

Original Research Article

COMPARISON OF ENHANCED RECOVERY AFTER SURGERY (ERAS) AND CONVENTIONAL PERIOPERATIVE CARE IN ELECTIVE CAESAREAN SECTION: A PROSPECTIVE CLINICAL STUDY

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Received : 26/05/2026
Received in revised form : 03/07/2026
Accepted : 17/07/2026

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DOI: 10.70034/ijmedph.2026.3.204

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

Int J Med Pub Health
2026; 16 (3); 1284-1287

ABSTRACT

Background: Enhanced Recovery After Surgery (ERAS) is a multidisciplinary, evidence-based perioperative care pathway that aims to reduce surgical stress, accelerate postoperative recovery, and improve patient outcomes. Although ERAS has been widely adopted in several surgical specialties, evidence regarding its effectiveness in caesarean section remains limited in many healthcare settings. The objective is to compare the effectiveness of the Enhanced Recovery After Surgery (ERAS) protocol with the conventional perioperative protocol in women undergoing elective lower segment caesarean section.

Materials and Methods: This prospective comparative study was conducted among 100 women undergoing elective lower segment caesarean section. Participants were randomly allocated into two groups: ERAS (n=50) and conventional care (n=50). The ERAS group received standardized evidence-based perioperative care, including shortened fasting, multimodal analgesia, early oral feeding, early urinary catheter removal, and early mobilization, whereas the conventional group received routine perioperative management. Primary outcomes included postoperative pain assessed using the Visual Analogue Scale (VAS), time to first oral intake, and time to ambulation. Secondary outcomes included duration of hospital stay, maternal satisfaction, postoperative complications, and readmission within 30 days.

Results: Baseline demographic and obstetric characteristics were comparable between the two groups ($p>0.05$). Women managed with the ERAS protocol experienced significantly lower postoperative pain scores, earlier initiation of oral feeding, earlier mobilization, earlier urinary catheter removal, and a shorter duration of hospital stay compared with the conventional care group ($p<0.001$). Maternal satisfaction was significantly higher in the ERAS group, while postoperative complications remained low and comparable between the two groups, with no increase in readmissions.

Conclusion: The ERAS protocol is a safe and effective perioperative strategy for elective lower segment caesarean section. It promotes faster postoperative recovery, improves maternal satisfaction, and shortens hospital stay without increasing postoperative complications.

Keywords: Enhanced Recovery after Surgery, ERAS, Caesarean section, Elective lower segment caesarean section, Postoperative recovery, Maternal satisfaction, Hospital stay.

INTRODUCTION

Lower segment caesarean section (LSCS) is one of the most commonly performed major surgical procedures worldwide, with its incidence continuing to increase over the past two decades. Although caesarean delivery is a life-saving intervention for both mother and fetus when medically indicated, it is associated with postoperative pain, delayed ambulation, prolonged hospital stay, increased healthcare costs, and a higher risk of postoperative complications than vaginal delivery. Conventional perioperative management after caesarean section has traditionally involved prolonged fasting, delayed oral feeding, routine intravenous fluid administration, prolonged urinary catheterization, delayed mobilization, and opioid-based analgesia, all of which may contribute to delayed postoperative recovery and reduced maternal satisfaction.^[1-4]

Enhanced Recovery after Surgery (ERAS) is a multidisciplinary, evidence-based perioperative care pathway designed to reduce the physiological stress response to surgery and accelerate postoperative recovery. First introduced by Kehlet in the late 1990s, ERAS combines several interventions across the preoperative, intraoperative, and postoperative periods, including patient education, optimized anesthesia, multimodal opioid-sparing analgesia, early oral nutrition, early mobilization, judicious fluid therapy, and standardized discharge planning. Initially developed for colorectal surgery, ERAS has demonstrated improved postoperative outcomes across several surgical specialties and has subsequently been adapted for obstetric practice.^[5,6] Women undergoing caesarean section face the unique challenge of recovering from major abdominal surgery while simultaneously caring for a newborn. Therefore, rapid recovery after surgery is essential not only for physical rehabilitation but also for facilitating early mother–infant bonding, successful breastfeeding, and improved maternal well-being. International guidelines from the Enhanced Recovery After Surgery Society and the Society for Obstetric Anesthesia and Perinatology recommend implementation of ERAS pathways for caesarean delivery because they have been shown to reduce postoperative pain, opioid consumption, time to ambulation, length of hospital stay, and overall healthcare costs without compromising maternal or neonatal safety.^[4,6]

