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A COMPARATIVE STUDY OF PRIMARY CESAREAN SECTIONS IN PRIMIGRAVIDA AND MULTIGRAVIDA USING ROBSON'S CLASSIFICATION

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ABSTRACT

Background: Primary cesarean section is a major contributor to the rising cesarean section rate and influences future obstetric outcomes. Robson's Ten Group Classification System (TGCS) is a standardized tool for auditing cesarean section trends. This study compared primary cesarean sections among primigravida and multigravida women using Robson's classification. **Materials and Methods:** This observational study was conducted at Government Rajaji Hospital, Madurai, over one year. A total of 400 women undergoing primary cesarean section were included, comprising 200 primigravidas and 200 multigravidas. Clinical, obstetric, intrapartum, maternal, and neonatal data were collected and analysed using SPSS software. Women were classified according to Robson's TGCS. **Result:** Multigravidas were significantly older than primigravidas (27.56±4.03 vs 25.57±5.00 years; p<0.001). PROM/PPROM (42 vs 16 cases), hypertensive disorders (30 vs 17), and cephalopelvic disproportion (25 vs 13) were more common among primigravidas. Unengaged head with fetal distress was the commonest indication for cesarean section in both primigravidas (44.5%) and multigravidas (29%). Failed induction was the second most common indication. Robson Group 2a was the largest contributor among primigravidas (39.5%), whereas Group 4a predominated among multigravidas (35.5%). Abnormal CTG and meconium-stained liquor were significantly more common among primigravidas. Healthy live births occurred in 97% of both groups, and maternal complications were comparable. **Conclusion:** Primary cesarean sections showed distinct parity-related patterns. Robson's classification effectively identified major contributing groups and may serve as a valuable audit tool for reducing unnecessary primary cesarean sections.

INTRODUCTION

Cesarean section is a surgical procedure in which a fetus is delivered through an incision in the abdominal wall (laparotomy) and the uterus (hysterotomy). It is one of the most commonly performed obstetric operations worldwide and was originally developed as a lifesaving procedure for both mother and fetus during difficult deliveries. However, the incidence of cesarean section has increased substantially across the world. Cesarean delivery is associated with higher maternal surgical risks, including infection, hemorrhage, anesthetic complications, and thromboembolic events, and increases the likelihood of repeat cesarean sections in subsequent pregnancies. Multiple repeat cesarean deliveries are associated with complications such as abnormal placentation, uterine infection, adjacent organ injury, hysterectomy, and blood transfusion requirements.[1,2]

Besides the increase in cesarean sections for medical indications, advances in obstetric and neonatal care, improved fetal surveillance, medico-legal concerns, and changing obstetric practices have contributed to the rising cesarean section rates worldwide. The World Health Organization has stated that there is no justification for cesarean section rates higher than 10–15%, and rates beyond this threshold have not been consistently associated with reductions in maternal and neonatal mortality.[3,4] Therefore, understanding the reasons for cesarean delivery is essential for identifying potentially preventable procedures.

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Primary cesarean section refers to the first cesarean delivery performed on a woman, irrespective of gestational age or pregnancy outcome. It excludes women with a previous uterine scar and is considered a critical determinant of future obstetric outcomes. Once a woman undergoes a primary cesarean section, the likelihood of repeat cesarean delivery in subsequent pregnancies increases. Consequently, reducing unnecessary primary cesarean sections has become an important strategy for controlling the overall cesarean section rate.

Primigravida women are more likely to experience labor dystocia, failed induction, and intrapartum complications leading to cesarean section, whereas multigravida women may require primary cesarean delivery because of malpresentations, placental abnormalities, fetal factors, or medical disorders. Despite previous vaginal deliveries, multigravida women may still develop cephalopelvic disproportion and other obstetric complications. Therefore, studying these two populations separately may help identify avoidable indications for primary cesarean section.[5-11]

Robson's Ten-Group Classification System (TGCS), endorsed by the World Health Organization, is a standardized and internationally accepted method for auditing and analyzing cesarean section rates. The system classifies women into ten mutually exclusive and totally inclusive groups based on parity, previous cesarean section, onset of labor, fetal presentation, number of fetuses, and gestational age. It enables meaningful comparisons between institutions and helps identify groups contributing disproportionately to cesarean section rates.[1,2]

The present study was undertaken to compare primary cesarean sections among primigravida and multigravida women using Robson's classification system and to identify differences in indications, clinical characteristics, and outcomes between these two groups.

