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OUTCOME OF VERY LOW BIRTH WEIGHT NEWBORNS IN RECEP TAYYIP ERDOGAN HOSPITAL MUZAFFAR GARH

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ABSTRACT

Objectives: To determine the survival rate of very low birth weight newborns admitted in Recep Tayyip Erdogan Hospital Muzaffar Garh and to assess the short-term morbidity outcomes such as respiratory distress syndrome, sepsis, necrotizing enterocolitis and intraventricular hemorrhage.

Material and Methods: This retrospective cohort study was conducted Department of Neonatology, Recep Tayyip Erdogan Hospital, Muzaffar Garh. Pakistan and the medical records were retrieved from November 2024 to October 2025. All newborns (n = 237) with birth weight <1500 grams admitted to NICU within 24 hour of birth of either sex were included in our study following clearance by the institutional ethical review committee. Data was collected from hospital record and researcher recorded total number of newborns less than 1500 gram weight, total number of survival , short term morbidity and mortality and baseline information such as birth weight, maternal age, neonatal gestational age and delivery method while short-term morbidities such as; Necrotizing Enterocolitis, Respiratory distress syndrome, Neonatal sepsis and Intraventricular haemorrhage**.**

Results: This study included a total of 237 very low birth weight newborns admitted in Recep Tayyip Erdogan Hospital Muzaffar Garh, of which 56.5% (n = 134) were boys while 43.5% (n = 103) were girls. Mean gestational age was 28.87 ± 3.11 weeks and 69.2 % (n = 164) were aged up to the 30 weeks of gestation. Of these 237 very low birth weight newborns, 69.2 % (n = 164) were from rural areas while 67.1% (n = 159) belonged to poor families and primiparity was noted in 16.9% (n = 40). Hypertension was noted in 22.8% (n = 54) while multiple gestations in 14.3 % (n = 34) and premature rupture of membranes in 30.8 % (n = 73). Malnutrition was noted in 22.8 % (n=54), respiratory distress syndrome in 22.8 % (n = 54), sepsis in 16.9 % (n = 40), intraventricular haemorrhage in 4.2 % (n = 10) and Necrotizing Enterocolitis was noted in 6.3 % (n = 15). Of these 237 very low birth weight newborns 80.2 % (n = 190) were discharged alive and 19.8 % (n = 47) expired. Conclusion; Our study demonstrated a high survival rate among VLBW newborns admitted to our institution. Mortality was significantly associated with male gender, primiparity, multiple gestation, PROM, maternal malnutrition, sepsis and NEC. Continued strengthening of perinatal and neonatal intensive care services is essential to further improve outcomes in this highly vulnerable population.

KEYWORDS: Very Low birth weight, Newborn, Sepsis.

INTRODUCTION

Regardless of gestational age, the World Health Organization (WHO) defines very low birth weight (VLBW) as a birth weight of less than 1500 grams.[1] Although they make up only 1% to 2% of live births, VLBW babies are disproportionately responsible for neonatal morbidity and mortality globally.[2] The quality of prenatal and neonatal care has gradually improved throughout time. These improvements include the use of surfactant therapy, continuous positive airway pressure (CPAP), high flow nasal cannulas, prenatal corticosteroids, and better neonatal critical care procedures. In high-income nations, they have had a major influence on these newborns' survival.[3] The survival of these VLBW neonates in low- and middle-income nations, including Pakistan, is still below ideal due to a lack of resources, inadequate neonatal critical care units, delayed referrals, and inadequate expertise.[4]

Birth weight, gestational age, perinatal events, gender, mother health, any chronic illnesses, sepsis, respiratory distress syndrome, intraventricular hemorrhage, and the availability of advanced NICU support are some of the factors that affected these newborns' survival.[5] According to various research, Pakistan's survival rates are significantly lower than those of affluent nations, ranging from 30 to 60%.[6] In wealthy nations, newborns weighing 1000–1500 grams have a survival rate of around 85%.[7] The

overall survival percentage for a research[8] that included 2575 ELBW newborns was 55.11%. The survival rate rose progressively from 41.76% to 62.02% between 2008 and 2017, whereas the number of ELBW newborns climbed quickly from 91 to 466. Birth weight (BW), area economic growth, and specialized hospitalization are all strongly associated with increased survival. Necrotizing enterocolitis (12.0%), intraventricular hemorrhage (29.4%), and newborn respiratory distress syndrome (85.2%) were the most common sequelae.[8-10]

Assessing the results of VLBW babies in our population will yield important insights into how well the most recent neonatal care practice guidelines are working. It will assist in identifying practice gaps and provide guidance on new guidelines to increase survival and lower morbidity. In Pakistan, where newborn mortality is still among the highest in the world, this study is particularly significant since it could raise awareness of the need for improved neonatology management and resources.

