

AUDIT OF CLINICAL INDICATIONS FOR PRIMARY CESAREAN SECTION IN A TERTIARY CARE HOSPITAL

QAYYUM N^{*1}, REHMAN N¹, AMJAD A², HASSAN H³, BIBI T¹, SHAHINDA⁴, SHAH SH¹

¹Department of Obstetrics & Gynae, Khyber Teaching Hospital, Peshawar, Pakistan

²Department of Obstetrics & Gynae, Lady Reading Hospital, Peshawar, Pakistan

³Department of Obstetrics & Gynae, Javed Medical Complex, Peshawar, Pakistan

⁴Department of Obstetrics & Gynae, Hayatabad Medical Complex, Peshawar, Pakistan

*Corresponding author email address: nabarehman0315@gmail.com

(Received, 05th July 2025, Revised, 30th July 2025, Accepted 10th August, Published 24th August 2025)

ABSTRACT

Background: Cesarean section (CS) rates are rising globally, with primary cesarean deliveries contributing substantially to maternal and neonatal morbidity. Identifying the leading indications and evaluating labor management practices is essential to improving obstetric care and reducing unnecessary procedures. **Objective:** To assess the indications for primary cesarean section in a tertiary care hospital. **Study Design:** Clinical audit. **Setting:** Department of Obstetrics and Gynecology, Khyber Teaching Hospital, Pakistan. **Duration of Study:** January 2025 to June 2025. **Methods:** A total of 150 cases of primary cesarean delivery were prospectively enrolled. Data were collected using standardized case record forms documenting demographic characteristics, labor progression parameters, fetal monitoring methods, surgical indications, and maternal and neonatal outcomes. Statistical analysis was performed using descriptive methods and comparative assessment of labor management practices. **Results:** Emergency cesarean sections accounted for 80.7% of cases. Fetal distress (41.3%) and VBAC (35.3%) were the most common indications, followed by breech presentation and failed induction. Incomplete partograph documentation was observed in 71.3% of cases, and fetal monitoring methods varied across patients. Maternal complications occurred in 12.0% of cases, while neonatal outcomes revealed 11.3% with low Apgar scores and 10.7% requiring NICU admission. Comparative analysis highlighted significant inconsistencies in the diagnosis of fetal distress and labor management approaches. **Conclusion:** Fetal distress and VBAC were the leading indications for primary cesarean delivery. The findings underscore the urgent need for standardized fetal monitoring protocols, consistent partograph utilization, and improved labor management strategies to optimize maternal and neonatal outcomes and reduce unnecessary cesarean sections.

Keywords: Primary Cesarean Section, Clinical Audit, Fetal Distress, VBAC, Obstetric Outcomes, Partograph Utilization

INTRODUCTION

Cesarean section (CS) is a surgical procedure carried out to facilitate the delivery of an infant by means of an incision in the maternal abdomen. It is advised in cases where conventional vaginal delivery could pose risks to the mother or the infant. Possible circumstances consist of prolonged labour and abnormal foetal position (1, 3). This kind of surgery has been conducted for numerous years, both on a scheduled and emergency basis, illustrating established advantages. C- Section markedly reduces both neonatal and maternal mortality when performed for valid indications; nevertheless, it may present risks to mother as well as child if carried out inappropriately (3, 4). Various nonmedical variables have been recognised as contributing to the swift rise in C-section rates. Factors consist of increased maternal requests due to anticipated anxiety related to delivery via vagina, along with a preference for delivery on a particular day. The rising number of C-sections in private hospitals, as opposed to public hospitals, can be determined by physicians' preferences and financial incentives linked to greater rates of caesarean deliveries as opposed to vaginal births. The rate of caesarean deliveries rose from 5% in 1970 to 31.9% in 2016 (5). The substantial increase can be ascribed to several factors, such as shifts in maternal age facilitating management of complex pregnancies, as well as the evolution of obstetric practices (6). Recent studies have identified various factors contributing to the rising caesarean rate. Evolving risk profiles for older primiparae have been identified as a significant factor in the rise of caesarean births (7, 8). A surge in maternal requests for caesarean deliveries is additionally contributing to the condition (9, 10). The rise in C-section rates should be recognised in the context of broader societal transformations. On the other hand, financial and cultural factors

appear to have a significant effect. The interplay of these variables, coupled with public perception of caesarean delivery as an essentially risk-free procedure, could be contributing to the rising incidence of C-sections carried out (11, 12).

