Original Article

Assessing Patient Satisfaction with Enhanced Recovery After Surgery (ERAS) Protocols in Elective Cesarean Deliveries

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Abstract

Objective: To assess patient satisfaction with the ERAS protocol in elective cesarean sections.

Methodology: A descriptive cross-sectional study was conducted in the Department of Obstetrics and Gynecology at FRPMC and Allied Hospital (PAF Faisal Hospital), Karachi from January to July 2023. By convenient sampling, all pregnant women undergoing elective cesarean sections under ERAS procedure were included in the study. A total of 100 patients were divided into two groups through convenient sampling: 50 in the ERAS group and 50 in the conventional (non-ERAS) group. At the time of discharge, a pre-validated questionnaire was used to record the patient's satisfaction with the care they had received. Data analysis was performed using SPSS version 23.

Results: ERAS patients were satisfied with their recovery and surgical experiences with 57.5% strongly agreeing compared to 12.8% in the non-ERAS group (p=0.001). About satisfaction with post-operative pain control, 57.5% of patient in ERAS were strongly agreed as compared to 5.1% of patient in non-ERAS (p=0.015) which showed a higher difference. A higher percentage of ERAS patients were satisfied with breastfeeding on "0" post-operative day with 45% strongly agreeing, compared to 5.1% in non-ERAS group.

Conclusion: The study revealed significant difference of satisfaction between ERAS protocol patients and non-ERAS patients, particularly satisfaction in recovery, shorter length of hospital stay, early postpartum bonding and post-operative pain control. Most patients favored ERAS, indicating its potential for broader application in elective cesarean sections to improve patient-centered perioperative care.

Keywords: Enhanced Recovery After Surgery (ERAS), Cesarean Section, Postoperative Care, Patient Satisfaction.

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Introduction

A multimodal, patient-centered perioperative treatment approach called "Enhanced Recovery After Surgery" (ERAS), aims to improve clinical and surgical outcomes with shorter hospital stay.[1] The pioneer of ERAS protocol was a Danish professor of Surgery, Henrik Kehlet (1990) a colorectal surgeon, thought about postoperative prolong fasting, mobility restriction, slow return to eating in traditional postoperative care.[2] Due to increasing surgical burden he modified the traditional protocol of surgery in its various phases (preoperative, intraoperative and postoperative phase), in a manner to facilitate surgeon and patient in the view of shorter hospital stay, early mobilization of patient with improved outcome.[2] By this change, the protocol adapted globally to other surgical field also having common theme with slight adjustment according to specialty and proved successful results.[3] ERAS pathway depends on a multidisciplinary team approach, requiring coordinated interventions across all phases of perioperative care from the initial preoperative consultation to hospitalization and, ultimately, the patient's return to normal daily activities.[4] In Pakistan and neighboring country very high percentage of caesarean section is being observed not only in private

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care hospital but also in public care.[5] That's why there is a need for implementation of ERAS not only for the sake of improved surgical outcome but also to shorten hospital stay and enhanced perioperative care.[6] The goals of ERAS are to shorten hospital stay, increase patient satisfaction, decrease re-admissions, and lessen surgical complications.[7]

ERAS is also supported by American College of Obstetrics and Gynaecology.[8] It has its own guidelines [9-12], with a few differences for obstetric specific elements like delayed cord clamping, subcuticular suture use, early removal of urinary catheter.[8] The main elements for ERAC, which is ERAS principal applied for obstetric patients are preoperative patient education and counseling, diet and fluid balance, patient medical optimization, intraoperative prophylactic antibiotic cover, prevention of hypothermia, prevention of hypotension by spinal anaesthesia, multimodal analgesia, postoperative multimodal analgesia, prophylaxis for venous thromboembolism, early mobilization, early removal of catheter, early bowl mobilization and early discharge plan.[13, 14]

In an exploratory trial, researchers managed to efficiently add an expanded recovery strategy to their obstetric unit, and saw a larger number of patients discharged early with better satisfaction with care, without a concurrent increase in the incidence of readmission.[1] Such approach involved several key adjustments to conventional pre- and post-operative care for women undergoing elective cesarean sections. Instead of the traditional overnight fasting, patients were given carbohydrate drinks two hours before surgery, which helped sustain energy levels.[15, 16] Fluid management was adjusted to focus on maintaining fluid balance rather than administering large intravenous volumes, which often contributes to post-surgical bloating and discomfort. All of these strategies are part of evidence-based modern care. These protocol components lessen operational stress in order to maintain anabolic homeostasis.[16]

Despite ERAS protocols becoming standard in many surgical specialties, there is a need for its adoption and successful implementation across Pakistan.[3] Particularly in obstetrics and gynecology patient of Pakistan. This gap reflects a need for more studies to assess its impact on maternal outcomes, recovery times, and patient satisfaction in cesarean and other gynecological procedures. Therefore, the aim of the study is to assess the patient's satisfaction with Enhanced Recovery After Surgery (ERAS) protocol in women undergoing elective cesarean sections.

