Outcomes, Risk Factors and Complications of the LBW Babies in a Newly Established Medical College Hospital in a Haor District of Bangladesh

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Newborns are most vulnerable population worldwide, more so are LBWs. In Bangladesh current neonatal mortality rate, infant mortality rate and under 5 mortality rate are 23, 31 and 38 respectively. This means that newborn death contribute to about 60% of under 5 mortality, 74% of infant mortality. Complications of preterm birth and LBW contribute to about 45% of neonatal deaths. If we want to reduce IMR and under 5 mortality rate we have to address the problem of newborns and specially those of preterm and LBWs vigorously. Studies regarding the problem of newborns of remote and hard to reach haor area is virtually non-existent. The present prospective observational clinical study was done at SSNIMC Hospital at Kishoreganj, a north-eastern district of Bangladesh having a vast area of haor in its catchment area, to see the outcomes, risk factors and complications of LBW newborns. The study attempted to see any difference among haor, non-haor and urban cases and also any difference among LBW, VLBW and ELBW cases, in these parameters. The study included 162 LBW babies comprised of 101(62%) non-haor rural, 32(21%) haor, 28(17%) urban cases. Among these 136(84%) were LBW (BW-1500 to 2499gm), 24(15%) VLBW (BW-1000 to 1499 gm), 2(1%) ELBW (BW<1000gm). Outcome was excellent with 80% cured in LBW group vs 42% cured in VLBW group. Only 5(3%) preterm LBW newborns died, 4(80%) deaths occurred in VLBW group. Poor economic condition and younger maternal age (<20 year) were main risk factors in haor and non-haor areas while poor economic condition was main risk factors for LBW in urban mothers. Sepsis (56) and RDS/Pneumonia (45) were two common complications. RDS/Pneumonia were commoner in haor cases, 16(48%) in haor vs 28(28%) in non-haor, 1(4%) in urban cases. We suggest larger case control studies for better understanding of the problem of preterm birth and LBWs in haor and non-haor rural areas, for their better outcomes.

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Introduction

Low Birth Weight (LBW) is defined by WHO as a birth weight (BW) of a live born infant of 2499gm or less, regardless of gestational age (GA).[1] Babies born before 37 weeks of gestational age are called preterm. If birth weight falls below 10th centile according to gestational age, baby is termed as Small for Gestational Age (SGA).[2] LBW babies are subdivided into LBW (BW-1500 to 2499 gm), Very LBW (BW- 1000 to 1499gm), Extremely LBW (BW- 750 to 999 gm), Incredibly LBW (BW- < 750gm).

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LBW may be either due to prematurity or preterm birth (GA < 37 weeks) or due to Intra Uterine Growth Retardation (IUGR) or SGA.[2]

Current Under five Mortality Rate (U5MR), Infant Mortality Rate (IMR), Neonatal Mortality Rate (NMR) in Bangladesh are respectively 41, 34, 25 per 1000 live birth as cited in Lancet, 2014.[3] According to UN Inter-Agency Group estimate 2014 the same rates are respectively 23, 31 and 38. So, more than 60% of our under five mortality and 74% of infant mortality are contributed by neonatal mortality. Again complications of preterm births or LBW contribute about 45% of all neonatal deaths in Bangladesh.[4,5] Preterm births and LBWs not only contribute to childhood mortality but also contribute to a great deal, to morbidity needing prolong hospital stay and leads to many short term and long term complications. Short term complications of LBW includes Hypothermia, Hypoglycemia, Respiratory Distress Syndrome (RDS), Apnea of prematurity, Infections, Hemorrhage, Feeding difficulty, GERD, Necrotizing Enterocolitis (NEC), Exaggerated Physiological Jaundice, Anemia of Prematurity, PDA etc. In long run, LBW babies may suffer from Rickets or Osteopenia of prematurity, Retinopathy of prematurity (ROP), Delayed Growth and Development, Cerebral Palsy (CP) and other Neurological deficit.[6]

Risk factors in the mother that may contribute to LBW include young age, multiple pregnancies, previous LBW infants, poor nutrition, hypertension, drug addiction, alcohol abuse, insufficient Antenatal Care (ANC), environmental factors including smoking, Lead Exposure and other types of air pollutions.[7]

