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Original Research Article

Morbidity profile and immediate outcome of low birth weight neonates in a rural tertiary care hospital of Gujarat, India

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ABSTRACT

Background: Low birth weight (LBW) has been defined as a birth weight of <2.5 kilogram regardless of gestational age. In India, every 3rd born child is of LBW. LBW is associated with increased neonatal mortality and morbidity, compromised growth and cognitive development.
Methods: This is a retrospective cohort study using previously collected data from January 2015 to December 2015.
Results: Out of 1238 live births, 485 (39.17%) were LBW. 456(94.01%) were LBW weighing >1500 grams (LBW), 22(4.53%) were VLBW, and 07(1.44%) were ELBW. 361(74.43%) were LBW2 (birth weight ≥2000 - <2500 grams), 95(19.58%) were LBW1 (birth weight ≥1500 - <2000 grams). 289(59.58%) of LBW neonates were full term. SNCU admission is significantly higher in LBW neonates (25.8% vs 9.61%). Morbidities were higher in LBW neonates compared to normal birth weight neonates. Difference was more significant in incidence of sepsis (3.72% vs 0.83%), RDS (2.19% vs 0%), TTN (5.48% vs 2.36%), hypoglycemia (1.31% vs 0%), feed intolerance (1.09% vs 0%) and risk of major congenital malformation (1.97% vs 0.27%). Need for respiratory support was 4.82% in LBW vs 2.36% in normal birth weight neonates. Morbidities were significantly higher in VLBW and ELBW neonates. Immediate poor outcome was in 3.92% in LBW neonates, while it was 0.56% in normal weight neonates. Poor immediate outcome was 1.11% in LBW2, 2.10% in LBW1, 10% in VLBW1, 41.66% IN VLBW2, and 100% in ELBW.
Conclusions: LBW neonates are at higher risk of morbidities and mortalities. The major determinant for mortality in LBW babies is the birth weight. The best option to prevent LBW is by improving maternal health. Improvement of perinatal and neonatal services in government sector and public private partnership model of free neonatal care can help to achieve the INAP goal of NMR <10 by 2030.

Keywords: Immediate outcome, Low birth weight, Morbidities

INTRODUCTION

Low birth weight has been defined as a birth weight of less than 2.5 kilogram regardless of gestational age (WHO -1960).[1]

More than 20 million infants worldwide, representing 15.5 percent of all births are born with low birth weight. More than 95 percent of them are born in developing countries. The incidence of low birth weight in developing countries (16.5 per cent) is more than double the incidence in developed regions (7 per cent). In India, nearly 8 million babies are born with a low birth weight every year.[2] In India, every 3rd born child is of a low birth weight.[3] Birth weight is a strong indicator not only of a mother's health and nutritional status but also a newborn's chances for survival, growth and long-term health. VLBW and ELBW neonates are of major concern because of maximum perinatal mortality found in this group[4].

Current neonatal mortality in India is 29 in 2013. Three fourth of neonatal deaths occur among low birth weight newborns. India Newborn Action Plan (INAP) was started on September 18th 2014 with goal of NMR less than 10 by 2030[5].

Currently nationwide data on neonatal morbidity and mortality in LBW babies are scares, more so in backward areas of Gujarat state like Waghodia taluka. Hence, we conducted this study. Another purpose was to evaluate the mortality and morbidity of LBW in this existing set up so that appropriate corrective measures can be taken to improve the outcome.

METHODS

This is a retrospective cohort study using previously collected data from neonates born at Dhiraj Hospital, Piparia, Vadodara district, Gujarat, India between January 2015 to December 2015.

These neonates were examined, monitored and managed by standard protocols. Nude weight of neonate at birth is taken by electronic weighing scale having ±1 gram accuracy. Gestational age is calculated using last menstrual period and new Ballard score.

Neonates with birth weight of less than 2500 grams are classified as low birth weight (LBW), with birth weight of between ≥2500-<3500 grams as normal birth weight (NBW), and with birth weight of ≥3500 grams as large birth weight (LaBW). Low birth weight neonates were further classified as low birth weight (birth weight ≥1500 grams - <2500 grams), very low birth weight (VLBW) with birth weight of ≥1000-<1500 grams, and extremely low birth weight (ELBW) with birth weight of < 1000 grams.

