



A Study of Comparison of Maternal and Neonatal Outcomes in Women Undergoing Elective Caesarean Section between 37-38 Weeks 6 Days and 39-40 Weeks

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ABSTRACT

INTRODUCTION

In this study, we wanted to assess the incidence of maternal and neonatal complications (including respiratory and non-respiratory complications) in women undergoing scheduled CS between 37-38+6 weeks and 39-40 weeks.

Material and methods

All Pregnant women admitted to a tertiary care centre with term singleton pregnancy with gestational age >37 weeks posted for elective LSCS were included in the study after satisfying inclusion and exclusion criteria. A total of 140 singleton term pregnant women were taken into

consideration. In that a total of 70 women were taken into each group undergoing elective caesarean section between 37-38 weeks 6days and 39-40 weeks of gestation.

RESULTS

Among 70 pregnant women who underwent LSCS between 37-38 weeks 6days, 14 neonates had respiratory complications and 24 neonates had non-respiratory complications. Among those who underwent LSCS after 39 weeks, 4 neonates had respiratory complications. There was no significant difference in maternal outcomes between the two groups.

CONCLUSIONS

According to our study findings, scheduled CS delivery between 37 and 38 weeks and 6days was associated with a higher rate of NICU admission, TTN, RDS and hyperbilirubinemia in comparison with scheduled CS performed after 39 gestational weeks.

KEY WORDS

Elective LSCS, gestational age, maternal outcomes, neonatal outcomes.

INTRODUCTION

Caesarean delivery is a common surgical procedure in modern obstetrics. Since the caesarean section is a major surgery, it is analogous with increased maternal and perinatal complications and has implications on future pregnancies as well.¹⁻⁴ It can be performed as an elective or emergency procedure depending on maternal and foetal conditions.⁵ Out of which incidence of

elective LSCS is increasing because of various factors like a maternal request for LSCS, pregnant women with previous LSCS refusing VBAC etc.

Preterm birth is defined by the World Health Organisation (WHO) as “Delivery before 37 completed weeks of gestation i.e., less than 259 days.”⁶ Despite the attention being paid with respect to gestational age by obstetric means, there is an increased requirement to assess foetal and infant maturity by other methods. When there is uncertainty about foetal gestational age or it is unknown, there is an increased need for assessment of foetal maturity. In preterm infants, the detrimental factors for their survival, risk of complications, health sequelae and the neurodevelopmental outcomes are directly proportional to the infant degree of maturation at birth. Foetal maturity is highly influential on the number of complications, long term health of neonates and neuronal development.⁷

Over the last few decades, studies have stated 37 completed gestational weeks as term pregnancy.⁸ However, there is a decreased risk of respiratory complications of neonates if the pregnancy is beyond 39 gestational weeks. With pre-term births, there is a disruption in the normal in-utero lung development and causes the transition of foetus from a hypoxic intrauterine environment to a hyperoxic atmospheric environment. The atmospheric oxygen concentration is 21% and it causes significant hypoxia for a pre-term infant. Even though this relative hypoxia does not cause any immediate alteration to lung maturity, in long term it can result in the development of chronic lung dysfunction.⁹

The concept of term gestation helps clinicians to schedule an optimal time for delivery according to gestational age and educates the public about the outcome of a healthy pregnancy if planned accordingly. The recent definition of term pregnancy has been divided into three

categories, i.e., premature term (37–38 weeks + 6 days), full-term (39–40 weeks and 6 days), and late-term (41-41 weeks + 6 days).¹⁰

Timing of elective CS at term is associated with various maternal and neonatal complications. Various neonatal complications like RDS, TTN, the incidence of NICU admissions, neonatal sepsis decrease with an increase in gestational age. Various maternal complications like maternal infection, bleeding, thromboembolism etc. decrease with an increase in gestational age but exact information is not known.¹¹

In this study we wanted to determine the incidence of neonatal respiratory complications, the incidence of non-respiratory neonatal complications and the incidence of maternal complications in women undergoing scheduled CS between 37-38+6 weeks and 39-40 weeks.

MATERIALS AND METHODS

This is a hospital-based comparative study conducted over a period of 18 months among pregnant women admitted to tertiary care centre, having term singleton pregnancy with gestational age >37 weeks posted for elective LSCS. Purposive sampling was followed.

