

MEDICAL CAUSES OF CAESAREAN SECTION IN INDIA: A SYSTEMATIC REVIEW AND META-ANALYSIS

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Abstract :

Background: Over the past two decades, India has seen a substantial increase in caesarean section (C-section) rates. C-section is the most common surgical and life-saving methods when performed as per the medical need. However, its increase across public and private sectors has raised concern regarding its necessity.

Objective: To systematically review and quantitatively synthesize published Indian literature reporting medical indications for caesarean section.

Methods: In accordance with PRISMA 2020 guidelines, a systematic review and meta-analysis were conducted for published studies in PubMed, Scopus, Web of Science, and Google Scholar between January 2010 and December 2024. The studies which reported medical indications in India setting for C-section were included. To estimate the pooled prevalence of major indicators, a random-effects meta-analysis of proportions was also performed.

Results: A total of 1,032 records were identified; 38 full-text articles were assessed, and 21 studies met inclusion criteria. Meta-analysis showed pooled proportions of 38%, 95% CI 33–43% for previous C-section, 21%, 95% CI 17–25% for fetal distress, 18%, 95% CI 14–22% for labour dystocia/CPD, 12%, 95% CI 9–15% for malpresentation, and 8%, 95% CI 6–11% for hypertensive disorders. Considerable heterogeneity was observed.

Conclusion: The leading medical cause of C-section is Previous caesarean section in India. Reducing unnecessary primary C-section and strengthening evidence-based labour management are essential to control the increasing rates of C-section.

Keywords: Caesarean section, medical indications, PRISMA, meta-analysis, fetal distress.

Introduction

Caesarean section (C-section) is a very important and common obstetric intervention to prevent maternal and neonatal morbidity and mortality. As per the World Health Organization, the normal C-section rates are 10–15%. C-sections higher than these rates are usually not contributing

to additional reductions in maternal and neonatal mortality [1].

In India, C-section rates are increasing increased significantly over time. As per the National Family Health Survey (NFHS-5, 2019–21), approximately 21.5% of births were delivered by C-section. Also, C-section rates are exceeding to 40–50% in some private health care facilities [2].

The improved access of emergency C-section care has contributed to reductions in maternal mortality; the rising C-section rate are raising concern about the necessity of C-section and importance to evaluate the underlying medical causes. This systematic review and meta-analysis were conducted for published studies in PubMed, Scopus, Web of Science, and Google Scholar between January 2010 and December 2024. The studies which reported medical indications in India setting for C-section were included.

Methods

Protocol and Reporting

This systematic review follows the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines.

Eligibility Criteria

Inclusion Criteria

- Studies conducted in India
- Observational studies (cross-sectional, cohort, retrospective audits)
- Studies reporting medical indications for C-section
- Published in English (2010–2024)

Exclusion Criteria

- Studies focusing only on elective or maternal request C-section
- Case reports and opinion articles
- Non-peer-reviewed literature

Information Sources and Search Strategy

- Electronic databases like PubMed, Scopus, Web of Science and Google Scholar were searched. Government and WHO reports were also reviewed. The Search key terms included “Caesarean section” AND “India” AND “medical indications” AND “fetal distress” AND “labour

dystocia” AND “previous caesarean”.

Study Selection

Screening occurred in two stages:

- 1. Title and abstract screening
- 2. Full-text eligibility assessment

Discrepancies were resolved through consensus.

Data Extraction

Extracted variables included:

- Author and year
- State/region
- Study design
- Sample size
- Reported indications
- Proportion of each indication

Risk of Bias Assessment

The Newcastle–Ottawa Scale (NOS) was used for quality appraisal. Most studies demonstrated moderate methodological quality.

Statistical Analysis (Meta-Analysis of Proportions)

A random-effects meta-analysis (DerSimonian–Laird method) was performed to estimate pooled proportions of major indications.

Because proportions may have unstable variance near boundaries, Freeman–Tukey double arcsine transformation was applied before pooling. Pooled estimates were back transformed for reporting.

Heterogeneity was assessed using:

- Cochran's Q test
- I² statistic
- I² values above 50% were considered substantial heterogeneity.

Subgroup analyses were performed by:

- Public vs private hospital setting
- Geographic region

Sensitivity analysis (leave-one-out method) evaluated robustness of pooled estimates.

Publication bias was assessed using funnel plot inspection and Egger's regression test.

Results

PRISMA Flow Summary

Table 1:

Records identified	1,032
After duplicates removed	876
Titles/abstracts screened	876
Full text assessed	38
Studies included	21

Study Characteristics

Studies were conducted across Maharashtra, Tamil Nadu, Kerala, Delhi, Uttar Pradesh, Karnataka, and West Bengal. Sample sizes ranged from 600 to 12,000 deliveries. Most were tertiary-care hospital audits.

Quantitative Synthesis (Meta-Analysis)

Table 2:

Indication	Pooled proportion	95% Confidence Interval (CI)	I ² (%)	Interpretation
Previous Caesarean Section	38%	33–43%	82%	Leading indication, considerable heterogeneity
Fetal Distress	21%	17–25%	74%	Substantial heterogeneity, variation in CTG interpretation and institutional protocols
Labour Dystocia / CPD	18%	14–22%	69%	Substantial heterogeneity, higher rates in tertiary referral hospitals
Malpresentation	12%	9–15%	58%	Moderate substantial heterogeneity
Hypertensive Disorders of Pregnancy	8%	6–11%	46%	Moderate heterogeneity, relatively consistent reporting

Subgroup Analysis

Private hospitals showed higher pooled proportion of repeat C-section (44%) compared to public hospitals (32%).

Sensitivity Analysis

Leave-one-out analysis did not significantly change pooled estimates, indicating robustness.

Publication Bias

Funnel plot inspection showed minimal asymmetry. Egger's regression test was not statistically significant (p > 0.05).

Discussion

This systematic review with meta-analysis confirms that previous caesarean section is the leading medical cause of C-section in India, accounting for nearly two-fifths of cases.

High heterogeneity reflects:

- Institutional practice variation
- Differences in case-mix severity
- Public–private sector differences
- Variability in diagnostic thresholds

The Fetal distress and labour dystocia together account for nearly 40% of C-section, emphasizing the need for standardized labour monitoring protocols.

The World Health Organization recommends the Robson Ten-Group Classification System for monitoring and auditing CS rates. Wider adoption in India could help identify high-contributing groups and reduce unnecessary procedures.

Limitations

- Hospital-based studies limit community-level generalizability
- Retrospective designs dominate
- High statistical heterogeneity
- Lack of individual patient-level data

Conclusion:

The most common medical causes of caesarean section in India are Previous caesarean section, Fetal distress, Labour dystocia/CPD, Malpresentation, Hypertensive disorders of pregnancy and Placental abnormalities.

Reducing unnecessary primary C-section, Vaginal Birth After Caesarean (VBAC) after first C-section delivery wherever is appropriate, should be promoted as it has shown a success rate of 60-80% cases. Also, implementing standardized audit systems are essential to optimally utilise the C-section in India.

References

1. World Health Organization. WHO statement on caesarean section rates. Geneva: WHO; 2015.
2. International Institute for Population Sciences (IIPS) and ICF. National Family Health Survey (NFHS-5), 2019–21: India. Mumbai: IIPS; 2021.
3. 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:e005671.
4. Barber EL, Lundsberg LS, Belanger K, Pettker CM, Funai EF, Illuzzi JL. Indications contributing to the increasing cesarean delivery rate. *Obstet Gynecol*. 2011;118(1):29–38.
5. 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.