For further analysis, low birth weight neonates were sub classified as LBW1 (birth weight of ≥1500-<2000 grams) and LBW2 (birth weight of ≥2000-<2500 grams). LBW1 were further classified as LBW1a (birth weight of between ≥1500 grams-<1800 grams) and LBW1b (birth weight of ≥1800 grams-<2000 grams). All the neonates were analyzed for morbidities and immediate outcome. There morbidities and outcome were compared. This study is a retrospective analysis of previously collected information. Neonates were managed by standard protocols. This study was approved by the hospital ethics committee.

RESULTS

718 (57.99%) neonates were of normal birth weight, 485 (39.17%) of low birth weight, and 35 (2.82%) of large weight.

Table 1: General characteristics of inborn live births.

Live births	1238
Full term	1024 (82.7%)
Preterm	211 (17.04%)
Late preterm	171
Mod preterm	23
Very preterm	16
Extreme preterm	01
Post term	03 (0.24%)
Normal birth weight (2500-3500 gm)	718 (57.99%)
LBW (<2500 gm)	485 (39.17%)
Large weight (>3500 gm)	35 (2.82%)
AGA	1083 (87.47%)
SGA	84 (6.78%)
LGA	71 (5.73%)

Table 2: General characteristics of LBW neonates.

	ELBW	VLBW1	VLBW2	LBW1	LBW2	LBW	NBW	LaBW
Total (1238)	07	12	10	95	361	485	718	35
SNCU admission (217)	07	12	10	71	47	147 (30.31%)	69	01
Extreme PT (01)	01	00	00	00	00	01	00	00
Very PT (16)	06	08	02	00	00	16	00	00
Mod PT (23)	00	03	05	15	00	23	00	00
Late PT (171)	00	00	02	67	86	155	16	00
Full term (1024)	00	01	01	13	274	289 (59.58%)	700	35
Postterm (03)	00	00	00	00	01	01 (0.20%)	02	00
SGA (84)	03	07	04	24	46	84 (17.32%)	00	00
AGA (1083)	04	05	06	71	315	401 (82.68%)	682	00
LGA (71)	00	00	00	00	00	00	36	35
Male (683)	05	07	04	50	172	238 (49.07%)	416	29
Female (555)	02	05	06	45	189	247 (50.93%)	302	06
VD (875)	06	08	08	73	268	363 (74.84%)	485	27
LSCS (363)	01	04	02	22	93	122 (25.15%)	233	08

Out of 485 low birth weight neonates; 456 (94.01%) were low birth weight weighing more than 1500 grams (LBW), 22 (4.53%) were VLBW, and 07 (1.44%) were ELBW. 361 (74.43%) were LBW2 (birth weight ≥2000 - <2500 grams), 95 (19.58%) were LBW1 (birth weight ≥1500 - <2000 grams), 10 (2.06%) were VLBW2 (birth weight ≥1250 - <1500 grams), 12 (2.47%) were VLBW1 (birth weight ≥1000 - <1250 grams); and 07 (1.44%) were ELBW (birth weight <1000 grams).

Table 3: Comparison of morbidities of LBW neonates with normal birth weight and large birth weight neonates.