Sample Size

Sample size was calculated based on the prevalence of caesarean sections which was 17.2%, out of which approximately 10% underwent elective caesarean section.

The formula used was $n = Z^2 \frac{pq}{d^2}$ where,

n = Sample size

Z = Standard deviation = 1.96

p = Prevalence = 10

q = 100-p = 90

$d = \text{absolute error} = 5$

Hence sample size = $1.96 \times 1.96 \times 0.1 \times 0.9/25 = 138 \sim 140$

So, a total of 140 singleton term pregnant women were taken into consideration. A total of 70 women were taken into each group undergoing elective CS between 37-38+6 weeks and 39-40 weeks of gestation.

Inclusion Criteria

Women with a singleton pregnancy with gestational age >37 weeks were admitted for elective LSCS.

Exclusion Criteria

- Gestational age <37 weeks
- Multiple pregnancies
- Gestational diabetes mellitus
- Preeclampsia
- LSCS due to foetal distress
- IUGR
- Foetal abnormalities
- LSCS during the active phase of labour
- Any other cause for emergency LSCS

Study Procedure

Pregnant women with more than 37 weeks of gestational age admitted to Tertiary care centre, Department of Obstetrics and Gynaecology from November 2019 to June 2021 were included in the study after satisfying inclusion and exclusion criteria and after obtaining clearance & approval from Institutional Ethical Committee. Written and informed consent was obtained from all the subjects included in the study. Information on maternal age, parity, indications for LSCS, intraoperative complications, neonatal weight, neonatal complications were collected.

The following were considered to assess neonatal outcomes –

- a) RDS - signs of respiratory distress (oxygen therapy, radiological features).
- b) Transient tachypnoea of newborn- transient means short-lived (less than 48 hours), tachypnoea - rapid breathing (more than 40 to 60 times per minute)-Breathing disorder is seen immediately after delivery in early term or late preterm babies.
- c) Admission to NICU within 48 hours and duration of stay in NICU, type of treatment (mechanical ventilation, CPAP, IV antibiotics)
- d) Birth weight, APGAR at one and five minutes.
- e) Others like neonatal sepsis, hypoglycaemia, meconium aspiration syndrome, hyperbilirubinemia, neonatal death.

The following were considered to evaluate maternal outcomes-

- a) Uterine atony
- b) Endometritis
- c) Wound infection.
- d) Anaesthetic complications like spinal headache, failed anaesthesia.
- e) Scar rupture, scar dehiscence.

Gestational age below 37 weeks, multiple pregnancies, maternal chronic diseases, GDM, PE, caesarean section due to foetal distress, intrauterine growth restriction, foetal abnormalities and any other cause of emergency caesarean section cases were excluded. Gestational age was calculated based on the date of LMP. If there was a difference in gestational age of more than 1 week between LMP GA and Ultrasonography GA, ultrasound GA was taken into consideration done in the first trimester. Data were analysed using descriptive statistics like mean, standard deviation, frequency and percentages. For categorical data, chi-square test and t-test were used.

RESULTS

A prospective study of maternal and neonatal outcome comparison in women undergoing elective caesarean section between 37-38+6 weeks and 39-40 weeks was undertaken during a period of 18 months. A sample of 70 each in both groups was studied.

Multigravida cases were more compared to primigravida in both the groups, slightly higher among the 39–40-week group and which was statistically significant (P-value- 0.008).

The most frequent indication for the elective caesarean section was previous LSCS among both the groups, which was higher in the 37-38 + 6-week group (75.7 %) and the difference of the indications showed the statistically significant result. (P-value- 0.017).

Intraoperative conditions among 37-38+6 weeks and 39–40-week groups were the same and which was not statistically significant also. (P-value- 0.316)

None of the patients had an injury to adjacent structures, scar dehiscence and scar rupture. Only one patient among 38-39 weeks had adhesions intraoperatively. And one patient in the 38–39-week group had excessive blood loss; the rest all had moderate blood loss.

