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Original Research Article

COMPARISON OF IMMEDIATE NEONATAL OUTCOME OF LOW BIRTH WEIGHT BABIES IN NORMAL VAGINAL DELIVERY VERSUS CESAREAN SECTION

Geeta Choudhari[1], Sana Farheen Z Magi[2]

[1,2]Department of Obstetrics & Gynaecology, Al Ameen Medical College, Vijayapura, Karnataka, India

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Corresponding Author:
Dr. Geeta Choudhari,
Email: geetachoudhari215@gmail.com

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Abstract

Background: Low birth weight infants have higher rates of morbidity and mortality because of their physiologic and metabolic immaturity, they are more susceptible to hypoglycemia, jaundice, infection, and re-hospitalization and it Is the biggest problems in maternal and child health in poor nations. The studies comparing the perinatal outcome of low birth weight infants delivered either vaginally and by caesarean section are scant. **Materials and Methods:** In this prospective cross-sectional comparative study, department of Obstetrics and Gynaecology, Al Ameen Medical College and Hospital from April 2021 to December 2022. The study population consisted of 2 groups of 100 women each who had delivered vaginally and through a caesarean section with vertex presentation babies with a birth weight less than 2.5kg. **Result:** The mean age of caesarean group was 22.59 years and 22.47 years in vaginal delivery group. The birth weight of children born to mothers of 85.0% of the cases in caesarean section and 92.0% of the vaginal delivery had birth weight of 2.1 – 2.5 kgs with mean birth weight of 2.26kg to 2.3 kg respectively. The intrauterine growth retardation was present in 48.0% of the cases in caesarean section and 38.0% of the cases in vaginal delivery group. NICU admission was needed for 59 % of infants with cesarian section and only 41% of infants with vaginal delivery needed NICU admission. The neonatal sepsis was present in 15.0% of the cases in caesarean section cases and 10.0% of the cases in vaginal delivery cases. The respiratory system disorders were present in 30.0% of the caesarean section cases and 20.0% of the vaginal delivery cases. IVH was not present in cases of caesarean section cases and present in 2.0% of the cases of vaginal delivery. NEC was present in 9.0% of the cases of caesarean section and 6.0% of the cases of vaginal delivery. Hyperbilirubinemia was present in 35.0% of the caesarean section cases and 30.0% of the vaginal delivery cases. The duration of stay in NICU was less than 5 days in 70.0% of the caesarean section cases and 50.0% of the vaginal delivery cases. The mean stay in NICU was 2.81 days in caesarean section cases and 2.4 days in vaginal delivery cases. Mortality was present in 4.0% of the caesarean section cases and 5.0% of the vaginal delivery cases .RDS was main cause for the death in 50.0% of the caesarean section cases and 40.0% of the vaginal delivery cases had IVH. **Conclusion:** Outcome of both modes of deliveries were same, but number of NICU admissions and duration of NICU stay were comparatively more in infants delivered by cessarian section.

INTRODUCTION

The UNICEF-WHO low birth weight estimate reports present new global, regional and national estimates of low birth weight, these show that 1 in 7 babies worldwide- that is more than 20 million babies are born with low birth weight.[1] Low birth weight babies are at a higher risk of perinatal and neonatal mortality and morbidity, and also various growth and development complications.[1]

Low Birth Weight (LBW) babies are the neonates weighing less than 2500g or 5.5lb at birth. If born before 37 weeks of gestation, they are called as preterm, or are otherwise called small for gestational age (SGA) or can also be due to intrauterine growth restriction (IUGR).[2]

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Low birth weight is caused by either preterm birth (birth before 37 weeks of gestation) or intrauterine growth restriction (IUGR). The later condition is similar to malnutrition and can affect both term and preterm infants. Neonates with IUGR are generally malnourished, undersized, and thus have a low birth weight. This category includes two-thirds of Low birth weight neonates born in India.3[3]nts worldwide representing 15.5% of all births born with low birth weight, 95.6% are born in developing countries.[4,5] The prevalence of low birth weight in developing countries (16.5%) is twice that in developed regions (7%). Mortality of LBW babies is 40 times more than the normal weight babies.[6] Infants born with very low weight are more than 100 times more likely to die in the first year of life than are infants of normal birth weight.[7]

The goal is to achieve a 30% reduction of the number of infants born with a weight lower than 2500 g by the year 2025.[8]

Because of their physiologic and metabolic immaturity, LBW infants have higher rates of morbidity and mortality. During their neonatal stage, these neonates are more susceptible to hypoglycaemia, jaundice, infection, and re-hospitalization. One of the biggest problems in maternal and child health in poor nations is LBW.[9]