Methodology

This descriptive cross-sectional study was carried out in the Obstetrics and Gynecology Department of FRPMC, PAF Faisal hospital Karachi from January 2023 to July 2023 obtaining ethical approval from Institutional Review Board (Protocol # 0062/2023). Based on the 2018 study by Cherot and 95% confidence interval with power of test= 0.05 at 5% margin of error, the sample size was calculated to be 100 patients.[17]

Patients were divided into two groups through convenient sampling: an ERAS group and a conventional (non-ERAS) group. 50 patients were in ERAS protocol group while 50 patients were in conventional group. The data was analyzed using statistical package for social sciences (SPSS) software version 23. T test were used to calculate quantitative variables. Chi square test was used for qualitative variables. Chi square test was applied with p-value less than 0.05 being considered significant.

Participants were selected based on inclusion and exclusion criteria. The study included all pregnant women undergoing elective cesarean sections under spinal anesthesia. Exclusion criteria were women requiring emergency cesarean sections, those who refused consent, or had comorbid conditions like diabetes mellitus, preeclampsia, heart disease, or obesity. Women needing general anesthesia, experiencing intraoperative or immediate postoperative complications, or requiring extended hospital stays for follow-up care were also excluded.

Every participant included in ERAS group, received comprehensive information leaflet regarding the ERAS protocol where comprehensive pre, intra, and postoperative information are given while in conventional/ standard care group usual information leaflet about pre, intra and postoperative information were given at antenatal visit. Both groups gave their informed consent, verbally and in writing. On the day of the patient's discharge from hospital, information was gathered through interviews and a pre-structured questionnaire while some follow-up questions at that questionnaire asked at 7th post-operative day at patient follow up. The protocol was developed with a number of references and adjusted as needed.[11, 12]

The ERAS group patients were admitted eight hours

before surgery and they were instructed to take a shower that day. The patient was briefed again received regarding the surgical procedure at the time of admission. The day before surgery they had pre-anesthesia checkup and fitness, as per the hospital policy. There was no need to preload the patient with intravenous (IV) fluids because the patient was allowed to eat soft food up to six hours before surgery and clear liquids up to two hours before surgery thus avoiding prolonged fasting. Two hours before the procedure, 200 cc of black tea with two teaspoons of sugar were used for carbohydrate loading. Metoclopramide was used before surgery to prevent nausea and vomiting.

In conventional group patients were admitted one day before surgery, where labs related to procedure refreshed and anesthesia fitness taken. Patient was advised for nil per oral about 9 to 10 hrs (night) before surgery. Metoclopramide was used before surgery and surgical method remain same as in ERAS group.

On the day of surgery, in ERAS group, standard monitoring including non-invasive blood pressure, electrocardiography and pulse-oximetry was started and intravenous line was secured. All operations were done under spinal anaesthesia using bupivacaine heavy 0.5%. To prevent infection, further precautions were taken, such as washing the abdomen with 4% chlorhexidine solution before applying betadine solution. Minimum fluid policy was adhered by monitoring the temperature in the operating room to maintain normothermia (between 20-24°C) and preventing the administration of excessive intravenous fluids by comparing the urine output to the intake. Regional analgesia, non-steroidal anti-inflammatory drugs (NSAIDs), Paracetamol were used in a multimodal pain management protocol. For pain management, NSAIDS, Paracetamol and narcotic analgesia are used in conventional group.

In ERAS group, early enteral feeding was initiated two hours after the patient was shifted to the post-operative ward, and soft diet was started four hours later. In conventional group, enteral feeding was started 6 to 7 hours after the procedure.

In ERAS group, the patient was encouraged for mobilization after the procedure as soon as effects of spinal anesthesia wears off (after almost 3-4 hours); and the Foley catheter was removed 6-8 hours after surgery. Instead of the usual two days post-operative stay, early discharge was urged on the first post-operative day. In conventional /standard care group, catheter removed after 8 to 10 hrs. of surgery and patient was encouraged for mobilization after catheter removal.

Results

The study revealed significant differences in postoperative outcomes between the ERAS and non-ERAS groups. While BMI showed no significant difference ($p = 0.176$), the ERAS group had a shorter hospital stay ($p < 0.001$) and lower pain scores at both the 10th and 20th hours postoperatively ($p < 0.001$). Detailed comparisons are provided in Table I.