The obstetric score showed significant results when compared to both groups. Primigravida cases were more among the 39–40-week group (38.6%) compared to 37-38+6weeks (18.7%) and gravida 3 and 4 were more among the 38-39 week group for elective caesarean section. (P-value- 0.031)

There was a statistical difference among both groups when compared to the number of paras (period of viable pregnancy). (P-value- 0.001) same as with the number of living children, 38-39 weeks had more compared to 39-40 weeks. (P-value – 0.001). Whereas there was no difference in the number of abortions. (P-value- 0.248)

Maternal Outcome

There was not much difference when compared with maternal outcome among both the groups and it was statistically not significant also. None of the patients had endometritis as well as spinal headaches. Only one patient among 37-38+6 weeks had a wound infection.

20% and 5.7% of the newborns had transient tachypnoea attacks among 37-38+6 weeks and 39-40 weeks respectively and this was statistically significant. (P-value -0.012) NICU admission was more among 37-38+6 weeks (21.4%) compared to 39-40 weeks (5.7%) with a p-value of 0.016. Two newborns among 37-38+6 weeks had sepsis and respiratory distress syndrome whereas none had respiratory distress syndrome and one newborn had sepsis among 39–40-week gestation group. 31.4% of the newborns presented with hyperbilirubinemia among 37-38+6-week group compared to 12.9% of 39–40-week group and statistically significant with a P-value of 0.008.

The mean weight of newborn babies was more among the 39–40-week group i.e., 3.131 ± 0.533 kg compared to 37-38+6 weeks i.e., 2.899 ± 0.411 kg and it was statistically significant with a P-value of 0.005.

DISCUSSION

There is an increased incidence of CS worldwide which is of concern to the public as well as professionals.¹² Increased rate of primary CS has led to an increased rate of repeat CS.

It can be performed as an elective or emergency procedure depending on maternal and foetal conditions.⁵ Out of which incidence of elective LSCS is increasing because of various factors like maternal request for LSCS, pregnant women with previous LSCS refusing VBAC, fear of medical litigation etc.

The present study was a comparative study to know the maternal & foetal outcomes following elective CS before 39 weeks and after 39 weeks.

The present study showed that 17.1% and 38.6% of mothers were primigravidae among less than 39 weeks and more than 39 weeks respectively. 82.9% and 61.4% were multigravidas respectively.

Sebastian G et al. observed that 44% were primigravidae in 38 weeks and 56.4% in 39 weeks. 53% were multigravidas in 38 weeks and 42.5% in 39 weeks. But according to Glavind et al.¹³ primigravidae were only 20%. A study conducted by Emily Doan and Wilmink et al.¹⁴ observed that primigravidae were 30% and multigravidas were 70% showing the increasing rate of elective CS in primigravida.

Primigravida and the grand multi difference were comparable and it was statistically significant in multigravida (p-value 0.008).

The present study showed, the primary indication for the caesarean section was previous LSCS (75.7%, 47.1%), next was CPD (18.5%, 35.7%), breech presentation (4.3%, 7.1%), oblique lie (1.4%, 5.7%) and least being maternal request (0%, 4.3%) among less than 39 weeks and more than 39 weeks respectively. The result of the indication was statistically significant (P-value – 0.017).

In a study done by Pirjani R et al.,¹⁵ in women who delivered between 38 and 39 gestational weeks, repeat CS was found to be a frequent indication compared to those who delivered after 39 weeks of gestation (64.7% vs. 45.1%, $P < 0.001$). In women who delivered after 39 weeks of gestation, breech presentation (10% vs. 4.2%), CPD (5.4% vs. 3.8%), and maternal request (35.4% vs. 21.7%) were found to be higher ($P < 0.001$).

In another study by Sebastian G, et al,¹⁶ the most common indication was malpresentation in primigravida who underwent elective CS out of which 70 patients underwent elective CS due to breech presentation and 34 because of a transverse lie, whereas the most common indication in multigravida and grand multigravida was previous CS & maternal request. Similar results were observed in studies done by Dahlgren et al. Mazzoni et al. and Hourani et al.¹⁷⁻¹⁹

The present study showed that there was no difference for the intraoperative conditions like adhesions (one case among less than 39-week group), blood loss (one case with excessive blood loss among less than 39 weeks), scar rupture, scar dehiscence, and adjacent structure injuries.

In a study done by Shakun Singh et al.²⁰ 3.7% of cases had scar dehiscence and 1% were found to have scar rupture. 26.92% of patients had adhesions intraoperatively.

