

Original Research Article

PRIMARY CESAREAN SECTION IN MULTIPAROUS WOMEN WITH PREVIOUS VAGINAL DELIVERIES: AN OBSERVATIONAL STUDY IN A TERTIARY CARE HOSPITAL

Shankari Pandian¹, Sudharsan Balasubramanian², Tamilarasan Muniyapillai³, Sriranganathan Thirunavukkarasu⁴

¹Assistant Professor, Department of Obstetrics and Gynaecology, Srinivasan Medical College and Hospital, Tiruchirappalli, Tamil Nadu, India.

²Associate Professor, Department of Community Medicine, Srinivasan Medical College and Hospital, Tiruchirappalli, Tamil Nadu, India.

³Professor, Department of Community Medicine, Dhanalakshmi Srinivasan Medical College and Hospital, Perambalur, Tamil Nadu, India.

⁴Associate Professor, Department of Community Medicine, Srinivasan Medical College and Hospital, Tiruchirappalli, Tamil Nadu, India.

Received : 16/06/2026
Received in revised form : 03/08/2026
Accepted : 17/08/2026

Corresponding Author:

Dr. Sudharsan Balasubramanian
Associate Professor, Department of
Community Medicine, Srinivasan
Medical College and Hospital,
Tiruchirappalli, Tamil Nadu, India.
Email: skbsudharsan@gmail.com

DOI: 10.70034/ijmedph.2026.3.537

Source of Support: Nil,
Conflict of Interest: None declared

Int J Med Pub Health
2026; 16 (3); 3438-3442

ABSTRACT

Background: Primary cesarean section (CS) among multiparous women with at least one previous vaginal delivery is increasingly encountered in obstetric practice, challenging the assumption that a prior successful vaginal birth predicts a low-risk subsequent labor. The objective is to describe the sociodemographic and obstetric profile, principal indications, and maternal-neonatal outcomes of primary CS in multiparous women, and to compare these parameters across antenatal booking status.

Materials and Methods: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, Srinivasan Medical College and Hospital, Samayapuram, Tamil Nadu, India, from January 2024 to December 2025. One hundred fifty multiparous women (para ≥ 1) with at least one prior vaginal delivery undergoing primary CS were enrolled consecutively and stratified by antenatal booking status (booked, n = 95; unbooked, n = 55). Continuous variables were compared using the independent-samples t-test or Mann-Whitney U test, and categorical variables using the Pearson chi-square test; $p < 0.05$ was considered significant.

Results: Unbooked women were significantly older (30.89 ± 5.39 vs 28.14 ± 5.31 years, $p = 0.0028$). Fetal distress (27.4% booked vs 25.5% unbooked) and malpresentation were the leading indications overall, with no significant difference in indication distribution by booking status ($p = 0.691$). Intraoperative adhesions (10.9% vs 2.1%, $p = 0.021$) and any intraoperative complication (18.2% vs 7.4%, $p = 0.044$) were more frequent among unbooked women. Postoperative morbidity was markedly higher among unbooked women (58.2% vs 16.8%, $p < 0.0001$), driven chiefly by febrile morbidity and wound infection, with a correspondingly longer hospital stay (median 7 vs 5 days, $p = 0.0004$). Neonatal outcomes did not differ significantly by booking status.

Conclusion: Multiparity and prior vaginal delivery do not preclude primary CS or guarantee freedom from maternal morbidity. Unbooked status, rather than parity itself, was the principal driver of excess intraoperative and postoperative complications, underscoring the need for universal antenatal registration and vigilant intrapartum surveillance in this subgroup.

Keywords: Primary cesarean section, Multiparous women, Antenatal booking status, Maternal morbidity, Neonatal outcome.

INTRODUCTION

Cesarean section (CS) rates continue to rise worldwide, with global estimates projecting a rate approaching 30% by 2030.^[20] Much of the clinical and policy attention devoted to this trend concerns nulliparous women delivering for the first time, since this population disproportionately drives both the primary CS rate and the likelihood of repeat CS in subsequent pregnancies.^[8] Multiparous women with at least one previous vaginal delivery are, by contrast, conventionally regarded as low risk, an assumption rooted in the belief that a prior uncomplicated vaginal birth demonstrates adequate pelvic capacity and uterine function.^[1,2] Yet this “low-risk” label frequently proves unwarranted: multiparous women remain susceptible to new-onset intrapartum complications, including fetal distress, malpresentation, cephalopelvic disproportion, and labor dystocia, that were absent in earlier pregnancies.^[3,4]