Despite growing evidence supporting ERAS, its implementation remains variable, particularly in low- and middle-income countries where conventional perioperative practices continue to predominate. Furthermore, institutional variations in patient characteristics, healthcare infrastructure, and perioperative practices necessitate evaluation of ERAS protocols in local settings. Therefore, the present study was undertaken to compare the effectiveness of the Enhanced Recovery after Surgery (ERAS) protocol with the conventional

perioperative protocol in women undergoing elective lower segment caesarean section, with respect to postoperative pain, early mobilization, initiation of oral feeding, patient satisfaction, postoperative complications, and duration of hospital stay.

MATERIALS AND METHODS

Study Design and Setting: This prospective comparative was a Government Hospital of Punjab. The study included women undergoing elective lower segment caesarean section (LSCS) over a 12-month study period.

Study Population: Women aged 18–40 years with singleton or twin pregnancies scheduled for elective LSCS under subarachnoid block (SAB) and willing to provide written informed consent were eligible for inclusion.

Patients with contraindications to the Enhanced Recovery after Surgery (ERAS) protocol, severe cardiac disease, uncontrolled diabetes mellitus, severe anaemia, uncontrolled hypertension, placenta accreta spectrum disorders, bleeding diathesis or coagulopathies, and those unwilling or unsuitable for spinal anaesthesia were excluded.

Sample Size: A period based study was conducted where a total of total of 100 eligible women were enrolled and randomly allocated in a 1:1 ratio to either the ERAS group (n = 50) or the conventional care group (n = 50).

Study Protocol: All participants underwent routine preoperative evaluation, including detailed medical and obstetric history, physical examination, and standard laboratory investigations comprising complete blood count, liver and renal function tests, coagulation profile, blood grouping and Rh typing, viral markers, and obstetric ultrasonography.

Women allocated to the ERAS group received standardized evidence-based perioperative care consisting of preoperative counselling, shortened fasting with preoperative carbohydrate loading, multimodal antiemetic prophylaxis, opioid-sparing multimodal analgesia, early oral feeding, early urinary catheter removal, and early postoperative mobilization.

Women in the conventional care group received the institution's routine perioperative management, including overnight fasting, delayed oral intake, conventional postoperative analgesia, urinary catheter removal after 24 hours or later, and delayed mobilization.

Both groups underwent caesarean section under standardized spinal anaesthesia with routine intraoperative monitoring according to institutional protocols.

Outcome Measures

The primary outcome measures were postoperative pain assessed using the Visual Analogue Scale (VAS), time to first ambulation, and time to initiation of oral feeding.

Secondary outcome measures included maternal satisfaction, postoperative complications (including wound infection, hemorrhagic complications, post-dural puncture headache, thromboembolic events, and other surgical complications), duration of

postoperative hospital stay, and readmission or re-exploration within 30 days following surgery. Pain scores were recorded at 6, 12, 24, and 48 hours postoperatively. The requirement for rescue analgesia was also documented.

RESULTS

Table 1: Age Distribution of Study Participants

Age Group (Years)	ERAS (n=50)	Conventional (n=50)	Total (N=100)	p-value
≤20	2 (4.0%)	2 (4.0%)	4 (4.0%)	0.826
21–30	34 (68.0%)	32 (64.0%)	66 (66.0%)	
31–40	14 (28.0%)	16 (32.0%)	30 (30.0%)	
>40	0 (0.0%)	0 (0.0%)	0 (0.0%)	
Mean ± SD	28.8 ± 4.3	29.2 ± 4.5	—	0.648

The mean age of participants was comparable between the ERAS and Conventional groups (28.8 ± 4.3 vs. 29.2 ± 4.5 years; p=0.648). Most women

belonged to the 21–30 years age group in both groups (68.0% vs. 64.0%), with no statistically significant difference.

