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## **Original Research**

# **Placental Weight and Risk of Neonatal Death**

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### ABSTRACT

**Background:** The placenta plays a crucial role in fetal growth, and babies born small for their gestational age are at a higher risk of infant mortality. The present study was conducted to assess placental weight and risk of neonatal death. **Materials & Methods:** 150 children of both genders were grouped based on placental weight (in grams) into quartiles within 2-week intervals of gestational age at birth. The associations of low (first quartile) and high (fourth quartile) placental weight with neonatal death were estimated as crude and adjusted odds ratios (aOR) with 95% confidence intervals.

**Results:**Out of 150 children, 80 were boys and 70 were girls.15 died during the neonatal period. Among the preterm born infants, high (aOR, 2.31; 95% CI, 1.63-3.27) and low placental weight (aOR, 1.56; 95% CI, 1.05-2.32) increased the risk of neonatal death. High placental weight relative to birth weight increased the risk of neonatal death among preterm-born children (aOR, 1.94; 95% CI, 1.40-2.70). Among the infants born at term, placental weight was not associated with neonatal death.

**Conclusion:** Neonatal mortality risk was elevated for preterm infants with both high and low placental weight. **Keywords:** neonatal death, placenta, children

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#### Introduction

The placenta plays a crucial role in fetal growth, and babies born small for their gestational age are at a higher risk of infant mortality.<sup>1</sup> This knowledge indicates that there may be a connection between placental factors and infant mortality, especially in cases of death shortly after birth. In the past, there has been a connection established between low placental weight and a heightened risk of fetal death, as well as cases of infant cerebral palsy.<sup>2</sup> In contrast, among children born preterm, the risks increased with both high placental weight and high placental weight in relation to birth weight. The earlier results imply that there could be a link between placental weight and neonatal mortality, with this connection potentially varying according to the gestational age at birth.<sup>3</sup>

Birth weight is a widely recognized indicator of

fetal growth and is closely linked to the overall health and survival of the newborn.<sup>4</sup> Low birth weight (LBW), defined as a birth weight of less than 2,500 grams, is a significant public health concern, as it is associated with an increased risk of perinatal morbidity and mortality, as well as long-term adverse consequences, such as impaired growth and neurodevelopmental delays.<sup>5,6</sup>

The weight of the placenta is affected by a range of factors, such as maternal attributes (age, parity, nutritional status, and existing health issues), fetal characteristics (gestational age, genetic influences, and patterns of fetal growth), and environmental factors (altitude, pollutants, and toxins).<sup>7</sup> In a comparable fashion, birth weight is affected by numerous elements, including maternal health, gestational age, fetal genetics, and placental function.<sup>8</sup>The present study was conducted to assess

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placental weight and risk of neonatal death.

#### **Materials & Methods**

The study was carried out on 150 children of both genders. All gave their written consent to participate in the study.

Data such as name, age, gender etc. was recorded. We grouped the distribution of placental weight (in grams) into quartiles within 2-week intervals of

gestational age at birth. The associations of low (first quartile) and high (fourth quartile) placental weight with neonatal death were estimated as crude and adjusted odds ratios (aOR) with 95% confidence intervals.

Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

#### Results

Table: I. Distribution of	of	children
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Total-150								
Gender	Boys	Girls						
Number	80	70						

Table I shows that out of 150 children, 80 were boys and 70 were girls.