In India, and particularly in rural and semi-urban tertiary referral centers, this risk is compounded by variable antenatal care utilization. A substantial minority of pregnant women present unbooked, or with

inadequate antenatal surveillance, and arrive in advanced labor with unrecognized complications necessitating emergency primary CS.^[22,23] Existing Indian series report primary CS rates among multigravida ranging from roughly one-fifth to two-fifths of all CS performed, with fetal distress and malpresentation consistently identified as the predominant indications.^[9,13,24] Comparatively few prospective studies, however, have specifically examined how antenatal booking status modulates intraoperative complexity and postoperative morbidity within this subgroup, an issue of particular relevance to resource-constrained rural teaching hospitals such as ours.

This study was therefore undertaken to characterize the sociodemographic and obstetric profile, principal indications, and maternal and neonatal outcomes of primary CS among multiparous women with prior vaginal delivery at a rural tertiary care teaching hospital in Tamil Nadu, and to compare these parameters between booked and unbooked participants, with the aim of informing targeted antenatal outreach and intrapartum monitoring protocols.

MATERIALS AND METHODS

Study Design and Setting: This prospective observational study was conducted in the Department of Obstetrics and Gynecology, Srinivasan Medical College and Hospital (SMCH), Samayapuram, Tiruchirappalli District, Tamil Nadu, India, a rural tertiary care teaching institution offering comprehensive maternity services, over a

24-month period from January 2024 to December 2025.

Study population: Multiparous pregnant women (para ≥ 1) with at least one previous vaginal delivery who underwent their first cesarean section during the index pregnancy were eligible for inclusion. Women with any previous cesarean delivery were excluded. Consecutive eligible women admitted for delivery and requiring primary CS, whether elective or emergency, were enrolled after written informed consent. Institutional Ethics Committee approval was obtained prior to commencement, and the study adhered to the Declaration of Helsinki.

Sample size: Based on comparable Indian series reporting postoperative morbidity proportions of approximately 30–35% among primary CS in multiparous women, a minimum sample of 138 participants was estimated to permit detection of a clinically meaningful between-group difference in postoperative morbidity with 80% power at $\alpha = 0.05$. Enrollment was extended to 150 participants to allow for anticipated data attrition.

Data collection: Structured proformas captured data across three phases. Preoperatively: maternal age, parity, educational level, monthly household income, and antenatal booking status (booked, defined as first-trimester registration with at least four documented antenatal visits; unbooked, defined as fewer visits or no formal registration), obstetric history, and gestational age and indication for CS. Intraoperatively: type of anesthesia, uterine and adnexal findings, intraoperative complications, and estimated blood loss. Postoperatively: maternal complications, neonatal birth weight, 5-minute Apgar score, NICU admission, and duration of hospital stay. Follow-up continued to hospital discharge and, where feasible, up to six weeks postpartum by telephone contact.

Statistical analysis

Data were analyzed using SPSS version 26.0 (IBM Corp., Armonk, NY). Continuous variables were summarized as mean $\pm$ standard deviation or median with interquartile range according to distribution, and compared between booked and unbooked groups using the independent-samples t-test or Mann-

Whitney U test respectively. Categorical variables were expressed as n (%) and compared using the Pearson chi-square test. A two-tailed p value < 0.05 was considered statistically significant.

Ethical considerations

The study was approved by the Institutional Ethics Committee of SMCH. Confidentiality was maintained using unique study identifiers, and participation was voluntary; non-participation did not affect clinical care.

RESULTS

Of 150 multiparous women with previous vaginal delivery undergoing primary CS, 95 (63.3%) were

booked and 55 (36.7%) were unbooked. [Table 1] Unbooked women were significantly older (30.89 ± 5.39 vs 28.14 ± 5.31 years, $p = 0.0028$); the proportion aged ≥ 35 years was numerically higher among unbooked women, though this did not reach significance (23.6% vs 11.6%, $p = 0.0522$). Parity, educational attainment, and household income distribution were comparable between groups.

Obstetric antecedents and gestational timing did not differ significantly by booking status: mean gestational age at delivery was 38.16 ± 2.28 weeks among booked and 38.60 ± 2.22 weeks among unbooked women ($p = 0.2495$), and a prior obstetric complication was documented in a similar proportion of both groups (28.4% vs 32.7%, $p = 0.5792$).