The biggest challenges for obstetrical and new born care are low birth weight new-borns. Significant perinatal morbidity and mortality are linked to foetal growth limitation. Neonatal hypoglycaemia, hypothermia, meconium aspiration, foetal death, and birth asphyxia are all on the rise, along with the prevalence of aberrant brain development. Both term and preterm infants can experience this. Finally, compared to preterm infants that have grown normally, the risk of long-term death is much higher in preterm growth limited infants.[10]

Fetal growth restriction is frequently caused by placental insufficiency brought on by poor maternal perfusion, placenta ablation, or both. These problems, if they exist, are made worse by work. Due to these factors, a pregnant woman who suspects her foetus may have growth restrictions should have high risk intrapartum monitoring. The best option for the foetus at or near term who is thought to have growth restriction is probably prompt delivery. In fact, if intrauterine growth restriction is evident along with clinically severe oligohydramnios, the majority of clinicians even advise delivery as early as 34 weeks. Vaginal birth may be tried in the presence of a comforting foetal heart rate rhythm. Some of these foetuses cannot tolerate labour, necessitating a caesarean delivery.[11]

The common complications encountered by the low birth weight infants include, hypoglycaemia, Fluid and electrolyte imbalance, nutritional difficulties, hyperbilirubinemia, respiratory distress syndrome and chronic lung disease, patent ductus arteriosus, infections, necrotizing enterocolitis, intraventricular haemorrhage, periventricular leukomalacia, apnea of prematurity and Anemia.[12]

The caesarean section has become common nowadays. In the past ten years, the rate of primary caesarean sections has climbed by 50%, with preeclampsia accounting for 10% of those increases. Although caesarean sections are often performed, there is currently little evidence to support their use in favourable obstetric circumstances and in the absence of serious foetal hemodynamic abnormalities.[13]

Low birth weight babies are not harmed by induction of labour in women with severe preeclampsia, and it seems to be a safe method of delivery. In cases where delivery is required or inevitable, the Caesarean delivery of very premature new-borns and low birth weight infants has been suggested as an obstetric technique to improve neonatal outcomes. There has been a noticeable increase in caesarean deliveries for low birth weight kids and for preterm new-borns, even if the evidence in favour of them is still, at best, shaky.[14]

Hacque et al noted that, overall caesarean delivery rate was 51.6% in very low birth weight cohort. The neonatal mortality was 12.7% in caesarean deliveries compared 14.5% with vaginal deliveries. The incidence of neuro-disability was 46.8% in caesarean section compared to 47.7% in vaginal deliveries.[15]

The studies comparing the perinatal outcome of low birth weight infants delivered either vaginally and by caesarean section are scant. Hence it was decided to undertake this study with the aim of finding the perinatal outcome in low birth weight infants delivered either by caesarean section of vaginal delivery.

MATERIALS AND METHODS

This is a Prospective cross-sectional comparative study between two groups of infants delivered by caesarean section and delivered vaginally with vertex presentation to study the immediate neonatal outcome .Women admitted to the labour ward at Al Ameen Medical College and Hospital, Vijayapura during the study period April 2021to December 2022 with a birth weight of 2.5kgs or less will be included in this study.

Aims and Objectives

- To compare the type of morbidity in low birth weight baby born by vaginal delivery versus caesarean section route
- To compare the mortality, if any between the low birth weight babies delivered by caesarean section and by vaginal delivery.

Inclusion Criteria

Women with a singleton, vertex presenting fetus of 37weeks gestation and more (term delivery).

All babies born with a birth weight of 2.5kgs or less.

Exclusion Criteria

- Malpresentation

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- Gestational age of less than 37weeks
- Multifetal gestation
- Birth weight more than 2.5kg
- Congenital fetal anomalies.

A detailed history taking and clinical examination will be done, using a piloted proforma meeting the objectives of the study by means of personal interview with the patient after taking informed consent. Outcome of route of delivery and immediate outcome of the babies were noted.

Sample Size Calculation

With 95% confidence level and margin of error of ±10%, a sample size of 200 cases, subjects will allow the study to determine the immediate neonatal outcome of 100 low birth weight babies by caesarean section delivery and 100 low birth weight babies by normal vaginal delivery cases was also be taken for the comparison.

By using the formula

$$n = \frac{z^2 p(1-p)}{d^2}$$

where

Z= z statistic at 5% level of significance

d is margin of error

p is anticipated prevalence rate of good neonatal outcome (Sharma SR et al 2015).4

Statistical analysis

Categorical data was represented in the form of frequency and percentage. Association between variables were assessed with Chi Square Test. Fisher's Exact test was applied if the cell values were small. Quantitative data was represented as mean & standard deviation (SD). Comparison of Groups has been done with Unpaired t test. A p value of <0.05 was considered statistically significant. Data was analyzed using SPSS software v.20.0.