MATERIAL AND METHODS

This retrospective cohort study was conducted Department of Neonatology, Recep Tayyip Erdogan Hospital, Muzaffar Garh. Pakistan and the medical records were retrieved from November 2024 to October 2025 using non - probability convenience sampling. All available cases that fulfilled the inclusion/exclusion criteria were selected in time frame.

All newborns (n = 237) with birth weight <1500 grams admitted to NICU within 24 hour of birth of either sex were included in our study following clearance by the institutional ethical review committee. Newborns with congenital anomalies-like esophageal atresia, gastroschisis, omphalocele, myelomeningocele, tetralogy of Fallot, transposition of the major vessels and other congenital abnormalities incompatible with life were excluded from our study. Data was collected from hospital record and researcher recorded total number of newborns less than 1500 gram weight, total number of survival , short term morbidity and mortality and baseline information such as birth weight, maternal age, neonatal gestational age and delivery method while short-term morbidities such as; Necrotizing Enterocolitis that was defined as intestinal pneumatosis with or without gas in the biliary tree on plain abdominal radiographs; abdominal distension by monitoring abdominal girth or occult blood in stools; feeding intolerance (presence of gastric aspirate in an amount that was more than half of the previous feeding) and tachycardia (heart rate >160 beats per minute). Respiratory distress syndrome, presence of tachypnea (respiratory rate greater than 60 breaths per minute), cyanosis (bluish coloring, clinical examination), grunting, and subcostal and intercostal retractions was considered positive along with radiological findings of ground glass appearance and air bronchogram. Neonatal sepsis was taken as culture proven sepsis, either blood, urine or tracheal secretions and Intraventricular haemorrhage which was evaluated on cranial ultrasonography, IVH, newborn sepsis and RDS) in neonates who survived were also recorded.

SPSS version 25.0 was used for statistical analysis. The results were shown as mean ± SD for mother's age, infant weight, and gestational age. The baby's gender, the style of delivery (SVD/cesarean), the place of birth (inborn/outborn), gestational diabetes mellitus, pregnancy-induced hypertension, preterm membrane rupture, survival (yes/no) and short-term morbidity (NEC, IVH, newborn sepsis, and RDS) will all be taken into account when calculating the frequency and percentage. Using stratifications, effect modifiers such as gestational age, baby's gender, infant weight, mother's age, place of birth (inborn or outborn), gestational diabetes mellitus, pregnancy-induced hypertension, preterm rupture of the membrane, and delivery method (SVD/cesarean) were managed. Chi square post-stratification was used, and a p-value of less than 0.05 was regarded as significant.

RESULTS

This study included a total of 237 very low birth weight newborns admitted in Recep Tayyip Erdogan Hospital Muzaffar Garh, of which 56.5% (n = 134) were boys while 43.5% (n = 103) were girls. Mean gestational age was 28.87 ± 3.11 weeks and 69.2 % (n = 164) were aged up to the 30 weeks of gestation. Of these 237 very low birth weight newborns, 69.2 % (n = 164) were from rural areas while 67.1% (n = 159) belonged to poor families and primiparity was noted in 16.9% (n = 40). Hypertension was noted in 22.8% (n = 54) while multiple gestations in 14.3 % (n = 34) and premature rupture of membranes in 30.8 % (n = 73). Malnutrition was noted in 22.8 % (n=54), respiratory distress syndrome in 22.8 % (n = 54), sepsis in 16.9 % (n = 40), intraventricular haemorrhage in 4.2 % (n = 10) and Necrotizing Enterocolitis was noted in 6.3 % (n = 15). Of these 237 very low birth weight newborns 80.2 % (n = 190) were discharged alive and 19.8 % (n = 47) expired.