MATERIALS AND METHODS

This observational study was conducted in the Department of Obstetrics and Gynaecology, Government Rajaji Hospital, Madurai, over a period of one year. Approval was obtained from the Institutional Ethics Committee of Government Rajaji Medical College and Hospital, Madurai. Written informed consent was obtained from all participants prior to enrollment.

Study Population and Sampling: The study population comprised women undergoing primary cesarean section during the study period. A consecutive sampling technique was employed, and all eligible women satisfying the inclusion and exclusion criteria were recruited. The study included 200 primigravida and 200 multigravida women undergoing primary cesarean section.

Inclusion and Exclusion Criteria

Women undergoing primary cesarean section with a gestational age greater than 28 weeks and who provided informed consent were included in the study.

Women who delivered vaginally or by assisted vaginal delivery, those with a previous cesarean section, previous hysterotomy, previous uterine scar surgery such as myomectomy or septoplasty, and those unwilling to provide informed consent were excluded from the study.

Methods: After obtaining permission from the Dean, Government Rajaji Medical College and Hospital, Madurai, the Head of the Department of Obstetrics and Gynaecology, and approval from the Institutional Ethics Committee, eligible participants were enrolled in the study.

Detailed clinical and obstetric information was collected using a predesigned proforma. Data recorded included maternal age, parity, gestational age, onset of labour, intrapartum events, fetal lie, fetal presentation, indication for cesarean section, and maternal and neonatal outcomes.

All women were classified according to the TGCS. Participants were categorized into their respective Robson groups based on obstetric characteristics, and the incidence, indications, clinical profile, and outcomes of primary cesarean section were compared between primigravida and multigravida women.

Statistical Analysis: Comparisons between primigravida and multigravida groups were performed using the Chi-square test or Fisher's exact test for categorical variables and the independent sample t-test for continuous variables. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Most women were aged 21–30 years (63% of primigravidas and 71% of multigravidas). Multigravidas were significantly older than primigravidas (27.56 ± 4.03 vs 25.57 ± 5.00 years; $p<0.001$), while gestational age and term deliveries were similar between groups [Table 1].

Table 1: Comparison of demographic and obstetric characteristics

Category	Variable	Primi	Multi	P value
Age (years)	<20	35	4	<0.001
	21–30	126	142	
	>30	39	54	
	Mean ± SD	25.57 ± 5.00	27.56 ± 4.03	
Gestational Age (weeks)	Mean ± SD	37.88 ± 1.99	37.58 ± 1.71	0.10
Term / Preterm	Preterm	38	43	0.619
	Term	162	157	
Obstetric Code	Primi	166	–	

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	G2A1	20	–	
	G3A2	12	–	
	G5A4	2	–	
	G2P1L1	–	96	
	G2P1L0	–	18	
	G3P2L2	–	20	
	G3P1L1A1	–	36	
	G3P1L1	–	1	
	G3P1L0A1	–	1	
	G3P2L1	–	2	
	G3P2L0	–	1	
	G4P1L1A2	–	3	
	G4P2L2A1	–	9	
	G4P3L2	–	2	
	G4P3L3	–	6	
	G5P1L0A3	–	1	
	G5P2L2A2	–	1	
	G6P1L1A4	–	1	
	G6P5L5	–	1	
	G8P1L1A6	–	1	

Among primigravidas, unengaged head with fetal distress was the leading indication for LSCS (89/200, 44.5%), followed by failed induction (22/200, 11%). Cephalopelvic disproportion was another important contributor, occurring either alone or in combination with other obstetric complications. Additional indications included severe oligohydramnios with fetal distress, breech and other malpresentations, deep transverse arrest, placental abnormalities, fetal growth restriction with Doppler changes, hypertensive disorders, and multifetal pregnancies [Table 2].