Low Birth Weight (LBW) babies are the neonates weighing less than 2500g or 5.5lb at birth.2 Because of their physiologic and metabolic immaturity, LBW infants have higher rates of morbidity and mortality. During their neonatal stage, these neonates are more susceptible to hypoglycaemia, jaundice, infection, and re-hospitalization. One of the biggest problems in maternal and child health in poor nations is LBW.

RESULTS

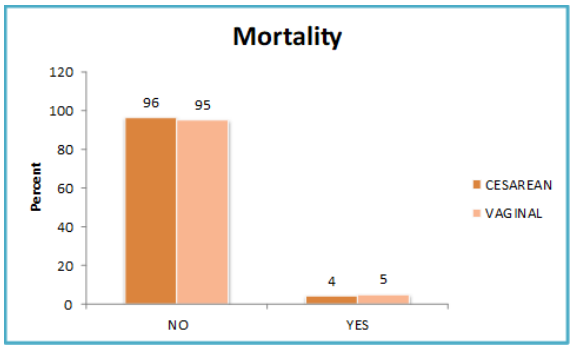

Figure 1: Distribution of the study groups according to mortality

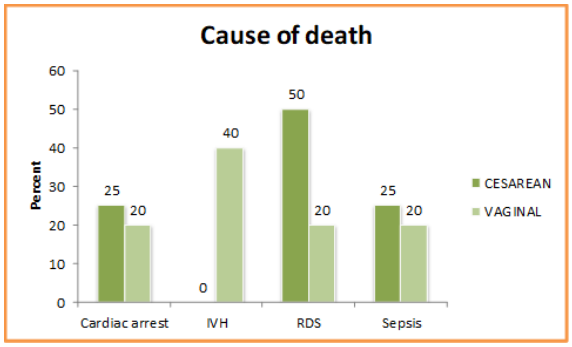

Figure 2: Distribution of the study groups according to cause of death

Table 1: Demographic details.

Characteristic	CESAREAN (N=100)	VAGINAL (N=100)	Total (N=200)	P Value
Mean Age (Years)	22.59 ± 3.39	22.47 ± 3.24		0.798 (Not Significant)
Age Distribution				
Age 20	33	27	60	0.200 (Not Significant)
21-25	47	60	107	
26-30	19	11	30	
> 30	1	2	3	
Gravidity				
Gravida 1	46	51	97	0.786 (Not Significant)
Gravida 2	36	32	68	
Gravida 3	14	15	29	
Gravida 4	3	2	5	
Gravida 5	1	0	1	
Parity				
Primi (First-time Delivery)	46	51	97	0.784 (Not Significant)
Multi (Multiple Deliveries)	54	49	68	
Living Children				
0 Living Children	3	0	3	0.360 (Not Significant)
1 Living Child	28	30	58	
2 Living Children	9	7	16	
3 Living Children	1	1	2	
History of Abortion				
Nil	80	83	163	0.823 (Not Significant)
1 Abortion	15	12	27	
2 Abortions	5	5	10	

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Gestational Age				
37-38 Weeks	49	53	102	0.572 (Not Significant)
39-40 Weeks	51	47	98	
Mean Gestational Age (Weeks)	38.50 ± 1.02	38.37 ± 1.04		0.374 (Not Significant)
Antenatal Events				
No	85	88	173	0.535 (Not Significant)
Yes	15	12	27	
Mode of Delivery				0.001 (Significant)
FTND (Full Term Normal Delivery)	0	95	95	
VBAC (Vaginal Birth After Cesarean)	0	5	5	
LSCS (Cesarean Section)	100	0	100	