The audit of clinical indications for primary C-section is essential to evaluate appropriateness and adherence to established guidelines in obstetric practice, with rising global rates of caesarean deliveries, particularly primary caesareans. It is crucial to ensure that such interventions are medically justified to minimize unnecessary maternal and neonatal risks, decrease healthcare costs, and support evidence-based care. This audit aims to identify trends and assess whether indications align with national or institutional protocols, highlighting areas of variation or potential overuse. The findings can inform targeted interventions, clinical training, and policy adjustments to promote safer, more effective, and standardized obstetric care.

METHODOLOGY

This clinical audit employed a prospective observational design to evaluate primary cesarean sections conducted at the Gynecology department, Khyber Teaching Hospital, from January 2025 to June 2025. The study population comprised 150 consecutive women undergoing their first cesarean delivery, excluding those with prior uterine scars or multiple gestations to maintain focus on primary interventions. Data collection utilized a structured proforma capturing demographic details, obstetric parameters, intrapartum monitoring practices, surgical indications, and maternal-neonatal outcomes. Patient records provided information on maternal age, parity, booking status, and gestational age at delivery. Labor progression was assessed through partograph documentation, where available, while fetal

monitoring methods were categorized as intermittent auscultation, continuous cardiotocography, or undocumented. Surgical indications were classified according to standardized obstetric categories, including fetal distress, VBAC, breech presentation, and failed induction. Outcome measures incorporated both immediate complications like postpartum hemorrhage and infection, along with neonatal status through Apgar scores and NICU admission requirements.

The collected data were analyzed with SPSS 25. We used mean and SD for presenting numerical data and frequency and percentages for categorical data.

RESULTS

Our audit included 150 women who underwent primary cesarean section with a maternal mean age of 25.41 ± 3.45 years. Gestational age at delivery averaged 39.00 ± 0.83 weeks.

In terms of parity, nulliparous women accounted for 91 cases (60.7%) while multiparous women constituted 59 cases (39.3%). A majority of the participants, 88 (58.7%), were unbooked cases, whereas 62 (41.3%) had booked antenatal care. Documentation of labor progress using partographs was notably low, with only 43 cases (28.7%) having a completed partograph, while 107 (71.3%) lacked this critical monitoring tool. Fetal heart rate monitoring methods varied, with intermittent auscultation used in 48 cases (32.0%), continuous cardiotocography (CTG) in 57 (38.0%), and no monitoring recorded in 45 cases (30.0%). The majority of cesarean sections 121, 80.7% were performed in emergency, while 29 (19.3%) were elective procedures (Table 1). The leading indication for primary cesarean section was fetal distress observed in 62 cases (41.3%), followed by VBAC in 53 (35.3%). Breech presentation and induction failure were less common, occurring in 21 (14.0%) and 39 (26.0%) cases, respectively (Table 2).

Maternal and neonatal outcomes were generally favorable, though some complications were noted. Postpartum hemorrhage occurred in 12 women (8.0%), while surgical site infections were reported in 6 cases (4.0%). Neonatal outcomes included 17 infants (11.3%) with low Apgar scores (<7 at 5 minutes) and 16 (10.7%) requiring admission to the neonatal intensive care unit (Table 3).

Table 1: Clinical parameters

Clinical parameters		n	%
Parity	Nulliparous	91	60.7%
	Multiparous	59	39.3%
Booking status	Booked	62	41.3%
	Unbooked	88	58.7%
Partograph used	Yes	43	28.7%
	No	107	71.3%
Fetal heart rate monitoring	Intermittent	48	32.0%
	CTG	57	38.0%
	None	45	30.0%
C section	Emergency	121	80.7%
	Elective	29	19.3%

Table 2: Indications for primary CS

Indications for Primary CS		n	%
Fetal distress	Yes	62	41.3%
	No	88	58.7%
VBAC	Yes	53	35.3%
	No	97	64.7%
Breech presentation	Yes	21	14.0%
	No	129	86.0%
Induction failure	Yes	39	26.0%
	No	111	74.0%