Table 2: Indications for LSCS in primigravida

Indication for LSCS	n	Indication for LSCS	n
1st twin non cephalic	2	Flexed breech / primi	1
1st twin non cephalic / MCDA twins	1	Flexed breech / FPD	2
AP eclampsia / unfavourable cervix	1	Flexed breech in labour	2
APH / complete placenta previa	1	Flexed breech / FPD	1
BOH / CPD 2nd degree	1	Flexed breech / PROM	1
Breech with footling	1	FPD / flexed breech	1
Complete placenta previa	2	Grade 3 abruption	2
CPD / oligo	1	Heart disease	1
CPD 1st degree in labour	1	Heart disease / CPD minor	1
CPD 2nd degree / fetal distress	1	Heart disease / CPD 1st degree	1
CPD 2nd degree in labour	1	Heart disease / FGR	1
CPD 2nd degree	11	Heart disease / CPD minor	1
CPD 2nd degree / placenta previa	1	Long period infertility / CPD 2nd degree	1
CPD 2nd degree in labour	1	Long period infertility / CPD minor	1
CPD / failed trial	1	Long period infertility / heart disease	1
DCDA twin / 1st twin non cephalic	1	Non progress of labour	1
DCDA twin – 1st non cephalic	1	Non reassuring CTG / fetal alarm signal	1
DCDA twin / FGR / severe oligo	1	PPROM / breech	3
DCDA twin / FGR Doppler changes	1	Preterm / flexed breech in labour	1
DCDA twin / FGR Doppler changes / oligo	1	PROM / fetal distress	1
Deep transverse arrest	3	Severe oligo / breech	1
Failed induction	22	Severe oligo / breech / FPD	1
Failed induction / fetal distress	1	Severe oligo / CPD 1st	1
Failed induction / PROM	1	Severe oligo / failed induction	1
Fetal alarm signal	2	Severe oligo / fetal distress	6
Fetal alarm signal / non reassuring CTG	3	Severe preeclampsia / unfavourable cervix	1
Fetal distress / severe oligo	2	Transverse lie in labour	3
FGR oligo Doppler changes	2	Unengaged head with fetal distress	89
FGR oligo Doppler changes / fetal distress	1		
FGR / severe oligo / Doppler changes	1		
FGR / oligo / Doppler changes	2		

Among multigravidas, unengaged head with fetal distress was the leading indication for LSCS (58/200, 29%), followed by failed induction (32/200, 16%). Malpresentations, including breech, footling, brow, face, transverse, and oblique lies, constituted an important group of indications. Additional indications included placental abnormalities, abruptio placentae, deep transverse arrest, cephalopelvic disproportion, fetal growth restriction with oligohydramnios, multifetal pregnancies, and various maternal medical and obstetric complications [Table 3].

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Table 3: Indications for LSCS in multigravida

Indication for LSCS	n	Indication for LSCS	n
1st twin non cephalic	1	Flexed breech in labour	11
AP eclampsia / unfavourable cervix	2	Flexed breech in labour / FGR / oligo	1
AP eclampsia / failure to progress	1	Flexed breech in labour / severe oligo	1
APH / complete placenta previa	1	Flexed breech / FPD	1
APH / placenta previa	1	Footling presentation	5
BOH / CPD 1st degree	2	Grade 2 abruption	7
Brow presentation	3	Grade 3 abruption	4
Complete placenta previa	2	Hand prolapse	2
Compound presentation	1	Heart disease / CPD	3
Cord presentation	2	Heart disease / CPD in labour	1
Cord prolapse	3	HELLP / impending coagulation failure	1
CPD 1st degree in labour	2	HELLP / unfavourable cervix	1
CPD 2nd degree	2	MCDA twin / 1st twin non cephalic	1
CPD in labour	2	MCMA twins in labour	1
DCDA twin / 1st twin non cephalic / PPROM	1	Oblique lie	1
DCDA twin / 1st twin transverse lie	1	Obstructed labour	2
DCDA twin / PPROM / non progress of labour	1	Oligo breech FGR	2
DCDA twins / 1st twin non cephalic	1	Persistent occipito-posterior	1
Deep transverse arrest	6	Placenta previa	1
Face presentation	1	Placenta previa in labour	1
Failed induction	32	PPCM / CPD 1st degree	1
Failed induction / fetal distress	1	PROM / DCDA twins / 1st twin non cephalic	1
Failed induction / PROM	1	Pulsatile cord prolapse	2
Fetal alarm signal / severe oligo	2	Severe oligo / fetal distress / PPROM	1
Fetal alarm signal / fetal distress	2	Transverse lie	2
Fetal distress / severe oligo	1	Transverse lie in labour	4
FGR oligo Doppler changes	1	Triplets (TCTA) in labour	1
FGR / unengaged head with fetal distress	3	Type 1 placenta previa in labour	1
FGR / severe oligo / breech	1	Unengaged head with fetal distress	58
First twin non cephalic	1		

Emergency LSCS accounted for 89.5% of primigravidas and 95.5% of multigravidas (p=0.037). Labour onset was more often induced in primigravidas (41.5%) and spontaneous in multigravidas (54.5%) (p<0.001) [Table 4].