The incidence of scar rupture was 1% with Shakun Singh et al.²⁰ studies, scar dehiscence was noted in 3.7% of cases in the study group. Intraoperatively, 26.92% of cases had adhesions in the study group.²⁰ In another study¹¹ three cases had scar rupture or dehiscence in 39-week group

and one case in 38-week group (RR 3.04, 95% CI 0.31–29.13) and in 39-week group, one case had bowel or bladder injury and in 38-week group, four cases were found (RR 0.25; 95% CI 0.03–2.26). The 39-week group (17.1%) had a lower risk of maternal bleeding compared to the 38-week group (21.7%).

The present study showed that only one patient in less than 39-week group had a wound infection, no other patients had any wound infection, endometritis or anaesthesia complication like a spinal headache. As per Ojeyi et al.²¹ (2008), puerperal pyrexia was seen in 24.1% of cases and wound dehiscence in 4.3%.

20% and 5.7% of the newborns had transient tachypnoea attacks among 37-38+6 weeks and 39-40 weeks respectively, NICU admission was more among 37-38+6 weeks (21.4%) compared to 39-40 weeks (5.7%) with a p-value of 0.016. Sepsis and RDS were found in two newborns among 37-38+6 weeks whereas none had respiratory distress syndrome and one newborn had sepsis among 39–40-week gestation group. 31.4% of the newborns presented with hyperbilirubinemia among 37-38+6-week group compared to 12.9% of 39–40-week group and statistically significant with a p-value of 0.008.

A study by Sebastian G et al. showed that out of 209 women, who underwent elective CS, 0.9% of babies had RDS at 38 weeks and 2.1% of babies had RDS at 39 weeks. A study by Zonardo et al,²² showed that the chance of RDS was 12.9% at <38 weeks, and it was 1.12% at >39 weeks. Similar results were observed in other studies done by Tita et al, Emily Doan, Hourani et al. Wilkink et al., Chiossi et al. These studies concluded a decrease in RDS with an increase in gestational age^{23,24}

In a study done by Chiossi et al.²⁵ 10.3% of babies required NICU admission at 38 weeks and 7.7% of babies required NICU admission at 39 weeks. Similar results were found in studies done

by Glavind et al.^{8,11} and Robinson et al. They found a 2% increased chance of NICU admission at 38 weeks.^{26,27} In a study done by Wilmink et al.,¹⁴ 1% increased chance of admission to NICU was observed at 38-38+6 weeks who underwent elective CS.

The incidence of TTN (transient tachypnoea of newborns) was 0.5% in those born after 39 weeks and 1.5% in those born before 39 weeks; the incidence of RDS was 0.3% in those born after 39 weeks and 0.7% before 39 weeks. There was no significant difference in neonatal sepsis between the two groups.⁷⁶ A randomized controlled trial done by Glavind J et al.¹³ showed that in a group of 635 women delivered before 39 weeks compared to 637 women after 39 weeks, the incidence of NICU admission within 48 hours was 13.9% and 11.9% in those delivered before and after 39 weeks respectively. The incidence of respiratory morbidities was 9% and 6.8% in those delivered before 39 weeks and after 39 weeks respectively. The incidence of intravenous antibiotic treatment was 2.7% and 2.2% in those delivered before and after 39 weeks respectively. A cohort study conducted at NICHD included 11,255 women delivered at 37 to 39 completed weeks showed maternal hospitalization (>5 days) and need for blood transfusions decreased with an increase in gestational age.²³

The weight of the newborn was comparatively higher among babies born after 39 weeks than the babies born before 39 weeks. Many studies showed similar results.²³

Limitations

The short duration of follow up was a limitation to evaluating neonatal outcomes.

CONCLUSIONS

Due to an increase in the trend of CS all over the world, timing of elective CS is a topic of debate. Assisted reproductive techniques, maternal request, advanced maternal age at conception contribute an important role in increasing the rate of elective CS. Scheduling LSCS after 39

weeks of gestation will help to reduce the incidence of neonatal complications including RDS after 39 weeks. To accurately determine the effect on maternal complications of elective CS there is a need for more studies.