Table 1: Baseline Demographic, Socioeconomic and Obstetric Characteristics of Multiparous Women Undergoing Primary Cesarean Section by Antenatal Booking Status (n = 150)

Parameter	Booked (n = 95)	Unbooked (n 55)	=	P value
Age (years), mean $\pm$ SD	28.14 ± 5.31	30.89 ± 5.39		0.0028*
Age ≥ 35 years, n (%)	11 (11.6)	13 (23.6)		0.0522
Parity (prior vaginal deliveries), median [IQR]	1 [1–2]	1 [1–2]		0.3423
Parity ≥ 3 prior vaginal deliveries, n (%)	15 (15.8)	8 (14.5)		0.8385
No formal education, n (%)	15 (15.8)	10 (18.2)		0.7048
Household income $\leq$ INR 25,000/month, n (%)	69 (72.6)	37 (67.3)		0.4873
Gestational age at delivery (weeks), mean $\pm$ SD	38.16 ± 2.28	38.60 ± 2.22		0.2495
Preterm delivery < 37 weeks, n (%)	14 (14.7)	6 (10.9)		0.5063
Any prior obstetric complication, n (%)	27 (28.4)	18 (32.7)		0.5792

Data presented as mean $\pm$ standard deviation, median [interquartile range], or n (%) as appropriate. P values derived from the independent-samples t-test, Mann-Whitney U test, or Pearson chi-square test as applicable. *Statistically significant ($p < 0.05$). IQR, interquartile range; INR, Indian rupees; SD, standard deviation.

Fetal distress was the leading indication for primary CS overall, followed by malpresentation and non-progress or obstructed labor. The distribution of indications did not differ significantly between booked and unbooked women ($p = 0.6911$),

indicating a comparable pathway to operative delivery irrespective of antenatal surveillance. [Table 2] Intraoperative findings, however, diverged by booking status: spinal anesthesia was used more frequently in unbooked women (85.5% vs 69.5%, $p = 0.0287$), excessive scar tissue or adhesions were identified more often among unbooked women (10.9% vs 2.1%, $p = 0.0208$), and any intraoperative complication occurred in 18.2% of unbooked versus 7.4% of booked women ($p = 0.0441$).

Table 2: Indications for Primary Cesarean Section and Intraoperative Findings by Antenatal Booking Status (n = 150)

Parameter	Booked (n = 95)	Unbooked 55)	(n =	P value
Fetal distress, n (%)	26 (27.4)	14 (25.5)		0.7984
Malpresentation (breech/transverse), n (%)	19 (20.0)	15 (27.3)		0.3053
Non-progress/obstructed labor, n (%)	12 (12.6)	11 (20.0)		0.2274
Hypertensive disorder (severe pre-eclampsia), n (%)	14 (14.7)	6 (10.9)		0.5063
Antepartum hemorrhage, n (%)	10 (10.5)	3 (5.5)		0.2874
Spinal anesthesia, n (%)	66 (69.5)	47 (85.5)		0.0287*
Excessive scar tissue/adhesions, n (%)	2 (2.1)	6 (10.9)		0.0208*
Any intraoperative complication, n (%)	7 (7.4)	10 (18.2)		0.0441*
Estimated blood loss > 1000 mL, n (%)	6 (6.3)	7 (12.7)		0.1786

Data presented as n (%). P values derived from the Pearson chi-square test. *Statistically significant ($p < 0.05$); expected cell frequencies below five were present for several indication and intraoperative categories, and these estimates should be interpreted with due caution.

Postoperative morbidity showed the most pronounced disparity. Any postoperative complication occurred in 58.2% of unbooked women compared with 16.8% of booked women (p

< 0.0001), with febrile morbidity (23.6% vs 4.2%, $p = 0.0003$) and wound infection (18.2% vs 1.1%, $p = 0.0001$) chiefly responsible. Median hospital stay was correspondingly longer among unbooked women (7 vs 5 days, $p = 0.0004$), and stay ≥ 7 days was required in half of unbooked women versus 15.8% of booked women ($p < 0.0001$). [Table 3] Neonatal outcomes, in contrast, showed no significant between-group differences in birth weight, Apgar score, or NICU admission.