Table No. 1 Impact of confounders on study outcome (n = 237)

Characteristics	**Outcome**		**P value**
	Discharged alive (n =190)	**Expired (n =47)**	
Gender			
Male (n=134)	**100 (52.6 %)**	**34 (72.3%)**	**0.015**
Female (n=103)	**90 (47.4 %)**	**13 (27.7 %)**	
Gestational Age groups (In weeks)			
Up to 30 weeks (n=164)	**127 (66.8 %)**	**37 (78.7%)**	**0.114**

More than 30 (n=73)	63 (33.2 %)	10 (21.3 %)	
Residential status			
Rural (n=164)	127 (66.8 %)	37 (78.7%)	0.114
Urban (n=73)	63 (33.2 %)	10 (21.3 %)	
Socioeconomic Status			
Poor (n =159)	128 (67.4 %)	31 (66.0 %)	0.854
Middle Income (n = 78)	62 (32.6 %)	16 (34.0 %)	
Primiparity			
Yes (n=40)	16 (8.4 %)	24 (51.1 %)	< 0.001
No (n=197)	174 (91.6 %)	23 (48.9 %)	
Hypertension			
Yes (n = 54)	44 (23.2 %)	10 (21.3 %)	0. 783
No (=183)	146 (76.8 %)	37 (78.7 %)	
Multiple gestations			
Yes (n =34)	15 (7.9 %)	19 (40.4 %)	< 0.001
No (=203)	175 (92.1 %)	28 (59.6 %)	
Premature rupture of membranes			
Yes (n=73)	52 (27.4 %)	21 (44.7 %)	0.021
No (n = 164)	138 (72.6 %)	26 (55.3%)	
Malnutrition			
Yes (n=54)	37 (19.5 %)	17 (36.2 %)	0.015
No (n = 183)	153 (80.5 %)	30 (63.8%)	
Respiratory Distress Syndrome			
Yes (n=54)	41 (21.6 %)	13 (27.7 %)	0.374
No (n =183)	149 (78.4 %)	34 (72.3%)	
Sepsis			
Yes (n=40)	27 (14.2 %)	13 (27.7 %)	0.028
No (n = 197)	163 (85.8 %)	34 (72.3%)	
Necrotizing Enterocolitis			
Yes (n= 15)	05 (2.6 %)	10 (21.3 %)	<0.001
No (n = 222)	185 (97.4 %)	37 (78.7%)	
Intraventricular Haemorrhage			
Yes (n=10)	10 (5.3 %)	NIL (00 %)	0.108
No (n = 227)	180 (94.7 %)	47 (100%)	

DISCUSSION

This retrospective cohort study evaluated the survival and short-term morbidity outcomes of very low birth weight (VLBW) newborns admitted to Recep Tayyip Erdogan Hospital Muzaffar Garh. A total of 237 VLBW newborns were included, with an overall survival rate of 80.2% and mortality rate of 19.8%, so the findings indicate encouraging progress in neonatal intensive care services in our setting despite the resource limitations commonly faced in low and middle income countries [11,12].

The survival rate observed in our study is comparable to some recent international reports but remains lower than figures from developed countries, such as Kresnawati et al [13] reported improved outcomes among VLBW infants in a resource limited setting following advancement in neonatal care practices [13]. Similarly, Jia et al [14] in a multicenter Chinese cohort reported progressive survival improvement among extremely low birth weight infants over recent years, largely attributed to specialized neonatal services [14], whereas, survival rates above 85% have been reported in high income countries where access to surfactant therapy, invasive ventilation, parenteral nutrition and advanced monitoring is more readily available [15]. Our relatively favorable survival rate may reflect better implementation of CPAP support, infection control measures and improved early stabilization practices.

Male neonates had significantly higher mortality than females (p=0.015). This finding is consistent with recent evidence suggesting a biological “male disadvantage” among preterm infants. Shin et al [16] found male sex to be independently associated with refractory respiratory distress syndrome and poorer neonatal outcomes among VLBW infants while delayed pulmonary maturation, increased inflammatory response and greater vulnerability to respiratory failure may explain this association.

Gestational age below 30 weeks was associated with higher mortality in our cohort, although statistical significance was not reached (p=0.114) while numerous studies have shown that lower gestational age remains one of the strongest predictors of death among VLBW infants due to organ immaturity, temperature instability, feeding intolerance and respiratory complications [17,18] while lack of significance in our study may be related to sample size or overlapping clinical severity across gestational age groups.