Shaheed Syed Nazrul Islam Medical College Hospital (SSNIMCH), a newly established tertiary level hospital in a Haor district of Bangladesh, is virtually so far an overhaul of the District Hospital situated in Kishoreganj Town having 3 complete, 3 partial Haor Upzilas of the same district and also part of six more Haor Upzilas of Netrokona, Sunamganj and Hobiganj district, in its catchment area. Haor is a wetland eco-system in the north-eastern part of Bangladesh which physically is a bowl or saucer shaped shallow depression, also known as backswamp.[8]

The present study was done among LBW babies admitted in this SSNIMCH with a considerable Haor area in its catchment area with an objective to find out the outcome, causes and contributing factors and complications of these LBW babies hailing from Haor and Non Haor areas.

Methods

This was a Prospective Observational Clinical Study. The study was conducted among Low Birth Weight (LBW) babies admitted in the Special Care Newborn Unit (SCANU) and Neonatal Ward in the Pediatric Department of Shaheed Syed Nazrul Islam Medical College Hospital (SSNIMCH) during the period spanning from May 25, 2015 to August 21, 2015.

For this study 162 LBW babies (both preterm and SGA) were selected and evaluated by clinical history, physical examination along with minimum laboratory investigations like blood examination for infections screening, Serum Bilirubin in few selected cases. Study sample of newborns were sub-categorized in to 3 birth weight groups, viz LBW (BW- 1500 to 2499 gm),. VLBW (BW- 1000 to 1499 gm), ELBW (BW- < 1000 gm).

The investigators followed the selected LBW newborns of study samples throughout their stay at hospital until their discharge. Data were collected from medical records of the newborns as well as of the mothers. Additional information were collected from

mothers or attendants during discharge using a pre-formulated structured form including the variables of interest.

Variables regarding the mothers and their pregnancies included maternal age, level of education of mother, order of pregnancy, mode of delivery, economic condition of the family, distance of hospital from home, transport to hospital, antenatal checkup. Variables regarding newborn included age, sex, birth weight, gestational age, presence of hypothermia, jaundice, inability to suck, RDS/ pneumonia, sepsis, apnea, hemorrhage and other complications.

Data obtained regarding selected variables of interest were analyzed and presented in tables, charts and figures.

One hundred sixty two (162) LBW babies coming from haor, non-haor and urban areas are sub-categorized into three birth weight (BW) sub group namely: BW-1500 to 2499gm (LBW), BW-1000 to 1499gm (VLBW), BW-<1000gm (ELBW). This study included 136(84%) LBW, 24(15%) VLBW, 2(1%) ELBW.

Results

A total of 162 newborns (n=162) with Low Birth Weight (LBW-birth weight less than 2500 gm) were included in this Prospective Observational Clinical Study. Study sample included a formidable number of newborns, 33(21%), hailing from Haor area in the catchment of SSNIMCH, Kishoreganj. Most of the cases, 101(62%) were contributed from Non-haor rural areas, whereas least numbers, 28(17%) hailed from Urban area. (Figure 1)

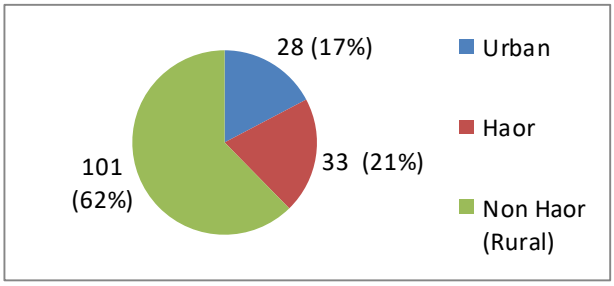

Figure 1. Distribution of cases according to hailing areas: Haor, Non-haor, and urban.

Data collected regarding outcomes (Cured, Referred, DORB, Death), Risk factors (Maternal Age <20 years, Multiple Pregnancy, Poor economic condition, Congenital Anomalies of the newborn and others), occurrence of deferent complications (Sepsis, Bleeding, Apnea, RDS/Pneumonia etc), were analyzed and presented in different figures, charts and tables.