Table 4: Comparison of labour characteristics

Category	Variable	Primi	Multi	P value
LSCS Type	Elective	21	9	0.037
	Emergency	179	191	
Trial of Labour	Yes	123	121	0.918
	No	77	79	
Labour Onset	Prelabour	48	19	<0.001
	Induction	83	72	
	Spontaneous	69	109	

Foley plus gel was the commonest induction method among primigravidas (29 cases), while Foley plus gel plus gel was common among multigravidas (27 cases) (p=0.004). Mean Bishop scores were comparable (3.30 vs 3.57; p=0.104) [Table 5].

Table 5: Comparison of induction characteristics

Category	Variable	Primi	Multi	P value
Type of Induction	Foley	2	7	0.004
	Foley + Gel	29	10	
	Foley + Gel + Gel	18	27	
	Gel	27	18	
	Gel + Gel	7	10	
Induction to Delivery Interval	Mean ± SD (hours)	24.96 ± 15.10	30.20 ± 23.55	0.095
Bishop Score Distribution	0–3	97	98	
	4–5	69	70	
	6–7	27	18	
	8–13	3	9	
	Nil	4	5	
Bishop Score	Mean ± SD	3.30 ± 1.67	3.57 ± 1.71	0.104

Abnormal CTG was more common in primigravidas than multigravidas (55.6% vs 41.8%; p=0.002). Meconium-stained liquor was observed in 20% of primigravidas compared with 12.5% of multigravidas (p=0.009) [Table 6].

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Table 6: Comparison of intrapartum findings

Category	Variable	Primi	Multi	P value
Membranes	Spontaneous rupture	65	88	0.059
	ARM	58	44	
	Intact	76	66	
	Clear	1	0	
	Blood stained	0	2	
Colour of Liquor	Meconium	40	25	0.009
	Clear	158	163	
	Blood stained	2	12	
CTG	Normal	88	114	0.002
	Abnormal	110	82	
	Missing	2	4	

Among primigravidas, Robson Group 2a contributed the highest proportion of primary cesarean sections (79 cases, 39.5%), whereas among multigravidas, Group 4a was predominant (71 cases, 35.5%) [Table 7].

Table 7: Distribution of primary cesarean section according to Robson classification

Variable	Primi	Multi
Type 1	48	–
Type 2a	79	–
Type 2b	32	–
Type 3	–	53
Type 4a	–	71
Type 4b	–	15
Type 6	16	–
Type 7	–	21
Type 8	11	10
Type 9	3	7
Type 10	11	23

Healthy live births occurred in 97% of both groups (194/200 each). NICU outcomes and APGAR scores were comparable between the groups. Mean birth weight was significantly higher in multigravidas (2.86 ± 0.63 kg vs 2.74 ± 0.51 kg; p=0.039), while maternal complications were similar (p=0.678) [Table 8].

Table 8: Comparison of maternal and neonatal outcomes

Category	Variable	Primi	Multi	P value
NICU Outcome	Mother side	107	100	0.788
	Admission/Others	79	84	
	Observation	12	12	
Fetal Outcome	PNMR	4	2	0.513
	Stillbirth	2	4	
	Alive & Healthy	194	194	
Birth Weight	Mean ± SD (kg)	2.74 ± 0.51	2.86 ± 0.63	0.039
APGAR Score	1 minute	8.47 ± 1.14	8.42 ± 0.91	0.658
	5 minutes	8.82 ± 0.78	8.92 ± 0.33	0.097
Maternal Outcome	Death	0	0	0.678
	Puerperal pyrexia	2	3	
	Wound infection/gaping	1	0	
	Paralytic ileus	2	3	
	PPH	10	15	
	DVT/CVT	0	0	
	Hemoperitoneum	0	0	
	Uneventful	185	179	

DISCUSSION

The present study compared primary cesarean sections among primigravida and multigravida women using Robson's classification and evaluated differences in demographic characteristics, obstetric risk factors, indications for cesarean section, labor characteristics, and maternal and neonatal outcomes. The study demonstrated distinct parity-related differences in the pathways leading to primary cesarean section while showing comparable maternal and neonatal outcomes between the two groups.