	Inborn LBW (1500-<2500 grams)	Inborn NBW (2500-<3500)	Inborn large birth weight (≥ 3500)
Total	456	718	35
SNCU admission	118 (25.8%)	69 (9.61%)	01 (2.85%)
At least one morbidity occurred in	112 (24.56%)	114 (15.96%)	04 (11.43%)
Birth asphyxia	22 (4.82%)	33 (4.59%)	01 (2.85%)
Mod – Sev HIE	04	10	00
Sepsis	17 (3.72%)	06 (0.83%)	00
RDS	10 (2.19%)	00 (00%)	00
MSAF	58 (12.71%)	103 (14.3%)	04 (11.4%)
MAS	02 (0.44%)	10 (1.39%)	00
PPHN	01 (0.22%)	04 (0.55%)	00
TTN	25 (5.48%)	17 (2.36%)	00
Apnea	05 (of which 1 secondary) (0.87%)	00 (00%)	00
Feed intolerance	05 (1.09%)	00 (00%)	00
NEC	01 (0.22%)	00 (00%)	00
Hyperbilirubinemia	60 (13.1%)	66 (9.19%)	03 (8.57%)
Polycythemia	01 (0.22%)	00 (00%)	00
Hypoglycemia	06 (1.31%)	00 (00%)	00
Thrombocytopenia	02 (0.44%)	00 (00%)	00
DIC	02 (0.44%)	01(0.14%)	00
Coagulopathy	01 (0.22%)	00	00
Hyponatremia	01 (0.22%)	00	00
Hypernatremia	01 (0.22%)	00	00
Hypocalcemia	00	00	00
ARF	03 (0.66%)	01 (0.14%)	00
Prerenal failure	01 (0.22%)	00	00
Malformations	14 (3.07%)	06 (0.83%)	00
Major malformations	09 (1.97%)	2 (0.27%)	00
PDA	06 (of which 3 large> 2 mm) (0.65%)	03 (of which 1 large > 3 mm) (0.14%)	00
Need for respiratory support (CPAP/Ventilator)	22 (4.82%)	17 (2.36%)	00

Need for SNCU admission is significantly higher in LBW compared to normal birth weight neonates (25.8 % vs 9.61 %).

It was least in large birth weight neonates (2.85%).

Many of the morbidities were higher in LBW neonates compared to normal birth weight neonates.

Difference was more significant in risk of sepsis (3.72% vs 0.83%), RDS (2.19% vs 0%), TTN (5.48% vs 2.36%), hyperbilirubinemia (13.1 % vs 9.19%), hypoglycemia (1.31% vs 0%), feed intolerance (1.09% vs 0%) and risk of major congenital malformation (1.97% vs 0.27%).

Need for respiratory support was 4.82% in LBW vs 2.36% in normal birth weight neonates.

Incidence of birth asphyxia was only slightly higher in LBW neonates (4.82% vs 4.59%).

Incidence of MAS and PPHN were higher in normal birth weight neonates compared to LBW neonates (1.39% vs 0.44%, and 0.55% vs 0.22%).

Amongst LBW neonates; morbidities were significantly higher in VLBW and ELBW neonates. On comparing LBW2 and LBW1 neonates, it was found that morbidities were significantly lower in LBW2 group-near comparable to found in normal birth weight neonates.

Table 4: Comparison of morbidities of among LBW neonates.

	Inborn ELBW	Inborn VLBW1	Inborn VLBW2	Inborn LBW1	Inborn LBW2	Inborn LBW TOTAL
Total	07	12	10	95	361	485
SNCU admission	07 (100%)	12 (100%)	10 (100%)	71 (74.7%)	47 (13.02%)	147 (30.31%)
At least one morbidity occurred in	07 (100%)	12 (100%)	07 (70.00%)	47 (49.47%)	65 (18.00%)	138 (28.45%)
Birth Asphyxia	04 (57.14%)	06 (50%)	01 (10%)	08 (8.42%)	14 (3.88%)	33 (6.8%)
Mod – Sev HIE				01	03	
Sepsis	03 (42.86%)	07 (58.33%)	00	12 (12.63%)	05 (1.38%)	27 (5.56%)
RDS	05 (71.43%)	07 (58.33%)	02 (20%)	10 (10.5%)	00 (00%)	24 (4.95%)
MSAF	01 (14.28%)	00	00	10 (10.5%)	48 (13.3%)	59
MAS	00	00	00	00 (00%)	02 (0.55%)	02
PPHN	00	00	00	00 (00%)	01 (0.28%)	01
TTN	00	00	00	14 (14.74%)	11 (3.05%)	25 (5.15%)
Apnea	01 (Secondary)	01 (8.33%)	00	04 (4.21%)	01 (Secondary)	07 (02 secondary)
Feed intolerance	01 (14.28%)	00	00	02 (2.10%)	03 (0.83%)	06
NEC	02 (28.57%)	01 (8.33%)	00	01 (1.05%)	00	04
Hyperbilirubinemia	01 (14.28%)	03 (25%)	06 (60%)	26 (27.37%)	34 (9.41%)	70 (14.43%)
Polycythemia	00	01 (8.33%)	00	01 (1.05%)	00	02
Hypoglycemia	00	02 (16.66%)	00	04 (4.21%)	02 (0.55%)	08
Thrombocytopenia	00	00	00	01 (1.05%)	01 (0.28%)	02
DIC	00	01 (8.33%)	00	02 (2.1%)	00	03
Coagulopathy	00	00	00	00	01 (0.28%)	01
Hyponatremia	00	00	00	00	01 (0.28%)	01
Hypernatremia	00	00	00	01 (1.05%)	00	01
Hypocalcemia	00	00	00	00	00	00
ARF	01 (14.28%)	01 (8.33%)	00	01 (1.05%)	02 (0.56%)	05
Prerenal failure	00	00	00	01 (1.05%)	00	01
Major malformations	00	00	00	02 (2.10%)	08 (2.22%)	09
PDA	00	03 (all large) (25%)	02 (of which 1 large) (10%)	06 (of which 3 large) (3.15%)	00 (00%)	11 (7 large)
Need for respiratory support (CPAP/Ventilator)	04 (57.14%)	11 (91.6%)	02 (20%)	17 (17.89%)	05 (1.38%)	39 (8.04%)