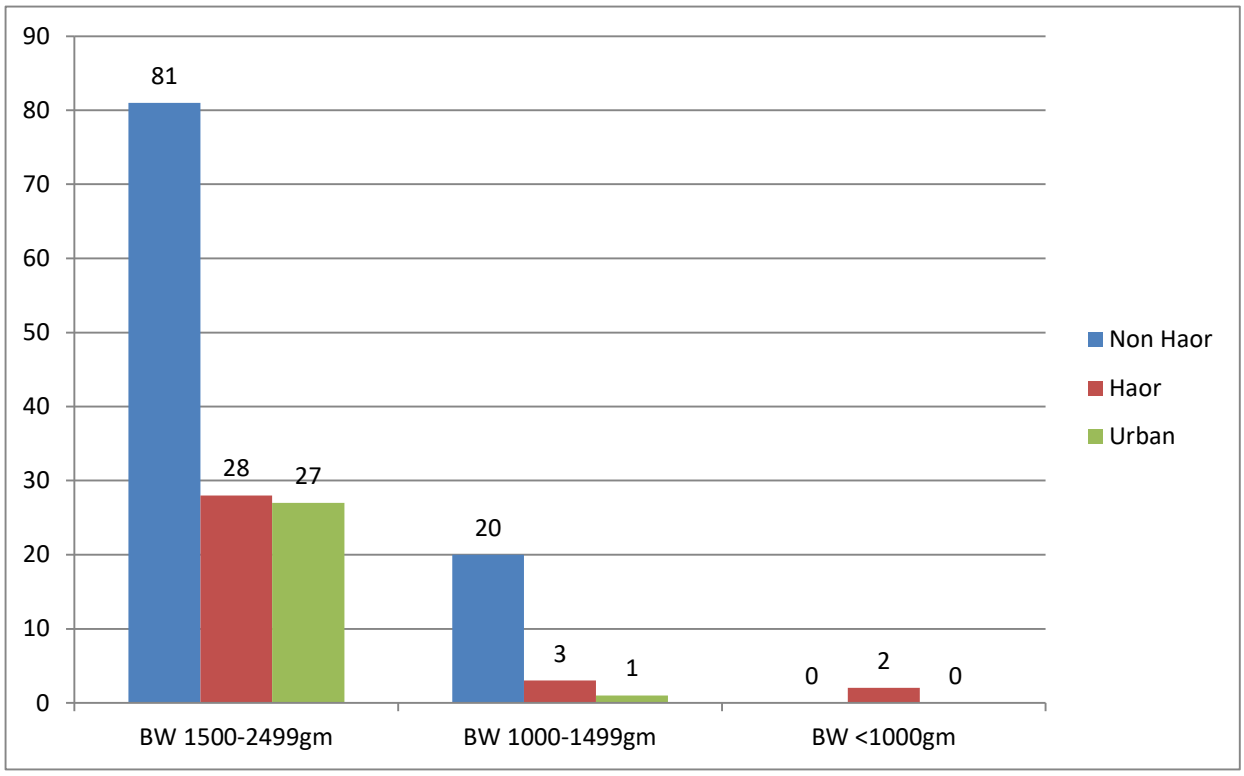

Figure 2. Distribution of cases according to birth weight (BW) sub group and hailing areas.

Figure 2 describes hailing area wise incidence of BW sub-groups of cases and shows that most, 136(84%) of cases belonged to BW-1500 to 2499 sub-group, in all three hailing areas viz. Non-Haor 81(80%), Haor- 28(85%), Urban- 27(96%). Least inclusions were from ELBW sub-group, total 2.