				1 abit. 11	. Ju	Noonot	al Death	iatai Deati	1			
Neonatal Death												
Placental weight Birth weight Placental to Birth Weight Ratio												
	Yes	No	Crude	Adjuste	Yе	No	Crude	Adjusted	Yе	No	Crude	Adjusted
				d	S				S			
GestationalAge,29-36weeks(100)												
First	4	34	1.45	1.56	3	35	1.14	1.29	4	35	0.79	0.78
			(0.98-	(1.05-			(0.78-	(0.87-			(0.51-	(0.51 - 1.21)
			2.16)	2.32)			1.67)	1.90)			1.21)	
Second	5	36	1[Referen	1	6	35	1[Referen	1[Referen	6	37	1[Referen	1[Referenc
tothird			ce]	[Referen			ce]	ce]			ce]	e]
				ce]								
Fourth	6	15	2.38	2.31	7	16	1.45	1.38	5	14	1.94	1.94
			(1.69-	(1.63-			(1.03-	(0.97-			(1.39-	(1.40-2.70)
			3.36)	3.27)			2.06)	1.97)			2.69)	
GestationalAge,37-42wk(50)												
First	7	15	1.18	1.18	8	14	1.95	1.90	7	15	1.07	1.09
			(0.91-	(0.90-			(1.51-	(1.47-			(0.82-	(0.83-1.43)
			1.54)	1.53)			2.52)	2.45)			1.41)	
Second	3	10	1[Referen	1	3	10	1[Referen	1[Referen		11	1[Referen	1[Referenc
tothird			ce]	[Referen			ce]	ce]	4		ce]	e]
				ce]								
Fourth	5	10	1.03	1.03	4	11	1.42	1.43	4	9	1.23	1.20
			(0.78-	(0.78-			(1.07-	(1.08-			(0.96-	(0.93-1.56)
			1.35)	1.35)			1.87)	1.90)			1.59)	

Tables II Odda Dation of Neonatal Death

Table II shows that 15 died during the neonatal period. Among the preterm born infants, high (aOR, 2.31; 95% CI, 1.63-3.27) and low placental weight (aOR, 1.56; 95% CI, 1.05-2.32) increased the risk of neonatal death. High placental weight relative to birth weight increased the risk of neonatal death among preterm-born children (aOR, 1.94; 95% CI, 1.40-2.70). Among the infants born at term, placental weight was not associated with neonatal death.

#### Discussion

Understanding the correlation between placental weight and birth weight, as well as their respective associations with perinatal outcomes, can provide valuable insights into fetal growth patterns, placental adaptations, and potential risk factors for adverse

perinatal events.9,10This knowledge may inform clinical decision-making, risk stratification, and the development of interventions aimed at optimizing placental function and fetal growth.<sup>11</sup>The present study was conducted to assess placental weight and risk of neonatal death.

We found that out of 150 children, 80 were boys and 70 were girls.Dypvik J et al<sup>12</sup> found that in total, 467 of the 38 229 infants with congenital malformations (1.22%) died during the neonatal period. Among the preterm-born infants, the associations of placental weight with neonatal death displayed similar patterns as for infants without congenital malformation. However, in term-born infants with congenital malformations, low placental weight increased the risk of neonatal death (aOR, 1.96; 95% CI, 1.48-2.60).

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Although the placental weight was low among the infants who died, birth weight was relatively lower. Thus, high placental weight relative to birth weight increased the risk of neonatal death in term-born infants with congenital malformations (aOR ,1.82; 95% CI, 1.37-2.41).

We found that 15 died during the neonatal period. Among the preterm born infants, high (aOR, 2.31; 95% CI, 1.63-3.27) and low placental weight (aOR, 1.56; 95% CI, 1.05-2.32) increased the risk of neonatal death. High placental weight relative to birth weight increased the risk of neonatal death among preterm-born children (aOR, 1.94; 95% CI, 1.40-2.70). Among the infants born at term, placental weight was not associated with neonatal death.Baer RJ et al<sup>13</sup> examined the effect of small or large for gestational age (SGA/LGA) status on mortality and morbidity by gestational age.Logistic binomial regression was used to calculate relative risks (RRs) and 95% confidence intervals for infant mortality and preterm morbidities for SGA or LGA compared with appropriately grown (AGA) deliveries stratified by gestational age group.Compared with AGA infants of similar gestational age, SGA infants were at increased risk for infant mortality. Mortality risk was decreased for LGA infants born between 25 and 27 weeks (RR: 0.6) but increased for LGA infants born between 28 and 31 weeks (RR: 1.9). Risk of preterm morbidity was increased for SGA infants born between 28 and 38 weeks, but decreased for LGA infants born before 37 weeks. This study demonstrates the importance of considering birth weight for gestational age when evaluating morbidity and mortality risks.

The shortcoming of the study is small sample size.

#### Conclusion

Authors found that neonatal mortality risk was elevated for preterm infants with both high and low placental weight.

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