Incidence of morbidities in LBW2 vs LBW1: Birth asphyxia (3.88% vs 8.42%), sepsis (1.38% vs 12.63%), RDS (0% vs 10.5%), TTN (3.05% vs 14.74%), hyperbilirubinemia (9.41% vs 27.37%), hypoglycemia (0.55% vs 4.21%), primary apnea (0% vs 4.21%), feed intolerance (0.83% vs 2.1%).

Incidence of MAS and PPHN was higher in LBW2 compared to LBW1 (0.55% vs 0%, and 0.28% vs 0%). There was not much difference in incidence of major malformations (2.10% vs 2.22%).

Incidence of PDA was higher in LBW1 group (3.15% vs 0%). Need for respiratory support was significantly higher in LBW1 group compared to LBW2 group (17.89% vs 1.38%).

On comparison of LBW1a (birth weight ≥1500 - <1800 grams) and LBW1b (birth weight ≥1800 - <2000 grams); it was found that at least one morbidity occurred in 37.5% of LBW1b neonates, while in 66.66% of LBW1a neonates at least one morbidity occurred.

Morbidities were higher amongst LBW1a neonates compared to LBW1b neonates, in particularly incidence of sepsis (20.51% vs 7.14%), RDS (20.51% vs 3.57%), apnea (10.25% vs 0%), feed intolerance (2.56% vs 1.78%), hyperbilirubinemia (25% vs 19.64%). Incidence of major congenital malformations was 2.56% vs 1.78%. Incidence of PDA was 3.57% vs 1.78%.

Table 5: Comparison of morbidities of among LBW neonates weighing ≥1500 - <1800 grams and ≥1800 - <2000 grams.

	Inborn LBW1	Inborn ≥1500 - <1800 (LBW1a)	Inborn ≥1800 - <2000 (LBW1b)
Total	95	39	56
SNCU admission	71 (74.73%)	38 (97.43%)	33 (58.9%)
Not any morbidity	48(50.53%)	13 (33.33%)	35(62.5%)
At least one morbidity	47 (49.47%)	26 (66.66%)	21 (37.5%)
Birth asphyxia	08 (8.42%)	03 (7.69%)	04 (7.14%)
Mod – Sev HIE	01		
Sepsis	12 (12.63%)	08 (20.51%)	04 (7.14%)
RDS	10 (10.5%)	08 (20.51%)	02 (3.57%)
MSAF	10 (10.5%)	07 (17.95%)	03 (5.36%)
MAS	00 (00%)	00	00
PPHN	00 (00%)	00	00
TTN	14 (14.74%)	06 (15.38%)	08 (14.28%)
Apnea	04 (4.21%)	04 (10.25%)	00
Feed intolerance	02 (2.10%)	01 (2.56%)	01 (1.78%)
NEC	01 (1.05%)	01 (2.56%)	00
Hyperbilirubinemia	26 (27.37%)	14 (25%)	11 (19.64%)
Polycythemia	01 (1.05%)	00	01 (1.78%)
Hypoglycemia	04 (4.21%)	01 (2.56%)	03 (5.36%)
Thrombocytopenia	01 (1.05%)	00	01 (1.78%)
DIC	02 (2.1%)	01 (2.56%)	01 (1.78%)
Coagulopathy	00	00	00
Hyponatremia	00	00	00
Hypernatremia	01 (1.05%)	00	01 (1.78%)
Hypocalcemia	00	00	00
ARF	01 (1.05%)	01 (2.56%)	00
Prerenal failure	01 (1.05%)	00	01 (1.78%)
Major malformations	02 (2.10%)	01 (2.56%)	01 (1.78%)
PDA	06 (of which 3 large) (3.15%)	04 (02 large) (3.57%)	02 (01 large) (1.78%)
Need for respiratory support (CPAP/Ventilator)	17 (17.89%)	13 (33.33%)	04 (7.14%)