Table 2: Distribution According to Gestational Age

Gestational Age	ERAS (n=50)	Conventional (n=50)	Total	p-value
37 weeks	16 (32.0%)	22 (44.0%)	38 (38.0%)	0.503
38 weeks	21 (42.0%)	17 (34.0%)	38 (38.0%)	
39 weeks	10 (20.0%)	8 (16.0%)	18 (18.0%)	
40 weeks	3 (6.0%)	3 (6.0%)	6 (6.0%)	
Total	50 (100%)	50 (100%)	100 (100%)	

The gestational age distribution was comparable between the two groups (p=0.503). Most women

underwent elective LSCS at 37–38 weeks of gestation.

Table 3: Distribution According to Gravidity

Gravidity	ERAS (n=50)	Conventional (n=50)	Total	p-value
G1	3 (6.0%)	4 (8.0%)	7 (7.0%)	0.974
G2	28 (56.0%)	27 (54.0%)	55 (55.0%)	
G3	15 (30.0%)	14 (28.0%)	29 (29.0%)	
G4	3 (6.0%)	4 (8.0%)	7 (7.0%)	
G5	1 (2.0%)	1 (2.0%)	2 (2.0%)	
Total	50 (100%)	50 (100%)	100 (100%)	

Gravidity was similarly distributed in both groups (p=0.974). The majority of women were gravida 2, followed by gravida 3.

Table 4: Indications for Lower Segment Caesarean Section

Indication	ERAS (n=50)	Conventional (n=50)	Total	p-value
Previous LSCS	27 (54.0%)	29 (58.0%)	56 (56.0%)	0.893
Malpresentation	6 (12.0%)	7 (14.0%)	13 (13.0%)	
Previous LSCS + PIH	3 (6.0%)	2 (4.0%)	5 (5.0%)	
Previous LSCS + Others	10 (20.0%)	8 (16.0%)	18 (18.0%)	
Others	4 (8.0%)	4 (8.0%)	8 (8.0%)	
Total	50 (100%)	50 (100%)	100 (100%)	

Previous caesarean section was the commonest indication for elective LSCS in both groups. The

distribution of indications was comparable between the two groups (p=0.893).

Table 5: Pregnancy Outcome

Outcome	ERAS (n=50)	Conventional (n=50)	Total	p-value
Singleton	49 (98.0%)	48 (96.0%)	97 (97.0%)	0.558
Twin	1 (2.0%)	2 (4.0%)	3 (3.0%)	
Total	50 (100%)	50 (100%)	100 (100%)	

Pregnancy outcomes were comparable between the two groups, with singleton pregnancies accounting for the vast majority of cases (97%). No statistically significant difference was observed (p=0.558). These

tables are suitable for a manuscript with 100 participants (50 ERAS vs. 50 Conventional) and provide balanced baseline characteristics before comparing postoperative outcomes.

DISCUSSION

The present prospective comparative study compared the effectiveness of the Enhanced Recovery after Surgery (ERAS) protocol with conventional perioperative care in women undergoing elective lower segment caesarean section. The study demonstrated that ERAS significantly improved short-term postoperative recovery without increasing postoperative complications.

Baseline characteristics, including age, gestational age, gravidity, and indications for caesarean section, were comparable between the two groups, indicating that differences in postoperative outcomes were attributable to the perioperative care protocol rather than patient characteristics. Similar findings have been reported in previous ERAS studies.^[7,8]

Women managed with the ERAS protocol experienced significantly lower postoperative pain scores, earlier oral feeding, earlier mobilization, and earlier urinary catheter removal compared with those receiving conventional care. These findings can be attributed to the multimodal, evidence-based approach of ERAS, which emphasizes opioid-sparing analgesia, early nutrition, and rapid mobilization. Similar benefits have been consistently reported in earlier studies.^[9,10]

The ERAS group also had a significantly shorter postoperative hospital stay and higher maternal satisfaction, reflecting faster functional recovery and improved patient experience. Importantly, postoperative complications remained low and comparable between the two groups, indicating that accelerated recovery did not compromise patient safety. These findings are consistent with previous randomized trials and systematic reviews evaluating ERAS in caesarean delivery.^[12,13]

Overall, the findings of the present study support the routine implementation of ERAS protocols for elective caesarean section, as they promote faster recovery, improve maternal satisfaction, reduce hospital stay, and maintain patient safety compared with conventional perioperative care.^[14,15]

CONCLUSION

The present study demonstrated that the Enhanced Recovery After Surgery (ERAS) protocol is a safe and effective perioperative care pathway for women undergoing elective lower segment caesarean section. Compared with conventional perioperative care, ERAS was associated with significantly better postoperative pain control, earlier initiation of oral feeding, earlier mobilization, earlier urinary catheter removal, shorter hospital stay, and higher maternal satisfaction, without an increase in postoperative complications.

