Low birth weight infants outcome in a government general hospital of South India

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ABSTRACT

Introduction: Globally, four million newborns die in the neonatal period. In India, 1.2 million neonatal deaths are reported every year. Low birth weight (LBW) is still a significant cause of neonatal deaths in India. **Aim:** The aim of the study was to determine the morbidity and mortality pattern of LBW neonates admitted in neonatal intensive care unit (NICU). **Materials and Methods:** A hospital based retrospective study was conducted at NICU of a government hospital of South India. Neonates admitted from April 2014 to March 2019 were included in the study and events from admission to discharge were recorded. Information was extracted retrospectively during admission from patient records and death certificates, using a pretested questionnaire. All neonates with incomplete and insufficient data were excluded from this study. The data collected were analyzed by frequency and percentages of various parameters of morbidity and mortality were calculated. **Results:** The data analysis showed that 7238 neonates were admitted to NICU during the study period. The majority of the neonates were males and the majority (4214, 58.22%) were born at full term of gestation, whereas preterm neonates born between 34 and 37 weeks were 1704 (23.54%) and <34 weeks were 1320 (18.23%). Of 3157 LBW neonates admitted, 2012 (63.73%) were discharged, whereas 651 (20.81%) expired, 277 (8.77%) left against medical advice, and 217 (6.87%) were referred to other departments or higher center. **Conclusion:** LBW is one of the most common causes of admission in NICU in the government hospital in South India. The study showed that as weight of the neonate decreased, the duration of hospital stay increased, and respiratory distress syndrome and death rates were reported to increase as the weight decreased.

Key words: *Birth weight, Care, Causes, Morbidity, Mortality, Neonatal*

The World Health Organization defined low birth weight (LBW) as a birth weight of <2500 g at birth. Classification of LBW babies includes LBW (<2500 g), very LBW (<1500 g), and extremely LBW (<1000 g) [1]. Globally, an estimated 13 million babies are born before 37 completed weeks of gestation. This figure is high among middle and low-income countries [2]. The newborns of adolescent mothers are also more likely to have LBW, with the risk of long-term effects [3]. More than 20 million LBW infants are born each year in the developing world. Incidence of LBW ranged from 6 to 18% across the globe with sub-Saharan Africa accounting 13–15% [4]. LBW is the result of either intrauterine growth retardation or premature birth. LBW is the main cause of fetal and neonatal morbidity and mortality. Later in life, it can be highly associated with chronic diseases and inhibited growth and development including poor academic achievement [5].

The risk factors of LBW babies are multiple gestations, mother's body composition during conception, maternal short stature, residing at high altitudes, and maternal nutrition during pregnancy, including lifestyle (substance or drug abuse) and medical disorders during pregnancy including hypertensive disorders. In addition, mothers with low socioeconomic status are prone to infections from poor nutrition, thus birth weight will decrease [6]. Around four million newborn babies are reported to die in the 1st month of life [7]. In India, 26 million babies are born every year and 1.2 million dies in the first 4 weeks of life which accounts for a quarter of global neonatal deaths. India thus faces the biggest newborn health challenge of any country in the world [8].

Antenatal care (ANC) visits are important for maternal and fetus health. Pregnant mothers who attended <4 ANC visits double their risk of delivering LBW babies compared to those visiting four or more times [9,10]. The study was undertaken with the objective to determine the morbidity and mortality pattern of LBW neonates admitted in neonatal intensive care unit (NICU).

MATERIALS AND METHODS

A retrospective study was done at the NICU of a government hospital in South India. The study was conducted on neonates admitted during 5-year period from April 2014 to March 2019. All LBW neonates below the age of 28 days were included in the study. The neonates with incomplete, insufficient data and improperly filled individual recordings in the register were excluded from

this study. Information was extracted retrospectively during admission from patient records and death certificates, using a pretested questionnaire.

The data collected were date of admission, age, weight of the child, status at birth, diagnosis, treatments given, outcome status, and records of maternal information such as parity, antenatal follow-up, gestational age, and mode of delivery. All these data were collected using a uniform extraction format developed by taking in to account all the relevant variables in the standard NICU registers. The data were entered and analyzed using SPSS version 20 and $p<0.05$ were considered statistically significant.

RESULTS

The data analysis showed that there were 7238 neonates admitted to NICU during 5-year period of study. Table 1 shows the distribution of neonates admitted to NICU. The minimum and maximum gestational age of the neonates was 25 and 43 weeks, respectively. The minimum and maximum weight of the admitted neonate was 620 and 4450 g, respectively.

Table 2 shows the duration of hospital stay in LBW neonates and as the weight decreased, duration stay increased.

The data were analyzed for outcome of the total admitted neonates during the study period. It was observed that of 3157 LBW neonates admitted, 2012 (63.73%) were discharged, whereas 651 (20.81%) expired and 277 (8.77%) left against medical advice (Table 3).

When patterns of diseases among LBW neonates were studied (Table 4), prematurity was seen to be the most common diagnosis at admission.

DISCUSSION

The study showed that as weight decreased in LBW neonates, duration of hospital stay as well as death rate increased. The study also showed that as weight decreased, incidence of birth asphyxia, hypoxic-ischemic encephalopathy, meconium aspiration, and transient tachypnea of neonate decreased and respiratory distress syndrome increased. Apt and consistent ANC from primary care to tertiary care has to be taken to reduce the birth of preterm and LBW babies. Maternal complications in labor carry a high risk of neonatal death, and poverty is strongly associated with an increased risk [7].