Table 6: Comparison of outcome among LBW neonates weighing ≥1500-<1800 grams and ≥1800-<2000 grams.

	Inborn LBW1	Inborn LBW ≥1500 - <1800 (LBW1a)	Inborn LBW ≥1800 - <2000 (LBW1b)
Total	95	39	56
SNCU admissions	71 (74.73%)	38 (97.4%)	33 (58.93%)
Discharged	92 (96.84%)	36 (92.30%)	56 (100%)
Death	01 (1.05%)	01 (2.56%)	00
DAMA	02 (2.10%)	02 (5.13%)	00
DAMA-Moribund	01	01	00
Death + DAMA-Moribund	02 (2.10%)	02 (5.13%)	00 (00%)
Transferred	00	00	00

Need for respiratory support was significantly higher amongst LBW1a neonates compared to LBW1b (33.33% vs 7.14%). There was not much difference in incidence of asphyxia (7.69% vs 7.14%), and of TTN (15.38% VS 14.28%). Incidence of hypoglycemia was higher in LBW1b group (5.36% vs 2.56%).

Outcome was significantly better in LBW1b group compared to LBW1a group with discharge rate of 100% in LBW1b group compared to 92.3% in LBW1a group. Poor outcome in the form of combined death and DAMA in moribund state was 5.13% in LBW1a group, while poor outcome was not noted in any neonate amongst LBW1b group.

Table 7: Comparison of outcome of LBW neonates with normal birth weight and large birth weight.

	Inborn LBW neonates (1500-<2500)	Inborn normal birth weight (2500-<3500 grams)	Inborn large birth weight (≥3500 grams)
Total	456	718	35
SNCU admissions	118	69	01
Discharged	445	713	36
Death	02	01	00
DAMA	08	03	00
DAMA – Moribund	04	03	00
Death+DAMA – Moribund	06 (1.31%)	04 (0.56%)	00 (00%)
Transferred	01	01	00

Table 8: Comparison of outcome among LBW neonates.

	Inborn ELBW	Inborn VLBW1	Inborn VLBW2	Inborn LBW1	Inborn LBW2	Inborn Lbw total
Total	07	12	10	95	361	485
SNCU admissions	07	12	10	71	47	147
Discharged	00 (00%)	05 (41.66%)	09 (90%)	92 (96.84%)	355 (98.33%)	460 (94.84%)
Death	03	02	01	01	01	08
DAMA	04	05	00	02	06	17
DAMA-Moribund	04	03	00	01	03	11
Death+DAMA-Moribund	08 (100%)	05 (41.66%)	01 (10%)	02 (2.10%)	04 (1.11%)	19 (3.92%)
Transferred	00	00	00	00	01	01

Overall outcome was poor in LBW neonates compared to normal weight neonates (1.31% vs 0.56%). All of the large birth weight neonates had good immediate neonatal outcome.

Amongst all LBW neonates, overall poor immediate outcome was found in 3.92%. Poor immediate outcome was 1.11% in LBW2, 2.10% in LBW1, 10% in VLBW1, 41.66% IN VLBW1, and 100% in ELBW.

