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ORIGINAL RESEARCH

Assessment of growth and neurodevelopmental outcomes of very low birth weight infants

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ABSTRACT

Background: The survival rates of very preterm and low birth weight (BW) infants have significantly improved as a consequence of recent advancements in perinatal and neonatal intensive care. The present study was conducted to assess growth and neurodevelopmental outcomes of very low birth weight infants. **Materials & Methods:** 82 women who had a gestational age of ≥37 weeks were selected. Birth weight was categorized as LBW< 2500 g (group I), normal birth weight 2500–3999 g (group II), and large birth weight ≥4000 g (group III). Perinatal factors such as type of delivery, pregnancy-induced hypertension, gestational diabetes (GDM), hypertension and diabetes mellitus (DM) diagnosed before pregnancy were recorded. **Results:** In group I, II and III, mean age (years) was 32.1, 31.4 and 31.6. The mean birth weight (kg) was 2.7, 3.5 and 4.3, pregestational diabetes (%) was seen in 1.6%, 1.1% and 2.5%, gestational diabetes was seen in 7.6%, 6.2% and 10.7%, pregnancy HTN was seen in 5.4%, 1.2% and 1.0% and cesarean section was seen in 46.5%, 36.2% and 50.6% respectively. The difference was significant (P< 0.05). In group I, group II and group III, any developmental delay was seen in 4.7%, 3.2% and 3.9%. Autism spectrum disorder was seen in 1.6%, 0.42% and 0.71%. Motor developmental delay was seen in 2.7%, 1.2% and 1.5%. Cognitive developmental delay was seen in 2.5%, 1.9% and 2.4%. ADHD was seen in 1.05%, 0.81% and 0.93%. Epileptic and febrile seizures was seen in 12.6%, 10.2% and 9.7% respectively. The difference was significant (P< 0.05). **Conclusion:** Compared to children with normal and big birth weights, children born with term low birth weight (LBW) were more susceptible to neurodevelopmental problems at the age of 5-7. This study provides more evidence in favor of parents receiving counseling regarding the long-term consequences of underweight births.

Keywords: low birth weight, preterm, neurodevelopmental

INTRODUCTION

The survival rates of very preterm and low birth weight (BW) infants have significantly improved as a consequence of recent advancements in perinatal and neonatal intensive care.[1] Infants born at the limit of viability, or with a birth weight less than 500 grams, or at 22–23 weeks gestation, have shown the greatest advances in these areas. Improving these high-risk newborns' long-term outcomes is the main objective of their admission to the neonatal intensive care unit (NICU), in addition to ensuring their survival.[2]

Birth weight is a major determinant of newborn health policy since it shows the health of the infant. The World Health Organization defines small for gestational age (SGA) as estimated fetal weight or birthweight below the 10th percentile for gestational age, and low birth weight (LBW) as a birth weight of less than 2500 g, regardless of gestational age.[3,4] Over 20 million babies globally are thought to be affected by LBW. In low- and middle-income nations, the prevalence of LBW varies and can range between 2.3–30%. Follow-up evaluations of neurodevelopmental outcomes included cognitive, neurosensory, and neurological deficits.[5] These conditions necessitate long-term assistance and interventions because they have a significant long-term impact on children and their families. It is necessary to inform parents about potential long-term disabilities for their children.[6] The present study was conducted to assess growth and neurodevelopmental outcomes of very low birth weight infants.

MATERIALS & METHODS

The present study was conducted on 82 women who had a gestational age of ≥37 weeks. All were informed regarding the study and their written consent was obtained.

Data such as name, age, etc. was recorded. Birth weight was categorized as LBW< 2500 g (group I), normal birth weight 2500–3999 g (group II), and large

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birth weight ≥4000 g (group III). Perinatal factors such as type of delivery, pregnancy-induced hypertension, gestational diabetes (GDM), hypertension and diabetes mellitus (DM) diagnosed before pregnancy were recorded. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Pre-pregnancy and pregnancy characteristics

Parameters	Group I (20)	Group II (32)	Group III (30)	P value
Age (years)	32.1	31.4	31.6	0.05
Birth weight (kg)	2.7	3.5	4.3	0.03
Pregestational diabetes (%)	1.6	1.1	2.5	0.02
Gestational diabetes (%)	7.6	6.2	10.7	0.01
Pregnancy HTN (%)	5.4	1.2	1.0	0.01
Cesarean section (%)	46.5	36.2	50.6	0.04