The majority of women in both groups belonged to the reproductive age group of 21–30 years, and multigravidas were significantly older than primigravidas. Similar observations have been reported by Sharma et al. and Patel et al., who found that women undergoing primary cesarean section were predominantly in the third decade of life. Maternal age is an important determinant of obstetric outcome, and the higher age among multigravidas

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reflects increasing parity with advancing maternal age. Gestational age at delivery and the proportion of term and preterm pregnancies were comparable between the two groups, suggesting that parity did not significantly influence the timing of delivery.[12,13]

The present study identified unengaged head with fetal distress as the most common indication for primary cesarean section in both groups, followed by failed induction. Similar findings have been reported by Gupta et al., who documented fetal distress and failed induction as major contributors to primary cesarean delivery. Fetal compromise remains one of the most frequent indications for operative delivery because of the increasing use of fetal surveillance techniques and continuous cardiotocographic monitoring. Likewise, the growing use of labor induction has contributed substantially to primary cesarean section rates.[14] The predominance of these indications highlights the importance of careful intrapartum monitoring and appropriate case selection for induction of labor.

Emergency cesarean section constituted the majority of deliveries in both groups. Primigravidas were more likely to undergo induction of labor, whereas spontaneous onset of labor was more common among multigravidas. Similar observations have been reported by Sharma et al., who noted higher induction rates among primigravidas and greater spontaneous labor among multiparous women.[12] These findings may be attributed to differences in cervical favorability, labor progression, and clinician decision-making. The higher frequency of induced labor among primigravidas may also explain the increased occurrence of fetal distress and operative intervention in this group.

With regard to induction characteristics, significant differences were observed in the methods of induction used between the groups, whereas induction-to-delivery interval and Bishop scores remained comparable. Similar findings have been reported by Patel et al., who demonstrated that induction practices often vary according to parity despite comparable cervical assessment scores.[13] This suggests that the choice of induction method may be influenced by clinical judgment and obstetric circumstances rather than cervical favorability alone.

Analysis of intrapartum findings showed that abnormal cardiotocography and meconium-stained liquor were more frequently observed among primigravidas. Comparable findings have been reported by Gupta et al. and Joshi et al., who observed increased rates of fetal distress and abnormal intrapartum monitoring among first-time mothers. Prolonged labor, induction of labor, and cephalopelvic disproportion may contribute to these findings. In contrast, blood-stained liquor was observed more frequently among multigravidas, which may reflect the greater occurrence of placental abnormalities in this group.[14,15] These observations emphasize the need for close intrapartum surveillance to facilitate timely intervention and optimize fetal outcomes.

Robson classification revealed distinct patterns between primigravidas and multigravidas. Among primigravidas, Robson Group 2a was the major contributor to primary cesarean section, whereas Group 4a predominated among multigravidas. Similar distributions have been reported by Bhatia et al., and Sarkar et al., who identified induction-related groups as major contributors to cesarean section rates. The predominance of Groups 2a and 4a indicates that induced labor in women without previous cesarean section contributes substantially to the burden of primary cesarean delivery.[16,17] These findings highlight the importance of auditing induction practices and implementing evidence-based labor management protocols to reduce unnecessary cesarean sections.

Despite the observed differences in clinical profile and indications for cesarean section, maternal and neonatal outcomes were largely comparable between the two groups. Healthy live births constituted the majority of deliveries, and no significant differences were observed in NICU admissions, Apgar scores, fetal outcomes, or maternal complications. Similar findings have been reported by Chhabra et al., Patel et al., and Kamble et al., who concluded that parity alone does not significantly influence short-term maternal or neonatal outcomes following primary cesarean section. Although birth weight was significantly higher among multigravidas, this difference did not adversely affect neonatal outcome.[4,13,18]

Overall, the present study demonstrates that while the indications and clinical pathways leading to primary cesarean section differ between primigravidas and multigravidas, maternal and neonatal outcomes remain comparable. The predominance of fetal distress, failed induction, and induction-related Robson groups highlights potential areas for intervention. Optimization of labor induction practices, improved intrapartum monitoring, and regular Robson classification audits may contribute to reducing primary cesarean section rates and improving obstetric care.

Limitation: This was a single-centre observational study with a relatively limited sample size and may not be generalizable to other settings. Long-term maternal and neonatal outcomes were not assessed. In addition, potential confounding factors influencing the decision for primary caesarean section could not be completely evaluated.

CONCLUSION

Primary cesarean sections showed distinct patterns between primigravida and multigravida women. Robson Groups 2a and 4a were the major contributors in primigravidas and multigravidas, respectively. Unengaged head with fetal distress was the commonest indication in both groups. Despite

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differences in indications and risk profiles, maternal and neonatal outcomes were favourable. Robson's classification proved to be a valuable audit tool for identifying target groups and strategies to reduce unnecessary primary cesarean sections.

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