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Background

The caesarean section (CS) rate in India has increased from 3% in 1992–93 to 21.5% in 2019–21¹. With rising CS rates following induction of labour (IOL), personalised risk prediction is crucial to reduce unnecessary interventions and improve outcomes. Although several predictive models exist, few have been externally validated across diverse populations²⁻³.

The ECSIL model, based on maternal demographics, medical history, and cervical examination, aims to predict the likelihood of CS.

Objective

To externally validate the ECSIL model (developed by Dorwal et al.⁴) to predict emergency CS following IOL in singleton term pregnancies.

Methodology

- **Design:** Prospective observational study
- **Setting:** AIIMS Jodhpur
- **Duration:** July 2023 – March 2024
- **Inclusion Criteria:** Term (37–42 weeks), singleton pregnancies with cephalic presentation and unfavourable cervix (Bishop score ≤ 6), undergoing IOL for medical/obstetric indications
- **Exclusion Criteria:** Favourable cervix (Bishop score > 6), multifetal gestation, uterine scar, malpresentation, abnormal placentation, distorted pelvis, infections, malignancy, fetal demise, hypersensitivity to dinoprostone, hydrocephalus, and non-reassuring fetal status at IOL initiation.
- Variables used in the prediction model (parity, membrane sweep at term, cervical dilation, cervical consistency, cervical length, fetal station, cervical position, patient height, and weight gain during pregnancy) were extracted from medical records to calculate individual CS risk. The accuracy of the ECSIL calculator was assessed using receiver-operating characteristic (ROC) analysis.

Study Population

During study period, 645 women underwent IOL; 500 met the inclusion criteria and were enrolled. 145 were excluded as shown in *Figure 2*.