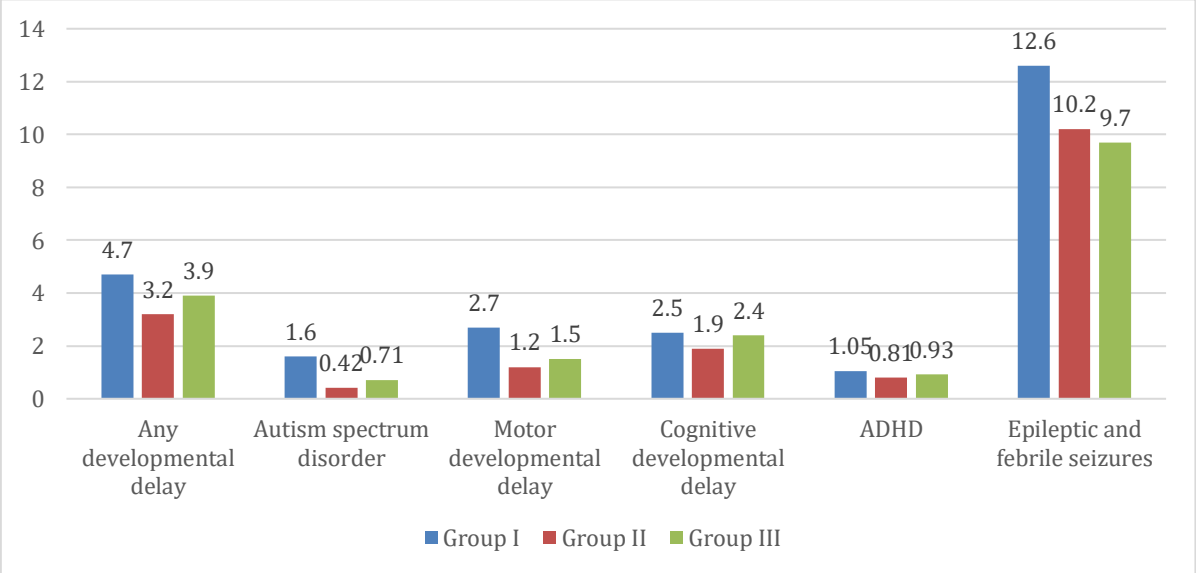
Table I shows that in group I, II and III, mean age (years) was 32.1, 31.4 and 31.6. The mean birth weight (kg) was 2.7, 3.5 and 4.3, pregestational diabetes (%) was seen in 1.6%, 1.1% and 2.5%, gestational diabetes was seen in 7.6%, 6.2% and 10.7%, pregnancy HTN was seen in 5.4%, 1.2% and 1.0% and cesarean section was seen in 46.5%, 36.2% and 50.6% respectively. The difference was significant (P< 0.05).

Table II Assessment of neurodevelopmental outcome of LBW

Parameters	Group I	Group II	Group III	P value
Any developmental delay	4.7	3.2	3.9	0.05
Autism spectrum disorder	1.6	0.42	0.71	0.02
Motor developmental delay	2.7	1.2	1.5	0.04
Cognitive developmental delay	2.5	1.9	2.4	0.03
ADHD	1.05	0.81	0.93	0.01
Epileptic and febrile seizures	12.6	10.2	9.7	0.05

Table II shows that in group I, group II and group III, any developmental delay was seen in 4.7%, 3.2% and 3.9%. Autism spectrum disorder was seen in 1.6%, 0.42% and 0.71%. Motor developmental delay was seen in 2.7%, 1.2% and 1.5%. Cognitive developmental delay was seen in 2.5%, 1.9% and 2.4%. ADHD was seen in 1.05%, 0.81% and 0.93%. Epileptic and febrile seizures was seen in 12.6%, 10.2% and 9.7% respectively. The difference was significant (P< 0.05).

Graph I Assessment of neurodevelopmental outcome of LBW



DISCUSSION

LBW increases the risk of developmental problems, general health, and newborn morbidity and mortality.[7] Though research on LBW children born at term has concentrated on IQ, learning, and behavior, earlier studies have mostly focused on the effects of LBW owing to premature birth, suggesting that prematurity itself is a primary cause of developmental issues.[8,9] Furthermore, children's age at assessment, outcome variables, and the definitions of small for gestational age (SGA) and prenatal growth restriction were varied with or without differences in cognitive and learning

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capacities, as well as the occurrence of attention issues. In this regard, the Asian population has not been the focus of many studies.[10] The present study was conducted to assess growth and neurodevelopmental outcomes of very low birth weight infants.

We found that in group I, II and III, mean age (years) was 32.1, 31.4 and 31.6. The mean birth weight (kg) was 2.7, 3.5 and 4.3, pregestational diabetes (%) was seen in 1.6%, 1.1% and 2.5%, gestational diabetes was seen in 7.6%, 6.2% and 10.7%, pregnancy HTN was seen in 5.4%, 1.2% and 1.0% and cesarean section was seen in 46.5%, 36.2% and 50.6% respectively. Kim et al[11] examined how term LBW affects the neurodevelopmental outcomes of children aged 5-7 in the short and long term as a neonate. 31,700 (3.8%) of the 830,806 women who gave birth during the study period had babies that weighed less than 2,500 grams. Children with LBW who were 5–7 years old were linked to attention deficit hyperactivity disorders, autistic spectrum, motor developmental delay, cognitive developmental delay, epilepsy, and febrile seizures. Compared to children with normal and big birth weights, those born with term low birth weight (LBW) were more susceptible to neurodevelopmental problems at the age of 5-7.

We found that in group I, group II and group III, any developmental delay was seen in 4.7%, 3.2% and 3.9%. Autism spectrum disorder was seen in 1.6%, 0.42% and 0.71%. Motor developmental delay was seen in 2.7%, 1.2% and 1.5%. Cognitive developmental delay was seen in 2.5%, 1.9% and 2.4%. ADHD was seen in 1.05%, 0.81% and 0.93%. Epileptic and febrile seizures was seen in 12.6%, 10.2% and 9.7% respectively. Gupta et al[12] assessed the growth and neurodevelopmental outcome of very low birth weight (VLBW) infants at corrected age of one year. The mean (SD) z-scores at one-year for weight for age, length for age and head circumference were -2.1 (1.1), -1.4 (1.03) and -2.2 (1.2), respectively. The mean (SD) DASII motor and mental scores were 90.8 (13.4) and 96.5 (13.2), respectively. Major and minor developmental abnormalities were noted in 9.4% and 18.2%, infants, respectively. Cerebral palsy was noted in 5.8% infants.

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that compared to children with normal and big birth weights, children born with term low birth weight (LBW) were more susceptible to neurodevelopmental problems at the age of 5-7. This study provides more evidence in favor of parents receiving counseling regarding the long-term consequences of underweight births.

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