Acknowledgement: Nil

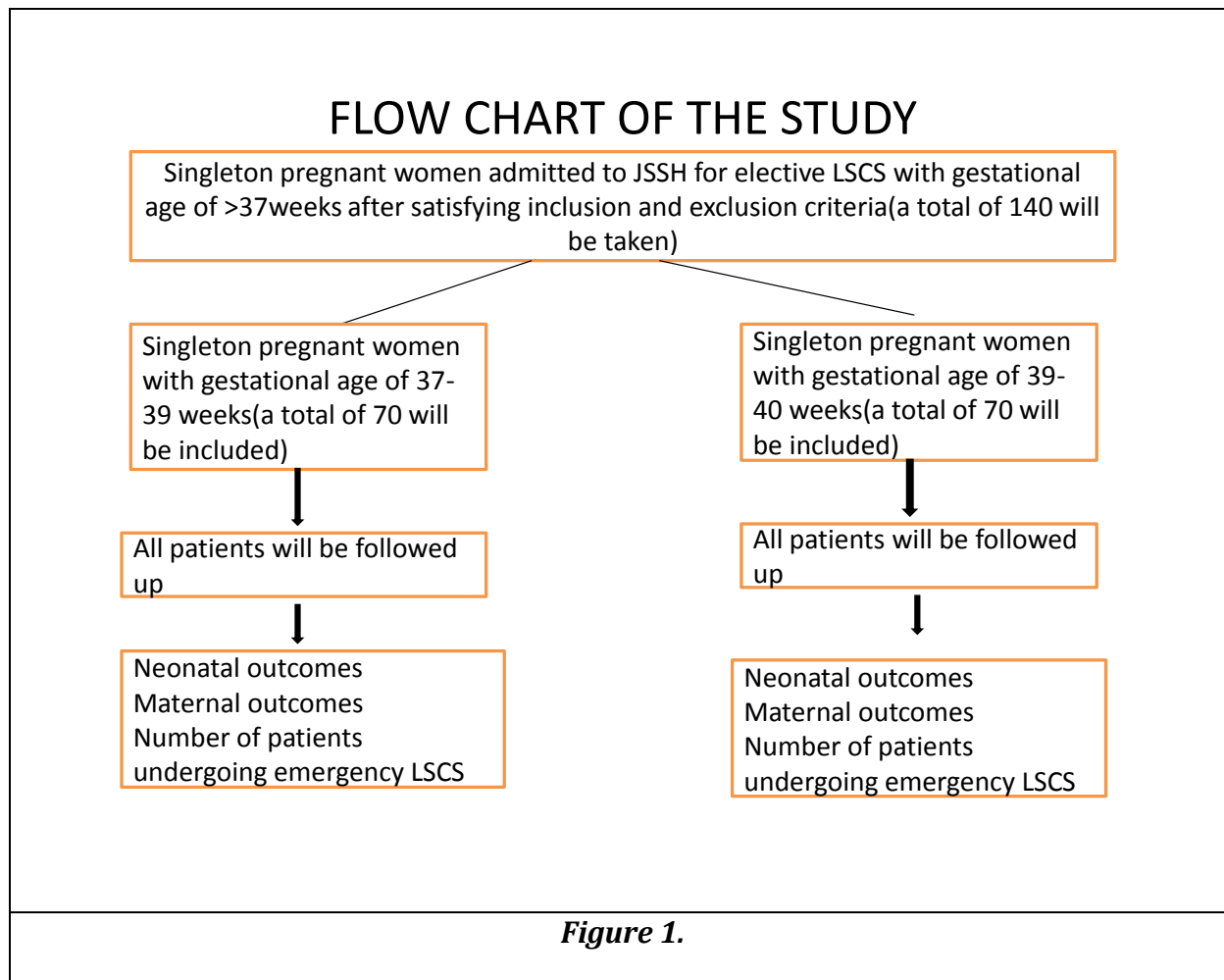
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Gravida	37-38weeks	39-40weeks	Total
	Number (%)	Number (%)	Number (%)
Primigravida	12(17.1)	27 (38.6)	39 (27.9)
Multigravida	58 (82.9)	43 (61.4)	101 (72.1)
Total	70 (100)	70 (100)	140 (100)
Chi square value- 7.99, p value- 0.008*, *Statistically significant			
<i>Distribution of cases according to gravida)</i>			