Table 2: Morbidity

Variable	CESAREAN (n = 100)	VAGINAL (n = 100)	Total (n = 200)	P Value
Birth Weight Distribution (kg)				
1.5 - 2.0 kg	15	8	23	0.121, Not Sig
2.1 - 2.5 kg	85	92	177	
Mean Birth Weight (kg)	2.26 ± 0.22	2.30 ± 0.17		0.113, Not Sig
IUGR				
No	52	62	114	0.153, Not Sig
Yes	48	38	86	
APGAR at 1 Minute				
≤ 7	31	41	72	0.090, Not Sig
> 7	69	59	128	
APGAR at 5 Minutes				
≤ 7	4	9	13	0.309, Not Sig
> 7	96	91	187	
NICU Admission				0.011, Sig
No	41	59	100	
Yes	59	41	100	
Neonatal Sepsis				0.285, Not Sig
No	85	90	175	
Yes	15	10	25	
Respiratory System Disorders				0.102, Not Sig
No	70	80	150	
Yes	30	20	50	
IVH (Intraventricular Hemorrhage)				0.155, Not Sig
No	100	98	198	
Yes	0	2	2	
NEC (Necrotizing Enterocolitis)				0.421, Not Sig
No	91	94	185	
Yes	9	6	15	
Hyperbilirubinemia				0.450, Not Sig
No	65	70	135	
Yes	35	30	65	
Duration in NICU (Days)				0.011, Sig
≤ 5	40 (70%)	20 (50%)		
6 – 10	14 (25%)	13 (32.5%)		
> 10	3 (5%)	7 (17.5%)		
Mean Duration in NICU (Days)	2.81 ± 3.38	2.40 ± 3.55		0.404, Not Sig

Table 3: Mortality and Cause of Death by Delivery Type

Mortality Status	Cause of Death	Cesarean count	Cesarean %	Vaginal count	Vaginal %	P Value (Mortality)	P Value (Cause of Death)
No Mortality	-	96	-	95	-	0.733, Not Sig	-
Yes Mortality	Cardiac Arrest	1	25%	1	20%	-	0.674, Not Sig
	IVH	0	0%	2	40%	-	-
	RDS	2	50%	1	20%	-	-
	Sepsis	1	25%	1	20%	-	-
Total	-	100	-	100	-	-	-

DISCUSSION

The biggest challenges for obstetrical and newborn care are low birth weight newborns. Significant perinatal morbidity and mortality are linked to foetal growth limitation.

In this study, patients admitted to the labour ward of OBG department of Al Ameen Medical College and Hospital from April 2021 to December 2022; excluding those who had any one of the exclusion criteria of the study.

The study population consisted of 2 groups of 100 women each who had delivered vaginally vertex

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presenting babies of birth weight less than 2.5kg and 100 women who had delivered through a caesarean section - vertex presenting babies with a birth weight less than 2.5kg.

Age

The mean age of caesarean group was 22.59 years and 22.47 years in vaginal delivery group which was statistically significant. About 47.0% of the cases in caesarean group and 60.0% of the cases in vaginal delivery group were aged between 21 – 25 years. A study by Racusin et al reported that, the median age of vaginal delivery cases was 29.2 years and caesarean delivery cases was 29.9 years.[16]

Gravidity

About 46.0% of the cases in caesarean group and 51.0% in vaginal delivery group were primigravidae which was not statistically significant.

Parity

About 51.0% of the cases in vaginal delivery group were primipara and 54.0% in caesarean group were multi para. A study by Racusin et al had noted that, about 24.7% of the vaginal delivery cases and 27.8% of the caesarean delivery cases were nulliparous.16 A study by Kardum et al had noted that, about 14.9% in vaginal delivered group and 27.0% in cesarean group were multi para.[17]

Living children

About 28.0% of the cases in caesarean group and 30.0% in vaginal delivery group had 1 living child.

Abortion

About 15.0% of the cases in caesarean group and 12.0% in vaginal delivery group had one abortion which was not statistically significant.

Gestational Age

About 53.0% of the cases in vaginal delivery group had gestational age of 37 – 38 weeks and 51.0% of the cases in vaginal delivery group had gestational age of 39 – 40 weeks. The mean gestational age in caesarean group was 38.5 years and in vaginal delivery group was 38.37 years. A study by Racusin et al noted that, the gestational age of 86.4% of women in vaginal delivery and 70.9% in the caesarean delivery was between 33 – 36 weeks.16 A study by AlQurashi et al reported that, the mean gestational age in caesarean section cases was 28.3 weeks and 29.02 weeks in cases with vaginal delivery.[18] A study by Kardum et al had noted that, the median gestational age in cases with vaginal delivery was 27 weeks and caesarean section was 28 weeks.[17]

Antenatal events

About 15.0% of the cases in caesarean group and 12.0% in the vaginal delivery group had antenatal events which was not statistically significant.