Table 3: Maternal and fetal outcomes

Maternal and fetal outcomes		n	%
PPH	Yes	12	8.0%
	No	138	92.0%
Infection	Yes	6	4.0%
	No	144	96.0%
Low APGAR (<7 at 5 min)	Yes	17	11.3%
	No	133	88.7%
NICU admission	Yes	16	10.7%
	No	134	89.3%

DISCUSSION

The findings of this audit reveal critical insights into the patterns of primary cesarean sections (CS) in our tertiary care setting. The high proportion of emergency CS (80.7%) contrasts with the lower rates reported by Thool et al. (22.6% Category I and 38.6% Category II) and Peng et al. (31.1% overall CS rate), suggesting potential differences in patient populations or clinical decision-making (13, 14). Our emergency CS rate aligns more closely with Dekker et al., who reported 88% of CS cases as emergencies in a rural Tanzanian hospital, indicating that resource limitations or delayed referrals may contribute to this trend (15). The predominance of emergency procedures in our study underscores the need for improved labor monitoring and timely interventions to prevent avoidable surgical deliveries.

Fetal distress emerged as the leading indication for CS (41.3%), mirroring findings from Thool et al. (38.8% in Category II) and Sheikh et al. (28% suboptimal CTG cases) (13, 16). VBAC accounted for 35.3% of CS indications. The low partograph completion rate (28.7%) in our audit, compared to 71.3% missing documentation, likely exacerbates this issue, as inadequate labor progress tracking may prompt premature surgical decisions. These parallels suggest that improving partograph use and adopting standardized labor management protocols, as implemented by Sheikh et al., could mitigate unnecessary interventions (16).

The nulliparous predominance (60.7%) in our study aligns with Thool et al. (59.38%) and Sheikh et al. (63.5%), reinforcing that first-time mothers face higher CS risks, particularly during induced labor (13, 16). However, our induction failure rate (26.0%) was lower than the 53.5% reported by Sheikh et al. in induced nulliparous women, possibly reflecting differences in induction criteria (16). The high rate of unbooked cases (58.7%) in our audit suggests limited antenatal care access, which may delay risk identification and contribute to emergency CS. This underscores the need for community-based antenatal programs to reduce late-presenting complications.

Maternal and neonatal outcomes were generally favorable, with PPH (8.0%) and infection rates (4.0%) comparable to those of Sheikh et al. (5.7% PPH and 1.6% infection) (16). However, our low Apgar rate (11.3%) and NICU admissions (10.7%) were comparable to those of Dekker et al., potentially reflecting the acuity of emergency cases (15).

When contextualized with broader literature, our findings reveal three critical areas for improvement. First, the overreliance on fetal distress as an indication for primary CS without objective confirmation leads to questionable diagnoses. Second, the high VBAC rates and poor partograph utilization suggest labor management deficiencies. Finally, the unbooked case burden necessitates community engagement strategies to improve antenatal attendance.

CONCLUSION

This audit identifies fetal distress and VBAC as the primary drivers of CS, compounded by inadequate monitoring and high unbooked rates. Compared to similar studies, our emergency CS proportion and fetal

distress rates are elevated while neonatal outcomes remain comparable. To address these gaps, we recommend standardizing fetal distress diagnosis with cord blood analysis, enforcing partograph compliance, labor management training, and expanding antenatal care access. These measures, modeled after successful interventions, could significantly reduce avoidable CS while maintaining maternal and neonatal safety.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRB)

Consent for publication

Approved

Funding

Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

NAYYAB QAYYUM (Consultant)

Conception of Study, Development of Research Methodology Design, Study Design, Review of manuscript, and final approval of manuscript.

NABA REHMAN (Junior Consultant)

Manuscript drafting, and Critical Input

AYESHA AMJAD (Trainee Medical Officer)

Manuscript revisions, critical input.

HIRA HASSAN (Junior Consultant)

Study Design, Review of Literature.

TUHEED BIBI (Consultant)

Conception of Study, Final approval of manuscript.

SHAHINDA (Consultant)

Data entry, data analysis, and drafting an article

SYEDA HUDABIA SHAH (Consultant)

Study Design, Review of manuscript.