DISCUSSION

The prevalence of LBW is a good indicator of mother's health and maternal nutritional status. The incidence of LBW in Asia as a whole is 19.7%. That of Europe, USA and Korea is 6.5%, 7% and 6-8% respectively.[6] The incidence of LBW in our hospital was 39.17%. Study by Kutubur et al showed incidence of LBW of 27.14%.[7] Study by Negi et al showed incidence of LBW of 26.8%.[8] In present study, M:F ratio was 1:1.038. Incidence of LBW, VLBW AND ELBW was 94.01%, 4.53% and 1.44% respectively. 59.58% of low birth weight neonates were full term and 17.32% were SGA. Of full term LBW neonates majority (94.8%) were between 2000 – 2500 grams. Study by Manikyamba D et al. showed M:F ratio of 1:1.1. In the same study incidence of LBW, VLBW and ELBW was 65.56%, 22.57% and 11.85% respectively. 73.8% were preterm and 26.2% were term IUGR babies.[9]

Need for SNCU admission is significantly higher in LBW compared to normal birth weight neonates (25.8 % vs 9.61 %). Many of the morbidities were higher in LBW neonates compared to normal birth weight neonates. Difference was more significant in risk of sepsis (3.72% vs 0.83%), RDS (2.19% vs 0%), TTN (5.48% vs 2.36%), hyperbilirubinemia (13.1 % vs 9.19%), hypoglycemia (1.31% vs 0%), feed intolerance (1.09% vs 0%) and risk of major congenital malformation (1.97% vs 0.27%). Need for respiratory support was 4.82% in LBW vs 2.36% in normal birth weight neonates. Incidence of birth asphyxia was only slightly higher in LBW neonates

(4.82% vs 4.59%). Incidence of MAS and PPHN were higher in normal birth weight neonates compared to LBW neonates (1.39% vs 0.44%, and 0.55% vs 0.22%). In a study by Mukeshkumar Gupta et al. major morbidities in LBW were neonatal jaundice (30.5%), respiratory distress (28.5%), HMD (14.5%), septicemia (23.5%).[10] In a study by Budhathoki S et al. three major complications in LBW neonates were clinical sepsis, non-physiological sepsis and hypoglycaemia.[11]

Amongst LBW neonates; morbidities were significantly higher in VLBW and ELBW neonates. On comparing LBW2 and LBW1 neonates, it was found that morbidities were significantly lower in LBW2 group – near comparable to found in normal birth weight neonates. Morbidities were higher amongst LBW1a neonates compared to LBW1b neonates. At least one morbidity occurred in 37.5% of LBW1b neonates, while in 66.66% of LBW1a neonates at least one morbidity occurred.

Immediate poor outcome in the form of combined death and DAMA cases in moribund state was in 3.92% in low birth weight neonates, while it was 0.56% in normal weight neonates and 0% in large weight neonates. Poor immediate outcome was 1.11% in LBW2, 2.10% in LBW1, 10% in VLBW1, 41.66% IN VLBW2, and 100% in ELBW. Outcome was significantly better in LBW1b group compared to LBW1a group with discharge rate of 100% in LBW1b group compared to 92.3% in LBW1a group. Overall survival rates as per Manikyamba D et al. was 76% for LBW babies, 32% for VLBW and 65% for ELBW babies.[9] In a study by Budhathoki S et al out of admitted low birth weight babies 82% improved and were discharged from hospital after treatment, 25 (9.0%) babies died and the same number of babies left against medical advice (LAMA).[11] In a study by Anuradha Bansal et al. overall mortality of VLBW babies was 24.6%.[12] In a study by Poudel P et al survival rate in VLBW neonates was 54.3%.[13] In a study by Basu S et al mortality rate of 37% was reported in VLBW neonates.[14] In a study by Acharya N et al mortality rate in ELBW and VLBW babies were 69.7% and 25% respectively.[15] In a study by K K Roy at al. - The commoner neonatal complications in both VLBW and ELBW babies were RDS, neonatal jaundice and sepsis. The neonatal mortality rate till discharge was 15.7% in VLBW group and 33.3% in ELBW group.[16]

Study by Singh M et al has shown improved survival with increase in both the birth weight and gestational age.[17] Present study results were in accordance with Singh et al.

CONCLUSION

The major determinants for mortality in low birth weight babies were the birth weight. Mortality was highest in ELBW followed by VLBW and followed by LBW. Also, there exist positive correlation between birth weight and morbid conditions.