Mode of delivery

About 95.0% of the cases in vaginal delivery group had FTND and 5.0% had VBAC. A study by AlQurashi et al had noted that, 53.0% of the cases underwent caesarean section and 47.0% had normal vaginal delivery.[18]

Birth Weight

The birth weight of children born to mothers of 85.0% of the cases in caesarean section and 92.0% of the vaginal delivery had birth weight of 2.1 – 2.5 kgs. The mean birth weight in cases with caesarean section was 2.26 kgs and vaginal delivery was 2.3 kgs. A study by Mechlor et al had noted that, the mean birth weight of infants delivered by caesarean section was 1120 gms and by vaginal delivery was 1029 gms.19 A study by AlQurashi et al noted that, the mean birth weight was 1100 gms in caesarean cases and 1010 gms in vaginal delivery cases. About 55.39% of the babies born to caesarean section cases and 44.6% of vaginal delivery cases had birth weight between 801 – 1000 gms.18 A study by Kardum et al had noted that, the median 5-minute APGAR score in vaginally delivered babies was 6 and in cesarean section cases was 7.[17]

IUGR

The intrauterine growth retardation was present in 48.0% of the cases in caesarean section and 38.0% of the cases in vaginal delivery group and it was not statistically significant.

APGAR score

The APGAR score was less than 7 in 31.0% of the cases in caesarean section and 41.0% of the vaginal delivery was present in 41.0% of the cases which was statistically not significant. The APGAR score at 5 minutes was less than equal to 7 in 4.0% of the caesarean cases and 9.0% of the vaginal delivery cases which was significant between the two groups. A study by Mechlor et al had noted no significant difference in the APGAR scores of infants delivered either by caesarean section and vaginally.[19]

NICU Admission

The NICU admission was not present in 59.0% of the vaginal delivery cases and present in 59.0% of the caesarean cases.

Neonatal Sepsis

The neonatal sepsis was present in 15.0% of the cases in caesarean section cases and 10.0% of the cases in vaginal delivery cases. This difference was not statistically significant between the two cases. A study by Kardum et al noted that, late onset sepsis as present in 63.3% of the vaginal delivery cases and 50.9% of the cesarean section cases.[17]

Respiratory System Disorders

The respiratory system disorders were present in 30.0% of the caesarean section cases and 20.0% of the vaginal delivery cases. This difference was not statistically significant between the two groups.

IVH

IVH was not present in cases of caesarean section cases and present in 2.0% of the cases of vaginal delivery. This difference was not statistically significant between the two groups. A study by Malloy et al had noted that, the incidence of IVH was significantly lower in infants born by caesarean than in those born vaginally in 1251 – 1500 gms birth weight interval.20 A study by Kardum et al had noted that, intraventricular hemorrhage was

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present in 25.0% of the vaginal delivery cases and 18.0% of the caesarean delivery cases.[17]

NEC

NEC was present in 9.0% of the cases of caesarean section and 6.0% of the cases of vaginal delivery. This difference was not statistically significant between the two groups. A study by Racusin et al had noted that, about 14.0% of the neonates with NEC in vaginal delivery and caesarean delivery groups had birth weight of < 750 gms.16 A study by Kardum et al noted that, 57.1% of the infants born by vaginal route and 36.4% of the cesareaninfanst had necrotizing enterocolitis.[17]

Hyperbilirubinemia

Hyperbilirubinemia was present in 35.0% of the caesarean section cases and 30.0% of the vaginal delivery cases which was not statistically significant.

Duration of stay in NICU

The duration of stay in NICU was less than 5 days in 70.0% of the caesarean section cases and 50.0% of the vaginal delivery cases which was statistically significant. The mean stay in NICU was 2.81 days in caesarean section cases and 2.4 days in vaginal delivery cases which was not statistically significant between the two groups.

Mortality

Mortality was present in 4.0% of the caesarean section cases and 5.0% of the vaginal delivery cases. This difference was not statistically significant between the two groups. A study by Mechlor et al noted no significant difference in mortality between the infants delivered ether by caesarean section and vaginal delivery.19 A study by Racusin et al had noted that, death was present in 14.0% of neonates with birth weight of less than 500 gms.16 A study by Malloy et al had noted that, the neonatal death rate was 53.1% for infants weighing 501 – 750 gms delivered by cesarean compared to 64.3% for vaginally born infants.20 A study by Kardum et al noted that, 33.3% o infant died within 7 days in vaginal delivery group and 14.8% of the cesarean section cases.[17]

RDS

RDS was main cause for the death in 50.0% of the caesarean section cases and 40.0% of the vaginal delivery cases had IVH. This difference was not statistically significant between the two groups. A study by Racusin et al noted that, about 57.0% of the neonates in vaginal delivery group and 29.0% in caesarean group with birth weight of less than 750 gms had RDS.16 A study by Kardum et al noted that, 84.1% of the neonates in vaginal delivery and 76.4% in cesarean group had RDS.[17]

CONCLUSION

No changes in outcome were observed in infants delivered by either vaginally or through cessarian section

While more number of admissions in NICU were seen in infants delivered through cessarian section and duration of NICU stay were comparatively more in infants delivered through cessarian section.

While observed mortality in both groups were almost same.

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