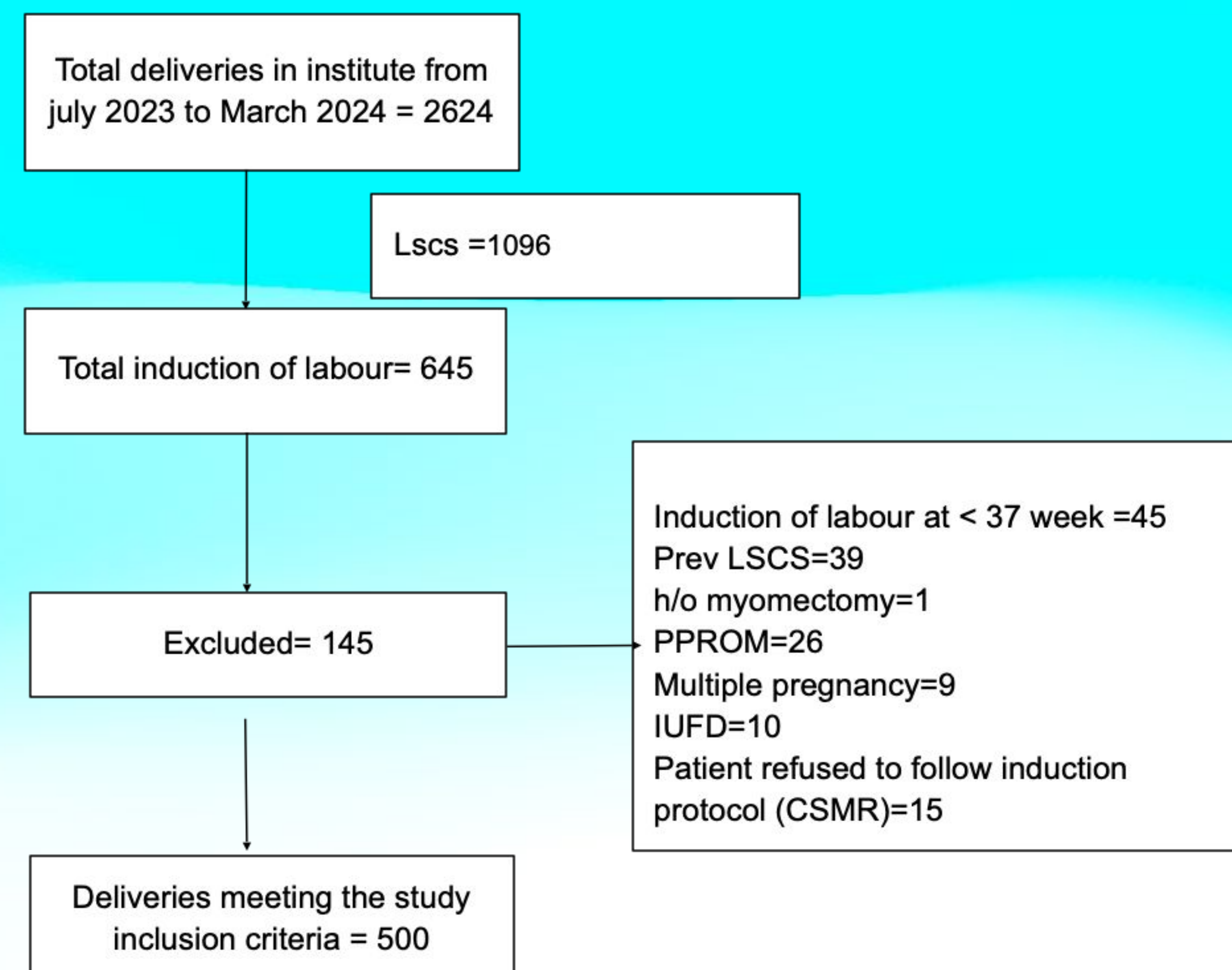


Table 1: Outcome of IOL in the study population

Outcome	No. of women	Percentage
Vaginal birth	314	62.8
LSCS	174	34.8
Instrumental delivery	12	2.4
Total	500	100.0

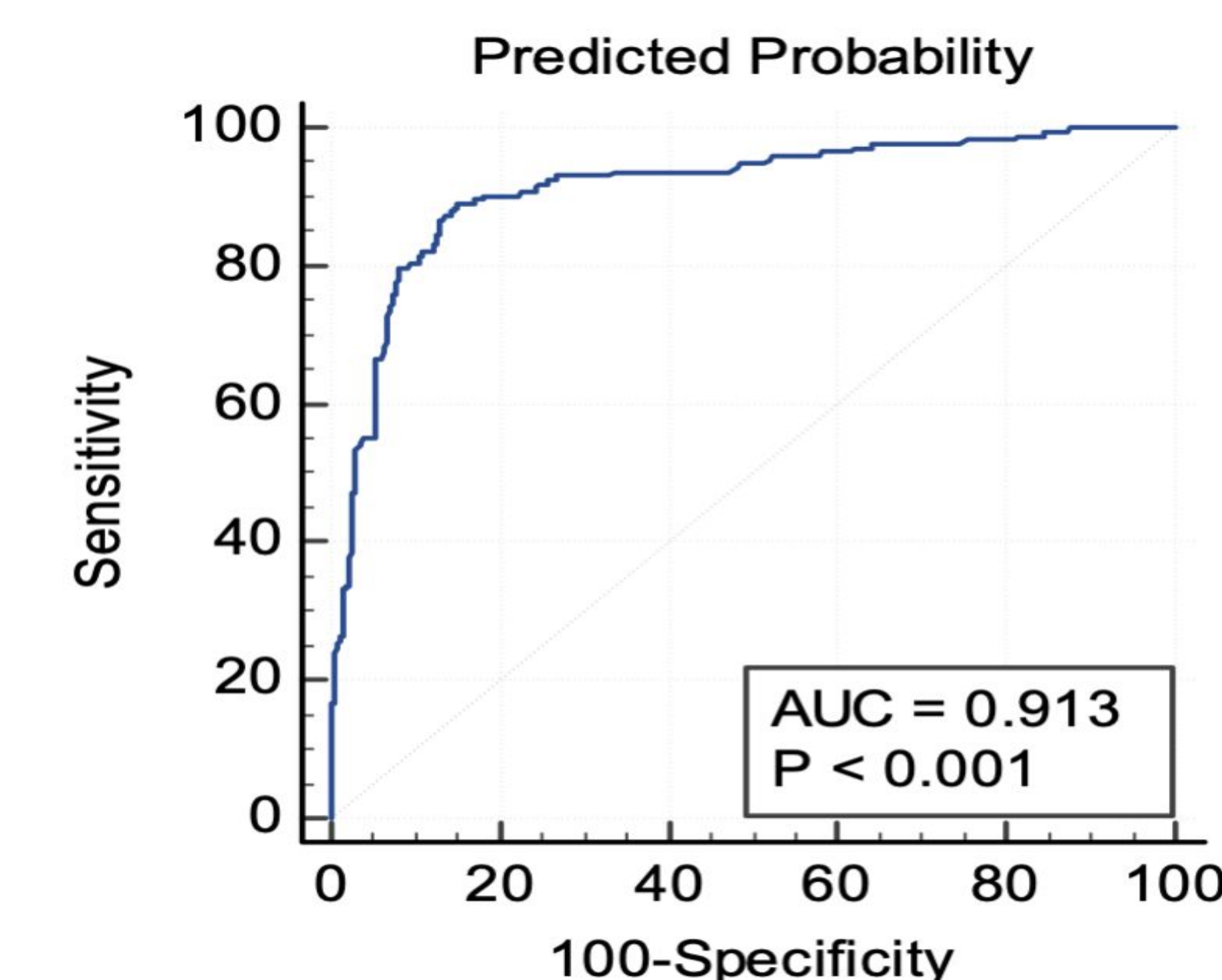
	A	B	C	D	E	F
1	Variable	Units		ENTER_VALUE		Predicted_Probability
2	Parity	1: Nulliparous; 0: Multiparous		1		0.755107249
3	Sweepstretch	1: Not Done; 0: Done		1		
4	CervicalDilatation	1: No dilatation; 0: 1-2 cms dilatation		1		
5	Cervical_Consistency_Coded	1: Firm or Medium; 0: Soft		1		
6	Cervical_Length_Coded	1: >3 cms, 0: < 3cms		1		
7	Fetalstation	1:-3 above spine, 0: -2 above spine		1		
8	Cervicalposition	1:Posterior, 0:Midposition		1		
9	Height	in cms		150		
10	WeightGaineduringpregnancy	in kgs		10		
11	Constant					