Primiparity showed a strong association with neonatal mortality ($p<0.001$). First pregnancies may carry higher risks of preterm labor, inadequate antenatal surveillance, hypertensive disorders and delayed recognition of obstetric complications. Similar associations between maternal obstetric factors and adverse neonatal outcomes have been documented in recent cohort studies [19] that highlights the need for enhanced antenatal counseling and closer monitoring of primigravida mothers carrying high-risk pregnancies.
Multiple gestation pregnancies were also significantly associated with mortality ($p<0.001$) that are well known to predispose to prematurity, fetal growth restriction and complicated deliveries. Recent neonatal studies continue to demonstrate poorer outcomes in multiple gestation VLBW infants because of combined effects of low gestational age and perinatal compromise [20] and hence these pregnancies require specialized obstetric and neonatal preparedness.
Premature rupture of membranes (PROM) was significantly associated with mortality in our study ($p=0.021$) which increases the risk of ascending infection, chorioamnionitis, preterm delivery and early neonatal sepsis [21]. Maternal malnutrition was another significant predictor ($p=0.015$), reflecting the close relationship between maternal nutritional status, placental health, fetal growth and neonatal resilience [22]. In developing countries, maternal malnutrition remains a modifiable determinant of poor neonatal outcomes.
Respiratory distress syndrome (RDS) was the most frequent morbidity, affecting 22.8% of newborns which is lower than some large neonatal network reports where RDS prevalence exceeds 50% among VLBW infants, likely due to differences in diagnostic criteria, gestational age distribution and use of antenatal corticosteroids [16, 23]. Although RDS was common in our study, its association with mortality was not statistically significant ($p=0.374$), suggesting that available respiratory support measures may have mitigated fatal outcomes.
Sepsis occurred in 16.9% of infants and was significantly associated with mortality ($p=0.028$) and this finding aligns with recent studies identifying infection as one of the leading preventable causes of death in VLBW neonates. Zeigler et al [24] emphasized that late-onset sepsis markedly increases mortality risk and organ dysfunction in VLBW infants while Strengthening hand hygiene, aseptic catheter care, early cultures and rational antibiotic use are therefore essential priorities.
Necrotizing enterocolitis (NEC) was identified in 6.3% of newborns and showed a strong association with mortality ($p<0.001$), similarly Mara et al [25] reported NEC incidence between 3% and 5% in large contemporary VLBW cohorts, with substantially higher mortality in surgical NEC cases [25] and our findings confirm that NEC remains one of the most dangerous complications in premature neonates. Breast milk feeding, cautious feed advancement, probiotic protocols where appropriate, and early recognition may reduce disease burden.
Intraventricular hemorrhage (IVH) was present in 4.2% of cases and no deaths were documented among infants with IVH and the relationship with mortality was not statistically significant ($p=0.108$) which contrasts with larger national datasets where IVH has been associated with adverse neurodevelopmental outcomes and higher long term morbidity. Park et al [9] reported persistent developmental concerns among VLBW infants with IVH, particularly severe grades requiring surgical intervention. The low IVH frequency in our study may reflect underdiagnosis, smaller sample size, or predominance of milder grades.
Socioeconomic status and residential background were not significantly associated with mortality in our cohort and most enrolled families belonged to poor socioeconomic groups and rural areas which may limit the ability to detect group differences. Nevertheless, poverty and rural residence remain important indirect determinants through delayed referral, poor antenatal access and transportation barriers in Pakistan [10] .
The findings of this study carry important clinical implications. Improving antenatal corticosteroid coverage, maternal nutrition, referral systems, infection prevention practices, thermal care, human milk feeding and timely respiratory support may further improve VLBW survival in our population and focused management of NEC and sepsis can particularly reduce avoidable mortality [13, 24,25].

CONCLUSION

Our study demonstrated a high survival rate among VLBW newborns admitted to our institution. Mortality was significantly associated with male gender, primiparity, multiple gestation, PROM, maternal malnutrition, sepsis and NEC. Continued strengthening of perinatal and neonatal intensive care services is essential to further improve outcomes in this highly vulnerable population.

Limitations of the study; It was retrospective and single-centered in design, relying on record completeness. Important variables such as antenatal steroid exposure, Apgar scores, duration of ventilation, surfactant administration and long-term neurodevelopment were not studied while multicenter prospective studies are recommended to better characterize determinants of survival in Pakistan in these very low birth weight newborns

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