The higher incidence and mortality of LBW especially ELBW and VLBW1 neonates in present study indicates a need for prevention of such neonates by improving maternal health and care, provision of good community based newborn care, good neonatal transport facility, up gradation of NICU facilities in Government hospitals, provision of free neonatal care by private hospitals under public private partnership program and ensuring adequate manpower with their regular training. With all these efforts together, it will be possible to achieve the INAP goal of NMR less than 10 by 2030.

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REFERENCES

1. WHO Library Cataloguing-in-Publication Data. Guidelines on optimal feeding of low birth weight infants in low and middle income countries. World Health Organization, Geneva; 2011. Available at http://www.who.int/maternal_child_adolescent/documents/9789241548366.pdf
2. United Nations Children's Fund, WHO and UNICEF. Low birth weight: Country, Regional and Global estimates. Newyork: WHO and UNICEF; 2004. Available at https://www.unicef.org/publications/index_24840.html
3. Bhargava SK, Singh KK, Saxena BN. ICMR Task Force National Collaborative Study on Identification of High Risk Families, Mothers and Outcome of their Off-springs with particular reference to the problem of maternal nutrition, low birth weight, perinatal and infant morbidity and mortality in rural and urban slum communities. Summary, conclusions and recommendations. Indian Pediatr. 1991;28:1473-80.
4. Ahman E, Zupan J. WHO Library Cataloguing-in-Publication Data. Neonatal and perinatal mortality: country, regional and global estimates 2004. Geneva: WHO;2007.
5. India Newborn Action Plan. Ministry of Health and Family Welfare, Govt of India 2014 Available at http://nhm.gov.in/india-newborn-action-plan.html
6. Kayastha S, Tuladhar H: Study of Low Birth Weight babies in Nepal Med Coll J 2007: 266-9
7. Kutubur Rahman, A R Bhuyan et al. Incidence and clinical profile of low birth weight babies: A rural tertiary care hospital based study. New Indian J OBGYN. 2015;2(1):43-45.
8. Negi KS, Kandpal SD, Kukreti. Epidemiological factors affecting low birth weight. JK Sci. 2006;8(1):31-4.
9. Manikyamba D, Madhavi N, Prasad AK, Padmavati IV, Anitha. Morbidity and mortality of LBW Babies and their growth and neurodevelopment outcome at 1 year – NICU, Government General Hospital,

Kakinada. Scholars J Appl Med Sci. 2015;3(4B):1721-5.
10. Gupta MK, Kakkar M, Sethi C, Malhotra AK. Pattern of morbidity and mortality in LBW neonates: a study from Jaipur. J Evol Med Dental Sci. 2014 Feb 10;3(06):1339-45.
11. Budhathoki S, Poudel P, Bhatta NK, Singh RR. Clinico-epidemiological study of low birth weight newborns in the Eastern part of Nepal Nepal Med Coll J. 2014;16(2-4):190-3.
12. Bansal A, Chawla D. Mortality and morbidity profile of preterm very low birth weight infants: A prospective longitudinal observational study. Indian J Child Health. 2017 Nov 14;4(2):225-30.
13. Poudel P, Budhathoki S, Shrivastava MK. Maternal Risk Factors and Morbidity Pattern of Very Low Birth Weight Infants: A NICU Based Study at Eastern Nepal. J Nepal Paed Soc. 2009;29(2):59-66.
14. Basu S, Rathore P, Bhatia B D. Predictors of Mortality in very low birth weight neonates in India. Singapore Med J. 2008;49(7):556-60.
15. Acharya N, Mishra P, Shrestha N, Gupta V. Immediate outcome of Elbw and Vlbw Babies in a tertiary care center of Nepal. J Nepalgunj Med Coll. 2015 Sep;12(1):32-4.
16. Roy KK, Baruah J, Kumar S, Malhotra N, Deorari AK, Sharma JB. Maternal antenatal profile and immediate neonatal outcome in VLBW and ELBW babies. Indian J Pediatr. 2006 Aug;73(8):669.
17. Singh M. Birth weight, gestational age correlation neonatal mortality. Indian Paediatr. 1982;49:511-7.

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