Table I: Comparison of BMI, Length of Hospital Stay, and Pain Scores at 10th and 20th Hours between ERAS and Non-ERAS Protocol Patients.

Variable	ERAS Protocol Patients Mean±SD	Non-ERAS Patients Mean±SD	p-value
BMI	24.68±3.467	25.74±3.39	0.176
Length of Stay	33.88±8.18	61.59±10.49	<0.001
Pain at 10th hrs	5.03±1.80	6.72±1.74	<0.001
Pain at 20th hrs	2.35±1.12	4.41±1.68	<0.001

p-value calculated using independent t-test. Significant p-values (<0.05)

Table II indicates that patients following the ERAS protocol experienced catheter removal significantly earlier, with 65.0% achieving removal within 6 to 9 hours, in contrast to just 5.1% of non-ERAS patients ($p<0.001$). Furthermore, breastfeeding was initiated within the first 0 to 6 hours by 22.5% of ERAS patients, compared to only 2.6% in the non-ERAS group ($p=0.001$). Additionally, at the 10th hour, 92.5% of ERAS patients reported no nausea, a marked improvement over the 74.4% seen in non-ERAS patients ($p=0.030$). However, there were no significant differences in the incidence of nausea between the two groups at the 20th hour.

Table III illustrates the variations in postoperative outcomes and demographic characteristics between patients treated under ERAS protocols and those receiving non-ERAS care. At the 20-hour mark, urinary complications were notably reduced in the ERAS cohort, with 100% of patients reporting no issues, in contrast to 82.1% in the non-ERAS group ($p=0.005$).

Table IV illustrates notable disparities in patient satisfaction and postoperative experiences between the ERAS and non-ERAS cohorts. Patients in the ERAS group reported a significantly higher level of agreement regarding the adequacy of education received about the procedure before surgery, with 75% strongly

agreeing, in contrast to 25.6% in the non-ERAS group

Table II: Comparison of Demographics, Clinical Parameters, and Postoperative Outcomes between ERAS and Non-ERAS Protocol Patient.

Variable		ERAS protocol patients n(%)	Non-ERAS Patients n(%)	P-value
Age (years)	20-25	15(37.5%)	13(33.3%)	0.847
	26-30	13(32.5%)	13(33.3%)	
	31-35	9(22.5%)	10(25.6%)	
	36-40	2(5.0%)	3(7.7%)	
	41-45	1(2.5%)	0(0.0%)	
Gravida Parity	Primigravida	11(27.5%)	6(15.4%)	0.190
	Multigravida	29(72.5%)	33(84.6%)	
Indication	Previous 1 Scar	12(30.0%)	14(35.9%)	0.288
	Previous 2 Scar	12(30.0%)	11(28.2%)	
	Previous 3 Scar	1(2.5%)	6(15.4%)	
	Breech Baby	8(20.0%)	2(5.1%)	
	Large Size Baby	3(7.5%)	3(7.7%)	
	Intraurterine Dead Baby	2(5.0%)	1(2.6%)	
	Wish for C Section	2(5.0%)	2(5.1%)	
Catheter Removal	6-9	26(65.0%)	2(5.1%)	<0.001
	10-13	13(32.5%)	3(7.7%)	
	14-17	1(2.5%)	22(56.4%)	
	MORE 17	0(0.0%)	12(30.8%)	
Breast Feeding	0-6	9(22.5%)	1(2.6%)	0.001
	7-12	24(60.0%)	16(41.0%)	
	13-18	6(15.0%)	14(35.9%)	
	MORE 18	1(2.5%)	8(20.5%)	
Nausia at 10th hrs	None	37(92.5%)	29(74.4%)	0.030
	Mild	3(7.5%)	10(25.6%)	
Nausea at 20 hrs	None	39(97.5%)	37(94.9%)	0.541
	Mild	1(2.5%)	2(5.1%)	

p-value calculated using Chi-square test or Fisher's exact test, as appropriate. Significant p-values (<0.05)

Table III: Comparison of Postoperative Temperature, Urinary Issues, Gestational Age, and Education between ERAS and Non-ERAS Patients.