Mohanty *et al*. in 2006 concluded maternal anthropometric parameters, i.e., maternal weight, height, mid-arm circumference, and maternal body mass index to be important predictors of LBW [9]. As reported by UNICEF in 2004, a number of factors affect fetal growth, and thus, the birth weight. It is affected to a great extent by the mother's own fetal growth and her diet from birth to pregnancy. Women of short stature, women living at high altitudes, and young women have smaller babies. Mothers in deprived socioeconomic conditions frequently have LBW infants. The infant's weight depends primarily on the mother's nutrition and health over a long period of time, including during pregnancy and the high prevalence of specific and non-specific infections. Physically demanding work during pregnancy also contributes to poor fetal growth [11]. Nayak *et al*. in 2013 concluded that age of mother and parity contributes significantly to LBW [12].

Early timely referral of high-risk pregnancies to the tertiary care centers would significantly lessen the mortality and morbidity in LBW babies [13,14]. Septicemia was the most common cause of morbidity and mortality in both inborn and outborn LBW babies. This was comparable to the earlier study done by Anthony *et al*. in 2004 [15]. Early intervention, awareness, and interaction with obstetricians, resuscitation by trained personnel, adequate manpower, antenatal steroids, surfactant, continuous positive airway pressure ventilation, and close monitoring of LBW babies will reduce the death rate of LBW babies [16]. Further proper

Table 1: Distribution of neonates admitted to neonatal intensive care unit

Characteristic	Variable	Frequency (n=7238)	Percentage (%)
Age of the neonate on admission	<24 h	4131	57.07
	1–3 days	2137	29.52
	4–7 days	573	7.91
	8–28 days	397	5.48
Neonatal period	Early (0–7 days)	6841	94.52
	Late (8–28 days)	397	5.48
Place of delivery	Health Institution	7088	97.92
	Home	150	2.07
Gender	Male	4088	56.48
	Female	3150	43.52
Gestational age at birth	>37 (weeks)	4214	58.22
	34–37 (weeks)	1704	23.54
	<34 (weeks)	1320	18.23
Weight on admission	>2500 g	4081	56.38
	1500–2499 g	2528	34.93
	1000–1499 g	512	7.07
	<1000 g	117	1.62

Table 2: Distribution of duration of hospital stay

Duration of stay (n=3157)	2499–1500 g	1499–1000 g	<1000 g	Total	%
1 day	4	0	0	4	0.13
1–3 days	274	4	0	278	8.80
4–7 days	563	21	0	584	18.50
>7 days	1687	487	117	2291	72.57

Table 3: Outcome of the neonates who were admitted to neonatal intensive care unit

Outcome (3157)	Total low birth weight	%	2499–1500 g (2528)	%	1499–1000 g (512)	%	<1000 g (117)	%
Total	3157	100	2528	100	512	100	117	100
Discharged	2012	63.73	1780	70.41	218	42.58	14	11.97
Expired	651	20.81	350	13.85	210	41.02	91	86.32
LAMA	277	8.77	221	8.74	51	9.96	5	4.27
Referral	217	6.87	177	7.00	33	6.44	7	5.98

LAMA: Left against medical advice

Table 4: Patterns of disease among low birth weight neonates admitted to neonatal intensive care unit

Disease	<2500 g (3157)	%	2499–1500 g (2528)	1499–1000 g (512)	<1000 g (117)
Septicemia	285	9.02	250	22	8
Hypoxic ischemic encephalopathy	261	8.27	254	7	0
Birth asphyxia	257	8.14	241	14	2
Neonatal jaundice	229	7.25	222	7	
Transient tachypnea of neonates	183	5.80	179	4	0
Prematurity	574	18.18	305	206	63
LBW (other)	459	14.54	331	128	
Meconium aspiration syndrome	154	4.88	150	4	0
Others	116	3.67	111	5	0
Respiratory distress syndrome	152	4.81	33	77	52
Intrauterine growth restriction	174	5.51	152	21	1
Congenital anomalies	82	2.60	51	11	20
Meningitis	29	0.91	29	0	00
Seizure disorder	18	0.57	17	0	1
ELBW	13	0.41	0	0	13
Pneumonia	7	0.29	5	2	0
Hypoglycemia	5	0.16	1	0	4
Shock	4	0.13	4	0	0
ARF	3	0.09	3	0	0
Extreme preterm	2	0.06	0	1	1
Disseminated intravascular coagulation	1	0.03	1	0	0

LBW: Low birth weight, ELBW: Extremely low birth weight

ANC, correction of anemia, and malnutrition are important in reducing the birth of LBW babies [17].

A recent meta-analysis from the South Asian setting revealed significant deficits in cognitive and motor scores in children and adolescents born with LBW, compared to those born with normal birth weight [18]. The study had certain limitations as it was a retrospective study and only a few outcome variables were studied.

CONCLUSION

LBW is an important indirect cause of death. Its burden remains high, with the greatest numbers of such infants being born to women from developing countries, where the main cause of LBW at delivery is reduced fetal growth rate. Preventing deaths in newborn babies should be the focus of safe motherhood programs.

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