Indication	37-38+6weeks	39-40weeks	Total
	Number (%)	Number (%)	Number (%)
Breech	3 (4.3)	5 (7.1)	8 (5.7)
CPD	8 (11.4)	14 (20)	22 (15.7)
Major CPD	5 (7.1)	11 (15.7)	16 (11.4)
Maternal request	0 (0)	3 (4.3)	3 (2.1)
Oblique lie	1 (1.4)	4 (5.7)	5 (3.6)
Previous LSCS	53 (75.7)	33 (47.1)	86 (61.4)
Total	70 (100)	70 (100)	140 (100)
Chi square value- 13.83, p value- 0.017*, *Statistically significant			
Distribution of cases according to indication for caesarean section			
<i>Table 1</i>			

Condition		37-38+6 weeks	39-40 weeks	Chi square test	P-Value
		Number (%)	Number (%)		
Adhesions	Yes	1 (1.4)	0 (0)	1.007	0.316
	No	69 (98.6)	70 (100)		
Blood loss	Excessive	1 (1.4)	0 (0)	1.007	0.316

	Moderate	69 (98.6)	70 (100)		
Injury to an adjacent structure	Yes	0 (0)	0 (0)	--	
	No	70 (100)	70 (100)		
Scar dehiscence	Yes	0 (0)	0 (0)	--	
	No	70 (100)	70 (100)		
Scar rupture	Yes	0 (0)	0 (0)	--	
	No	70 (100)	70 (100)		
Table 2. Intraoperative condition of the cases					

Obstetric sore		37-38 + 6 weeks	39-40 weeks	Chi square test	P-Value
		Number (%)	Number (%)		
Gravida	1	13 (18.6)	27 (38.6)	10.658	0.031*
	2	40 (57.1)	33 (47.1)		
	3	14 (20)	9 (12.9)		
	4	3 (4.3)	0 (0)		
	7	0 (0)	1 (1.4)		
Parity	1	51 (72.9)	35 (50)	13.055	0.001*

	2	3 (4.3)	0 (0)		
Living	0	16 (22.9)	35 (50)	12.4	0.001*
	1	52 (74.3)	35 (50)		
	2	2 (2.9)	0 (0)		
Abortion	0	16 (22.9)	35 (50)	4.125	0.248
	1	15 (21.4)	17 (24.3)		
	2	3 (4.3)	0 (0)		
	5	0 (0)	1 (1.4)		
	0	52 (74.3)	52 (74.3)		

Table 3. The obstetric score of the cases

*Statistically significant

Maternal Outcome		37-38+6 weeks	39-40 weeks	Chi square test	P-Value
		Number (%)	Number (%)		
Endometritis	Yes	0 (0)	0 (0)	--	
	No	70 (100)	70 (100)		
Wound infection	Yes	1 (1.4)	0 (0)	1.007	0.316
	No	69 (98.6)	70 (100)		
Spinal headache	Yes	0 (0)	0 (0)	--	
	No	70 (100)	70 (100)		
Maternal outcome					
Neonatal outcome		37-38+6 weeks	39-40 weeks		

		Number (%)	Number (%)	Chi square test	P-Value
Transient tachypnoea	Present	14 (20)	4 (5.7)	6.375	0.012*
	Absent	56 (80)	66 (94.3)		
NICU admission	Yes	15 (21.4)	5 (7.1)	5.833	0.016*
	No	55 (78.6)	65 (92.9)		
Respiratory distress	Yes	2 (2.9)	0 (0)	0.029	0.154
	No	68 (97.1)	70 (100)		
Hyperbilirubinemia	Present	22 (31.4)	9 (12.9)	7.002	0.008*
	Absent	48 (68.6)	61 (87.1)		
Sepsis	Yes	2 (2.9)	1 (1.4)	0.341	0.559
	No	68 (97.1)	69 (98.6)		
Neonatal outcome					
Table 4. Maternal and neonatal outcomes of the study cases					
(*Statistically significant)					

	Mean	Standard Deviation	student's t Test	P-Value	95% Confidence Interval
37-38+6 weeks	2.899 kg	0.411	-2.89	0.005	-0.391 to 0.0731
39-40 weeks	3.131 kg	0.533			
Table 5. Distribution of newborns according to their birth weight					