurity.

CONCLUSION

The common reasons for neonatal admissions and deaths in our hospital setting were respiratory distress, birth asphyxia, sepsis and prematurity. These can be prevented by making services of antenatal centers more efficacious, providing skilled birth attendants to faraway places, timely referral of high risk pregnant mothers to tertiary hospitals and by giving vigilant postnatal care to babies.

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