Table 3: Postoperative Maternal Morbidity, Hospital Stay and Neonatal Outcomes by Antenatal Booking Status (n = 150)

Parameter	Booked (n = 95)	Unbooked 55)	(n =	P value
Any postoperative complication, n (%)	16 (16.8)	32 (58.2)		< 0.0001 *
Febrile morbidity, n (%)	4 (4.2)	13 (23.6)		0.0003*

Wound infection, n (%)	1 (1.1)	10 (18.2)		0.0001*
Hospital stay ≥ 7 days, n (%)	15 (15.8)	28 (50.9)		<0.0001*
Neonatal birth weight (kg), mean $\pm$ SD	2.98 $\pm$ 0.47	3.00 $\pm$ 0.54		0.8457

Data presented as mean $\pm$ standard deviation or n (%) as appropriate. P values derived from the independent-samples t-test or Pearson chi-square test as applicable. *Statistically significant ($p < 0.05$). NICU, neonatal intensive care unit.

DISCUSSION

This prospective study of 150 multiparous women with prior vaginal delivery undergoing primary CS demonstrates that antenatal booking status, rather than parity itself, is the principal determinant of surgical complexity and postoperative morbidity in this population. Consistent with prior Indian series, fetal distress and malpresentation predominated as indications for primary CS irrespective of booking status.^[9,13,24] reaffirming that prior successful vaginal delivery does not confer durable protection against new-onset intrapartum complications in a subsequent pregnancy.^[1,2,4]

The comparable distribution of indications between booked and unbooked women in our cohort suggests that the underlying obstetric pathology precipitating primary CS — fetal compromise, malposition, or labor dystocia — arises largely independently of antenatal surveillance. What differed substantially was the downstream surgical and postoperative course: unbooked women more frequently exhibited adnexal adhesions and intraoperative complications, and experienced markedly higher rates of febrile morbidity, wound infection, and prolonged hospitalization. This pattern parallels observations from other Indian tertiary centers, where unbooked or unregistered status has been associated with excess maternal morbidity even after accounting for the indication for delivery.^[22,23] Plausible mechanisms include later presentation in advanced or obstructed labor with attendant tissue edema and contamination risk, cumulative unaddressed anemia or subclinical infection, and reduced opportunity for perioperative risk stratification and antibiotic optimization before delivery.^[18]

The marked excess of wound infection among unbooked women is of particular concern given its downstream implications for hospital-stay duration, healthcare cost, and the trajectory of future pregnancies, since adhesions encountered at this primary CS may themselves predispose to increased operative complexity at any subsequent cesarean delivery.^[14,15] Reassuringly, neonatal outcomes were largely equivalent between groups, mirroring the comparable distribution of operative indications; this suggests that once operative decision-making occurs, contemporary intrapartum and neonatal resuscitation practices at this center offset much of the risk associated with unbooked presentation, consistent with findings from a comparably designed multiparous CS cohort in South India.^[26]

These findings carry direct clinical implications. First, prior vaginal delivery should not be used as a surrogate marker of low intrapartum risk in either clinical counseling or resource allocation.^[8,17] Second, the striking morbidity gradient by booking status reinforces the emphasis placed by international guidance on universal, timely antenatal registration and contact-based antenatal care as a foundation for safe delivery, particularly in rural and underserved settings.^[10] Third, targeted perioperative infection-prevention measures, including structured antibiotic prophylaxis and vigilant wound surveillance, may be warranted specifically for women presenting unbooked, given their disproportionate contribution to postoperative morbidity. Limitations of this study include its single-center design, the use of a pragmatic institutional definition of booking status, and the absence of a comparative vaginal-delivery control group, which precludes direct estimation of the relative risk attributable to operative delivery itself.

CONCLUSION

Primary cesarean section among multiparous women with previous vaginal delivery remains predominantly driven by fetal distress and malpresentation, irrespective of antenatal booking status, confirming that multiparity does not equate to intrapartum safety. However, unbooked status was independently associated with greater intraoperative complexity and substantially higher postoperative morbidity, including febrile illness, wound infection, and prolonged hospitalization, without a corresponding excess in adverse neonatal outcomes. These findings argue for universal antenatal registration, individualized risk assessment regardless of parity, and targeted perioperative vigilance for unbooked women to reduce preventable maternal morbidity in this frequently overlooked obstetric subgroup.

REFERENCES

1. Solomon B. The dangerous multipara. *Lancet*. 1932;2:8–11.
2. Gibb DMF, Cardozo LD, Studd JWW, Magos AL, Cooper DJ. Outcome of spontaneous labour in multigravidae. *Br J Obstet Gynaecol*. 1982;89:708–11.
3. Parrish KM, Holt VL, Easterling TR, Connell FA, LoGerfo JP. Effect of changes in maternal age, parity, and birth weight distribution on primary cesarean delivery rates. *JAMA*. 1994;271(6):443–7.
4. Danielian PJ, Wang J, Hall MH. Long-term outcome by method of delivery of fetuses in breech presentation at term: population based follow up. *BMJ*. 1996;312(7044):1451–3.
5. Thomas J, Callwood A, Brocklehurst P, Walker J. The National Sentinel Caesarean Section Audit. *BJOG*. 2000;107(5):579–80.
6. National Institutes of Health. NIH state-of-the-science conference statement: cesarean delivery on maternal request. *Obstet Gynecol*. 2006;107(6):1386–97.