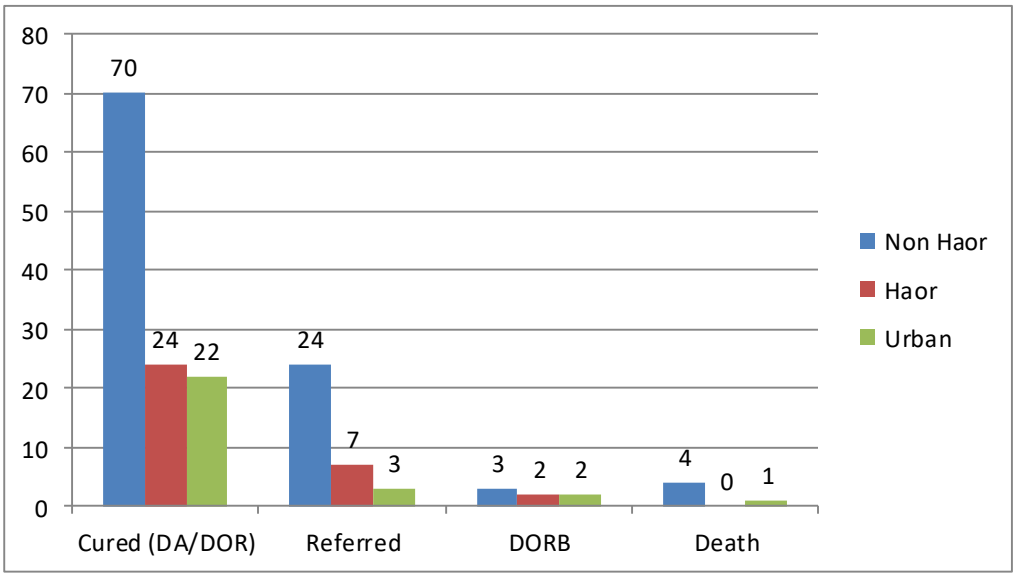

Figure 3. Distribution of outcomes of cases according to hailing areas.

Figure 3 shows hailing area wise outcomes of the cases and denotes that most of the cases from Non Haor-70(69%), Haor-24(73%), Urban- 22(79%) newborns were cured, only 5(3%) of total 162 cases died which included 4(4%) from Non Haor and 1(4%) from Urban area.

Table I: Distribution of outcomes of cases according to birth weight (BW) sub-group.

BW Sub-group	Cured	Referred	DORB	Death
1500-2499gm	106(80%)	23	6	1
1000-1499gm	10(42%)	9	1	4
<1000gm	0	2	0	0

Table I shows that maximum 106(80%) out of 136 BW-1500 to 2499gm sub-group were cured, whereas only 10(42%) out of 24 of BW-1000 to 1499gm sub-group were cured. Most of the deaths, 4(80%) out of 5 were in VLBW sub-group.

Table II: Incidence of risk factors according to hailing areas.

Hailing Areas	Age <20 years	Multiple Pregnancy	Poor Group	Anomalies	Others
Non-Haor	67	6	61	2	2
Haor	18	8	13	2	2
Urban	4	2	20	0	0

In Table II Haor, Non-Haor and Urban residential area wise incidence of risk factors shows that younger age of the mother (<20 years) is the main risk factors for LBW in all three hailing areas. While poor socio-economic condition is the second common risk factors in haor and non-haor rural areas, it was the main risk factors for LBW in urban area.

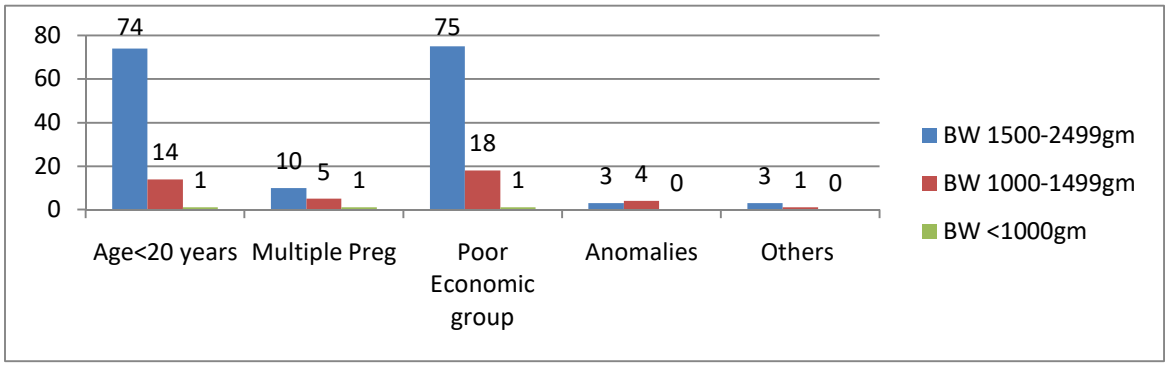

Figure 4. Distribution of risk factors in different birth weight (BW) sub -groups.