Variable		ERAS protocol patients n(%)	Non-ERAS Patients n(%)	P-value
Temp at 10th hrs	None	37(92.5%)	35(89.7%)	0.425
	Mild	2(5.0%)	4(10.3%)	
	Moderate	1(2.5%)	0(0.0%)	
Temp at 20th hrs	None	40(100.0%)	38(97.4%)	0.308
	Mild	0(0.0%)	1(2.6%)	
Urine problems at 10th hrs	None	37(92.5%)	30(76.9%)	0.054
	Mild	3(7.5%)	9(23.1%)	
Urine problems at 20th hrs	None	40(100.0%)	32(82.1%)	0.005
	Mild	0(0.0%)	7(17.9%)	
Gastational Age	37	7(17.5%)	1(2.6%)	0.014
	38	33(82.5%)	34(87.2%)	
	39	0(0.0%)	4(10.3%)	
Education	Illiterate	2(5.0%)	0(0.0%)	0.467
	Primary	12(30.0%)	9(23.1%)	
	Secondary	7(17.5%)	10(25.6%)	
	Inter	12(30.0%)	11(28.2%)	
	Graduate	7(17.5%)	9(23.1%)	

(p<0.001). Additionally, a greater proportion of ERAS patients expressed satisfaction with their recovery and surgical experience, with 57.5% strongly agreeing compared to just 12.8% in the non-ERAS group (p=0.001). Furthermore, urinary complications following surgery were significantly less prevalent in the ERAS group, with only 15% reporting issues, compared to 28.2% in the non-ERAS group (p=0.015). Satisfaction regarding postoperative pain management was also higher among ERAS patients, with 35% strongly agreeing, as opposed to 7.7% in the non-ERAS group (p=0.015).

Table IV: Patient Satisfaction and Postoperative Experiences among ERAS and Non-ERAS Groups.

Variable	Patient Group	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	P-value
Did you agree that proper education regarding the procedure prior to surgery was given adequately?	ERAS Protocol Patients	30(75.0%)	9(22.5%)	1(2.5%)	0(0.0%)	0(0.0%)	<0.001
	Non-ERAS Patients	10(25.6%)	0(0.0%)	5(12.8%)	12(30.8%)	12(30.8%)	
Did you experience expected recovery? Are you satisfied with your surgery experience?	ERAS Protocol Patients	23(57.5%)	9(22.5%)	6(15.0%)	0(0.0%)	2(5.0%)	0.001
	Non-ERAS Patients	5(12.8%)	18(46.2%)	8(20.5%)	2(5.1%)	6(15.4%)	
Nausia and Vomit Did you experience post-op nausea and/or vomiting?	ERAS Protocol Patients	2(5.0%)	3(7.5%)	7(17.5%)	16(40.0%)	12(30.0%)	0.068
	Non-ERAS Patients	3(7.7%)	8(20.5%)	1(2.6%)	20(51.3%)	7(17.9%)	
Did you experience any urinary complaints after surgery?	ERAS Protocol Patients	1(2.5%)	5(12.5%)	6(15.0%)	17(42.5%)	11(27.5%)	0.015
	Non-ERAS Patients	2(5.1%)	11(28.2%)	0(0.0%)	9(23.1%)	17(43.6%)	
Are you satisfied with post-op pain control?	ERAS Protocol Patients	14(35.0%)	10(25.0%)	5(12.5%)	6(15.0%)	5(12.5%)	0.015
	Non-ERAS Patients	3(7.7%)	8(20.5%)	11(28.2%)	13(33.3%)	4(10.3%)	

p-value calculated using Chi-square test

Table V presents significant differences in postoperative experiences and satisfaction between the ERAS and non-ERAS groups. ERAS patients reported greater satisfaction with post-operative pain control, with 57.5% strongly agreeing that their pain was well managed, compared to only 5.1% of non-ERAS patients ($p<0.001$). A significantly higher proportion of ERAS patients also had early skin-to-skin contact with their newborns on post-op day 0, with 50% reporting this experience compared to just 2.6% in the non-ERAS group ($p<0.001$).

Additionally, a higher percentage of ERAS patients were satisfied with breastfeeding on post-op day 0, with 45% strongly agreeing, compared to 5.1% in the non-ERAS group ($p<0.001$). However, there was no significant difference between the groups regarding re-admission rates ($p=0.065$), and a significant difference was observed in the visit to the doctor, with more ERAS patients disagreeing with the statement about post-operative visits compared to non-ERAS patients ($p=0.031$).