7. Nahar K. Indications of caesarean section - study of 100 cases in Mymensingh Medical College Hospital. *J Shaheed Suhrawardy Med Coll.* 2009;1(1):6–10.
8. Boyle A, Reddy UM, Landy HJ, Huang CC, Driggers RW, Laughon SK. Primary cesarean delivery in the United States. *Obstet Gynecol.* 2013;122(1):33–40.
9. Rao JH, Rampure N. Study of primary caesarean section in multiparous women. *J Evol Med Dent Sci.* 2013;2(24):4414–8.
10. World Health Organization. WHO Recommendations on Antenatal Care for a Positive Pregnancy Experience. Geneva: World Health Organization; 2016.
11. Sengodan SS, N S. Prevalence of hypertensive disorders in pregnant women in a tertiary care centre in Tamil Nadu. *Int J Reprod Contracept Obstet Gynecol.* 2019;9(1):236–9.
12. Jain M, Patel A. A cross sectional study of rate, indications and complications of primary caesarean section. *Int J Reprod Contracept Obstet Gynecol.* 2017;5(6):1814–9.
13. Mohan SS, Thippeveranna C, Singh LR, Singh NN. Primary caesarean section in multiparous women: a clinical study from tertiary care centre in North East India. *Indian J Obstet Gynecol Res.* 2017;4(4):420–3.
14. Sams S, Chacko TJ, Balachandran A. Institutional study of primary cesarean section among multigravida. *J Med Sci Clin Res.* 2017;5(4):20743–7.
15. Rajput N, Singh P, Verma YS. Study of primary caesarean section in multigravida patients. *Int J Reprod Contracept Obstet Gynecol.* 2018;7(1):185–91.
16. Kumar P, Dhaka M, Gaur SS, Pant R, Banerjee KP. Study the assessment of risk factor for primary caesarean section in multigravida. *Int J Med Biomed Stud.* 2020;4(1):21–4.
17. Somalwar S, Bansal R. Study of primary caesarean section in multiparous women in Central India. *J Krishna Inst Med Sci Univ.* 2020;9(4):1–10.
18. Khan T, Mushtaq E, Khan F, Ahmad A, Sharma KA. Decreasing the rate of surgical site infection in patients operated by cesarean section in a tertiary care hospital in India: a quality improvement initiative. *Cureus.* 2023;15(1):e34439.
19. Neethi Mohan V, Shirisha P, Vaidyanathan G, Muraleedharan VR. Variations in the prevalence of caesarean section deliveries in India between 2016 and 2021 - an analysis of Tamil Nadu and Chhattisgarh. *BMC Pregnancy Childbirth.* 2023;23(1):622.
20. Betrán AP, Ye J, Moller AB, Souza JP, Zhang J. Trends and projections of caesarean section rates: global and regional estimates. *BMJ Glob Health.* 2021;6(6):e005671.
21. Malik N, Kapoor B, Singh R, Sarkar R, Khan IA. Cesarean section trends and associated factors at a tertiary care center in India: a retrospective study. *Cureus.* 2024;16(11):e73308.
22. Gaikwad V, Bhadoriya A, Gaikwad S. A comparative study of fetal and maternal outcomes in registered and unregistered antenatal cases in a tertiary care center. *Cureus.* 2024;16(8):e66066.
23. Ali ST, Rizvi SA, Talat M, Abuzar S, Azhar M, Rehman M. Barriers to timely and adequate antenatal care: a systematic review of socioeconomic, cultural, psychosocial, and health-system factors across high- and low-resource settings. *BMC Pregnancy Childbirth.* 2025;26:96.
24. Kaur K, Garg SS, Garg M, Grover S. Primary cesarean section in multigravida women: trends and outcomes in a tertiary care setting. *Cureus.* 2025;17(6):e85517.
25. Priyanka MS, Abigail HH, Priya GP, Jeyamani B. Primary cesarean section in multiparous women with previous vaginal deliveries: a prospective clinical study from a tertiary care center in South India. *Indian J Obstet Gynecol Res.* 2026;13(2):241–8.