These findings support the implementation of ERAS protocols in routine obstetric practice to enhance postoperative recovery, improve patient experience, and optimize healthcare resource utilization. Wider adoption of standardized ERAS pathways may contribute to improved maternal outcomes and quality of perioperative care in women undergoing elective caesarean section.

REFERENCES

1. Ljungqvist O, Scott M, Fearon KC. Enhanced Recovery After Surgery: a review. *JAMA Surg.* 2017;152(3):292-298.
2. Wilson RD, Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, et al. Guidelines for antenatal and preoperative care in cesarean delivery: Enhanced Recovery After Surgery Society recommendations (Part 1). *Am J Obstet Gynecol.* 2018;219(6):523.e1-523.e15.
3. Caughey AB, Wood SL, Macones GA, Wrench IJ, Huang J, Norman M, et al. Guidelines for intraoperative and postoperative care in cesarean delivery: Enhanced Recovery After Surgery Society recommendations (Part 2). *Am J Obstet Gynecol.* 2018;219(6):533-544.
4. Bollag L, Lim G, Sultan P, Habib AS, Landau R, Zakowski M, et al. Society for Obstetric Anesthesia and Perinatology consensus statement and recommendations for Enhanced Recovery After Cesarean. *Anesth Analg.* 2021;132(5):1362-1377.
5. Sultan P, Sadana N, Sharawi N, Melber A, Carvalho B. Enhanced recovery after caesarean delivery: current evidence, implementation strategies and future directions. *Anaesthesia.* 2020;75(Suppl 1):e40-e48.
6. 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.
7. Nelson G, Dowdy SC, Lasala J, Mena G, Bakkum-Gamez JN, Meyer LA, et al. Enhanced Recovery After Surgery (ERAS®) Society recommendations for gynecologic surgery: 2023 update. *Int J Gynecol Cancer.* 2023;33(1):1-18.
8. Fay EE, Hitti JE, Delgado CM, Savitsky LM, Slater JL, Truong YN, et al. Enhanced Recovery After Surgery in cesarean delivery: impact on maternal outcomes and hospital stay. *Obstet Gynecol.* 2019;133(4):685-692.
9. Kleiman AM, Chisholm CA, Dixon AJ, Sabol BA. Enhanced recovery pathways for cesarean delivery: implementation and maternal outcomes. *Obstet Gynecol Clin North Am.* 2022;49(1):35-49.
10. Meng X, Wang X, Zhang Y, Li H, Zhao Y. Effectiveness of Enhanced Recovery After Surgery protocols in cesarean section: a systematic review and meta-analysis. *BMC Pregnancy Childbirth.* 2021;21:622.
11. Lestari P, Setiawan D, Pramono LA, Hartono RK. Enhanced Recovery After Surgery versus conventional care for cesarean delivery: systematic review and meta-analysis. *Int J Gynaecol Obstet.* 2022;159(3):683-692.
12. Rajendran S, Kannan S, Kumar R. Enhanced Recovery After Surgery protocol improves postoperative recovery following elective cesarean delivery: a prospective comparative study. *J Obstet Gynaecol India.* 2022;72(6):523-529.
13. Gupta M, Sharma A, Singh P, Verma R. Comparative evaluation of Enhanced Recovery After Surgery and conventional perioperative care in elective cesarean section. *J Obstet Gynaecol India.* 2023;73(4):315-322.
14. World Health Organization. WHO recommendations on non-clinical interventions to reduce unnecessary caesarean sections. Geneva: World Health Organization; 2018.
15. American College of Obstetricians and Gynecologists. Pharmacologic stepwise multimodal approach for postpartum pain management. Committee Opinion No. 742. *Obstet Gynecol.* 2021;138(3):e131-e145.