Figure 4 shows that younger age of the mother (<20 years) and poor socio-economic conditions plays as main risk factors in all three BW sub-group.

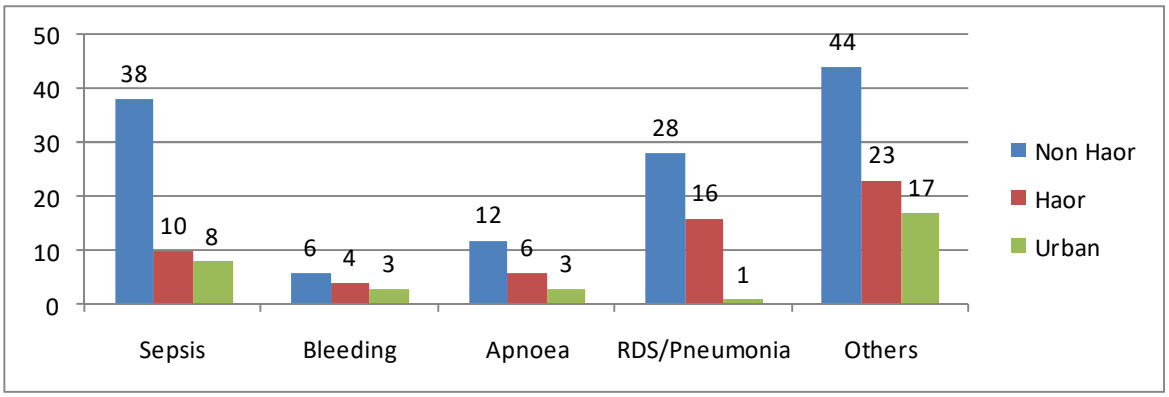

Figure 5. Bar chart showing distribution of complications according to hailing areas.

Figure 5 shows that sepsis was most common complication (56), RDS/Pneumonia being second commonest (45) as a whole. RDS/Pneumonia is common in haor area, 16(48%) out of 33 haor cases, followed by 28(28%) out of 101 Non-haor cases, whereas only 1(4%) out of 28 Urban cases.

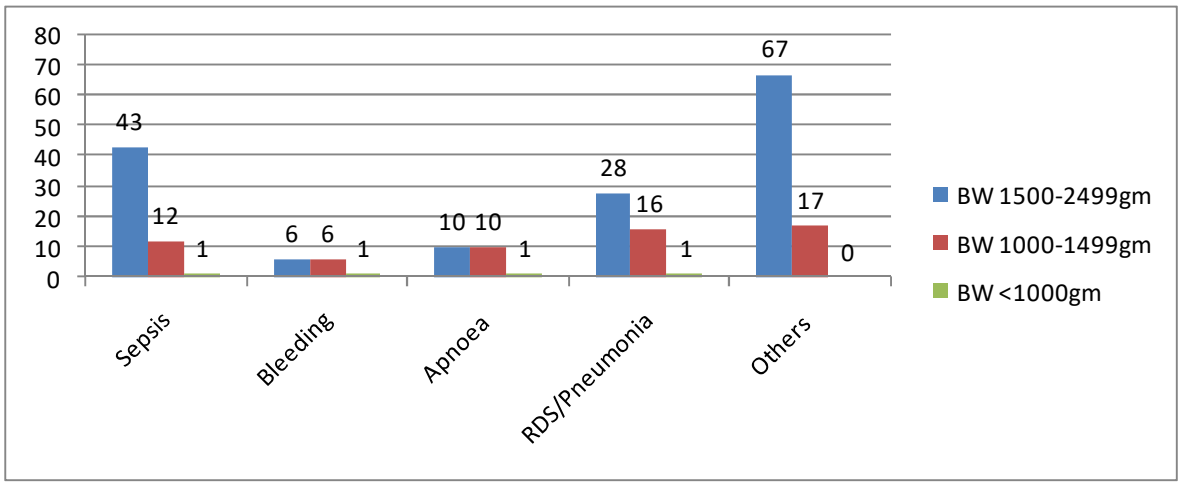

Figure 6. Incidence of complications in different birth weight (BW) sub groups.