Discussion

Despite the fact that the concept of ERAS was conceived in the 1990s, not much has been done to promote faster healing after cesarean sections.[14.] But over the past ten years, a number of obstetrical units in the UK have improved their recovery programs for obstetrics, and they have reported higher patient satisfaction, significant cost savings, and enhanced service quality.[11, 16, 17]

According to Cherot who created the ERAS guidelines for elective cesarean deliveries in the US, this method helped patients get more surgically ready for surgery while requiring less hospital stays and post-operative opioids.[18] Nevertheless, the researchers in this study solely examined the level of patient satisfaction following ERAS-compliant cesarean deliveries. Based on the study's findings, most patients expressed satisfaction with the hospital's cesarean section and optimism about their upcoming procedure.[2,4] One author conducted a search for studies focusing on patient satisfaction after caesarean section performed using the Enhanced Recovery After Surgery (ERAS) protocol.[1] An author explored Pakistani surgeons for their difficulty in the application of ERAS in different surgeries.[3] The existing research surgery consistently demonstrated a high rate of patient benefits in ERAS protocol about enhancing recovery experiences.[3, 6] These findings suggest that implementing ERAS principles may significantly contribute to improved patient outcomes and overall contentment following surgical procedures.[11]

In our study, ERAS patients experienced significant shorter hospital stay (33.88+_ 8.18) versus (61.59+_ 10.49) hours in non-ERAS patients. This finding runs counter to Pan et al findings, which found that anesthesia costs, total length of stay, and post-operative length of stay were similar in both the ERAS and control groups.[19] ERAS patient reported greater satisfaction with post-operative pain control, with 57.5% strongly agreeing that their pain was well managed, compared to only 5.1% of non-ERAS patients , also observed in a meta-analysis.[7] A significant 45% of ERAS patients reported being strongly agreed for satisfied breast feeding at "0" post-operative day versus 5.1 % in non-ERAS patient. Additionally, many non-ERAS patients observed that their post-operative visits are more than ERAS patient (Table V).[20]

Gupta S reported the length of stay, post-operative pain

Table V: Postoperative Experiences and Satisfaction among ERAS and Non-ERAS Groups.

Variable	Patient Group	Strongly Agree	Agree	Uncertain	Disagree	Strongly Disagree	P-value
Visit to Doctor	ERAS Protocol Patients	3(7.5%)	5(12.5%)	0(0.0%)	16(40.0%)	16(40.0%)	0.031
	Non-ERAS Patients	0(0.0%)	5(12.8%)	4(10.3%)	8(20.5%)	22(56.4%)	
Re-Admission	ERAS Protocol Patients	1(2.5%)	2(5.0%)	3(7.5%)	16(40.0%)	18(45.0%)	0.065
	Non-ERAS Patients	0(0.0%)	1(2.6%)	0(0.0%)	9(23.1%)	29(74.4%)	
Are you satisfied with post-op pain control?	ERAS Protocol Patients	23(57.5%)	12(30.0%)	4(10.0%)	0(0.0%)	1(2.5%)	<0.001
	Non-ERAS Patients	2(5.1%)	10(25.6%)	8(20.5%)	8(20.5%)	11(28.2%)	
Did you have early skin contact with the newborn after the procedure on post-op day 0?	ERAS Protocol Patients	20(50.0%)	18(45.0%)	2(5.0%)	0(0.0%)	0(0.0%)	<0.001
	Non-ERAS Patients	1(2.6%)	17(43.6%)	6(15.4%)	14(35.9%)	1(2.6%)	
Did you feel satisfied with breastfeeding on post-op day 0?	ERAS Protocol Patients	18(45.0%)	21(52.5%)	1(2.5%)	0(0.0%)	0(0.0%)	<0.001
	Non-ERAS Patients	2(5.1%)	21(53.8%)	9(23.1%)	7(17.9%)	0(0.0%)	

control, use analgesia, quality of life following caesarean section using an ERAC (Enhanced Recovery After Caesarean Section) versus standard post-operative care. They also noted that while most research indicated no negative impact on post-operative pain.[17] Although the majority of patients in this study reported excellent or very good pain management post-surgery, the author believes that implementing more rigorous post-operative pain management strategies could lead to better outcomes in conjunction with enhanced recovery protocol.[14]

Conclusion

In conclusion, the study demonstrates that ERAS patients were satisfied with their recovery and surgical experiences with 57.5% strongly agreed compared to 12.8% in the non-ERAS group. Implementing Enhanced Recovery Guidelines for Cesarean Sections, therefore, provides significant financial, emotional, and physical benefits for patients and reduces the burden on the healthcare system.

Limitations of study: The use of non-probability sampling, which was ideal for our study design and sample selection because our inclusion and exclusion criteria were stringent, as well as a solid study design analysis, increased the strength of our research. The main limitation of our study was that it was a single center-based study which limits generalizability because of the convenience sampling method used. Further multiple center studies are recommended regarding this clinical protocol which may impact nationwide future policies in different institutions.

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