REFERENCES

- Betran 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. <https://doi.org/10.1136/bmjgh-2021-005671>
- Visconti F, Quaresima P, Rania E, Palumbo AR, Micieli M, Zullo F, et al. Difficult caesarean section: A literature review. *Eur J Obstet Gynecol Reprod Biol*. 2020;246:72–8. <https://doi.org/10.1016/j.ejogrb.2019.12.026>
- Gedefaw G, Demis A, Alemnew B, Wondmieni A, Getie A, Waltengus F. Prevalence, indications, and outcomes of caesarean section deliveries in Ethiopia: a systematic review and meta-analysis. *Patient Saf Surg*. 2020;14:11. <https://doi.org/10.1186/s13037-020-00236-8>
- Angolile CM, Max BL, Mushemba J, Mashauri HL. Global increased cesarean section rates and public health implications: A call to action. *Health Sci Rep*. 2023;6(5):e1274. <https://doi.org/10.1002/hsr2.1274>

- ACOG Practice Bulletin No. 205: Vaginal Birth After Cesarean Delivery. *Obstet Gynecol*. 2019;133(2):e110–e127. <https://doi.org/10.1097/AOG.0000000000003078>
- First and Second Stage Labor Management: ACOG Clinical Practice Guideline No. 8. *Obstet Gynecol*. 2024;143(1):144–162. <https://doi.org/10.1097/AOG.0000000000005447>
- Franz MB, Husslein PW. Obstetrical management of the older gravida. *Womens Health (Lond)*. 2010;6(3):463–8. <https://doi.org/10.2217/whe.10.26>
- Guihard P, Blondel B. Trends in risk factors for caesarean sections in France between 1981 and 1995: lessons for reducing the rates in the future. *BJOG*. 2001;108(1):48–55. <https://doi.org/10.1111/j.1471-0528.2001.00009.x>
- Belizán JM, Althabe F, Cafferata ML. Health consequences of the increasing caesarean section rates. *Epidemiology*. 2007;18(4):485–6. <https://doi.org/10.1097/EDE.0b013e318068646a>
- Villar J, Carroli G, Zavaleta N, Donner A, Wojdyla D, Faundes A, et al. Maternal and neonatal individual risks and benefits associated with caesarean delivery: multicentre prospective study. *BMJ*. 2007;335(7628):1025. <https://doi.org/10.1136/bmj.39363.706956.55>
- Potter JE, Hopkins K. Consumer demand for caesarean sections in Brazil: Demand should be assessed rather than inferred. *BMJ*. 2002;325(7359):335. <https://doi.org/10.1136/bmj.325.7359.335>
- National Collaborating Centre for Women's and Children's Health (UK). Caesarean section. London: RCOG Press; 2011. (NICE Clinical Guideline CG132). No DOI assigned. Available from: <https://www.nice.org.uk/guidance/cg132>
- Thool KN, Jain SM, Shivkumar PV, Jain MA, Podder MR. A clinical audit and confidential enquiry of caesarean section indications at a rural tertiary health care centre. *Int J Reprod Contracept Obstet Gynecol*. 2017;6(4):1478–83
- Peng FS, Lin HM, Lin HH, Tu FC, Hsiao CF, Hsiao SM. Impact of clinical audits on cesarean section rate. *Taiwan J Obstet Gynecol*. 2016;55(4):530–3. <https://doi.org/10.1016/j.tjog.2014.12.015>
- Dekker L, Houtzager T, Kilume O, Horogo J, van Roosmalen J, Nyamtema AS. Caesarean section audit to improve quality of care in a rural referral hospital in Tanzania. *BMC Pregnancy Childbirth*. 2018;18:164. <https://doi.org/10.1186/s12884-018-1814-1>
- Sheikh L, Tehseen S, Gowani SA, Bhurgri H, Rizvi JH, Kagazwala S. Reducing the rate of primary caesarean sections—an audit. *J Pak Med Assoc*. 2008;58(8):444–8.



Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third-party material in this article are included in the article's Creative Commons licence unless indicated otherwise in a credit line to the material. Suppose material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use. In that case, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>. © The Author(s) 2025