Figure 6 shows that Sepsis, RDS/Pneumonia and others complications occurred more commonly in 1000 to 1499 gm BW sub-group. Viz. 12(50%) and 16(67%) out of 23 newborns of this group suffered Sepsis and RDS/Pneumonia respectively, in contrast to 43(32%) sepsis and 28(21%) RDS/Pneumonia out of 136 cases in BW-1500 to 2499 gm sub-group.

Discussion

Newborns are most vulnerable population all over the world. Preterms (born before 37 weeks of gestational age) are at increased risk. Currently prematurity is the leading cause of death among under 5 children around the world and leading cause of disability and ill heath later in life. LBW (newborns weighing <2500 gm at birth), due to prematurity and / or IUGR is also a major contributor of newborn and child deaths as well as disability and non-communicable diseases globally.[9]

In Bangladesh Neonatal Mortality Rate (NMR), Infant Mortality Rate (IMR), Under 5

Mortality Rate (U5MR) are currently 23, 31, 38 per thousand live birth respectively. Preterm birth rate is 14%, LBW birth rate is 22%.[9] About 60% of under 5 deaths, 74% of infant deaths are contributed by neonatal death. Complication of prematurity and LBW contribute about 45% of neonatal death.[4.5] Prevalence of malnutrition is much higher in children born with LBW than those with normal birth weight (Stunting: 51% vs 39%; wasting 25% vs 14%; and under weight: 52% vs 33%).[10] So, preterm birth and LBW are most important causes of child hood mortality and morbidity, undermines our national resources and productivity to a great extent. There are many relevant study to assess the status of prematurity and LBW in Bangladesh to improve the care of newborns born too early (<37 weeks) and too small (BW < 2500gm). Of 10 elements of care recommended by WHO for improved preterm birth outcome antenatal corticosteroids, tocolytics, magnesium sulphate, antibiotics for preterm premature rupture of membrane and kangaroo mother care (KMC) are currently included in Bangladesh's clinical standard of preterm care at hospital level.[9]

Still data regarding real situation of preterm and LBW problem in rural areas are scarce, particularly those regarding Haor areas of Bangladesh is virtually non-existent. Current study was done in newly established SSNIMC Hospital, at Kishoreganj with a formidable area of Haor in its catchment. This prospective observational clinical study included 162 LBW babies (both preterm and SGA), 101(62%) from non-haor rural areas, 32(21%) from haor areas, 28(17%) from urban area, who were admitted in the SCANU and neonatal ward of this hospital during the period from May 25, 2015 to August 21, 2015. Study populations of 162 Low Birth Weight babies were composed of 136(84%) LBW (BW-1500 to 2499gm), 24(15%) VLBW (BW-1000 to 1499gm), 2(1%) ELBW (BW<1000gm).

This study group assessed the outcome, risk factors and complications of these newborns. Result shows that, outcome of LBW (BW-1500 to2499 gm) group coming from haor, non-haor and urban areas were excellent, 80% were cured vs 42% in VLBW group. Only 5(3%) out of 162 LBW died, 4(80%) of them belong to VLBW group. Study found poor economic condition and younger maternal age (<20 years) as first and second common risk factors in haor and non-haor rural areas while poor economic conditions as main risk factors in urban cases.

Among the study population sepsis was the commonest complications (56) followed by RDS/Pneumonia (45). RDS/Pneumonia were commoner in haor area, 16(48%) vs 28(28%) in non-haor area, 1(4%) in urban area. Sepsis, RDS/Pneumonia and other complications were more common in VLBW group viz. 12(50%) sepsis and 16(67%) RDS/Pneumonia in VLBW group vs 43(32%) sepsis and 28(21%) RDS/Pneumonia in LBW group.

Unfortunately, no similar literature or study data were found to compare with this study.

Conclusion

The study found excellent outcome of LBW babies (BW-1500 to 2499gm). The outcome was worse in VLBW (BW-1000-1499gm) group. The authors recommend more extensive study to compare outcome, risk factors and complications of preterm and LBWs in haor, non-haor and urban areas and more extensive interventions to save the lives of LBWs and to reduce poor outcomes in later life of the survivors.

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