Figure 1 Web-based calculator used for predicting cesarean section risk following induction of labor

Results

Statistical Analysis:

- Software: **MedCalc Statistical Software v23.0**
- Method: ROC analysis to assess ECSIL predictive accuracy



AUC: 0.913 → *Excellent discriminatory power*

Sensitivity: 89.08% → *Correctly identifies CS cases*

Specificity: 84.97% → *Correctly identifies non-CS cases*

Cut-off probability: $>0.416 \rightarrow$ Threshold above which CS is likely

95% Confidence Interval for AUC: 0.885 – 0.936

P-value: $<0.0001 \rightarrow$ *Statistically significant*

Conclusion

The ECSIL model demonstrates high accuracy in predicting cesarean sections following IOL.

The high sensitivity ensures that most cases requiring cesarean sections are correctly identified, while the good specificity minimizes unnecessary interventions.

The model is effective for clinical use, but further validation in different populations is recommended to confirm its applicability across diverse groups.

Reference

1. International Institute for Population Sciences (IIPS). National Family Health Survey (NFHS-5) 2019-21: India. Natl Fam Health Surv India. 2021. Available from: <http://rchiips.org/nfhs/>
2. Rossi RM, Requarth E, Warshak CR, et al. Risk calculator to predict cesarean delivery among women undergoing induction of labour. *Obstet Gynecol*. 2020;135(3):559-568.
3. Jochum F, Le Ray C, Blanc-Petitjean P, et al. Externally validated score to predict caesarean delivery after labor induction with cervix ripening. *Obstet Gynecol*. 2019;134(3):502-510.
4. Dorwal M, Yadav G, Singh P, et al. Deriving a prediction model for emergency cesarean delivery following induction of labor in singleton term pregnancies. *Int J Gynecol Obstet*. 2022;00(0):1-9