" THE COMPARATIVE STUDY OF ENHANCED RECOVERY AFTER SURGERY PROTOCOL VS CONVENTIONAL CARE IN PATIENTS UNDERGOING CAESAREAN SECTION IN A TERTIARY CARE CENTRE "

By

DR.SABAH HUSSAIN

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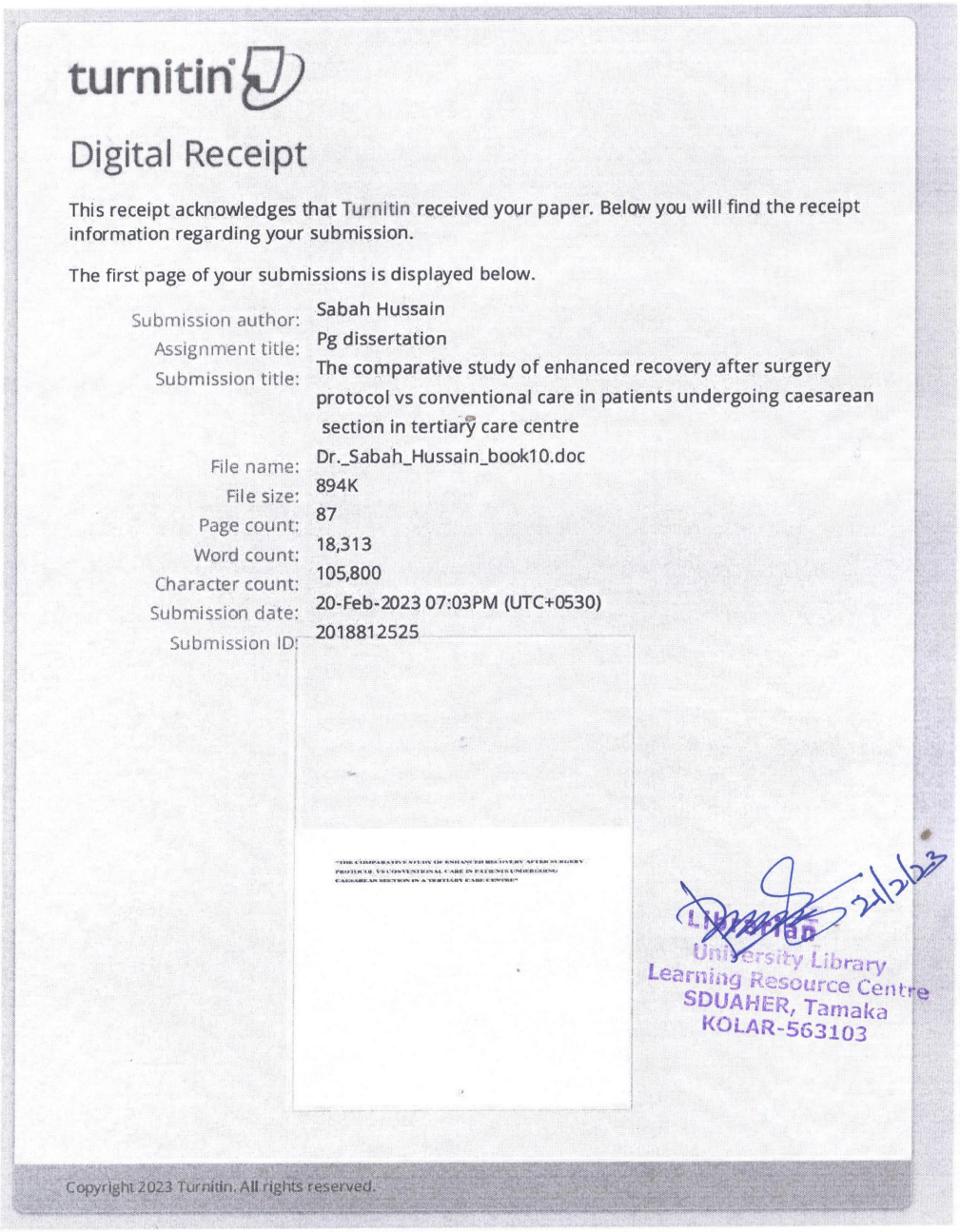

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Dr. SABAH HUSSAIN

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ABSTRACT

India's rate of caesarean sections is about 17.2% and among this most of the patients are young, healthy females, who have a higher chance of recovering quickly after giving birth.. Therefore, there is a need for ERAS protocol for patient benefits including early oral intake early ambulation and early catheter removal.

AIMS AND OBJECTIVES

1.To ascertain the effects of "enhanced recovery surgery protocol" on post operative outcomes in women undergone caesarean section.

2.To determine the effects of conventional treatment protocol on post operative outcomes in women undergone caesarean section.

3.To compare post operative outcomes between these two protocols in women undergone caesarean section.

METHODOLOGY

Materials and Methods-

Source of data: Post ceserean delivery women in "R.L.JALAPPA HOSPITAL AND RESEARCH CENTRE TAMAKA, KOLAR"

7.2 Study design: A Prospective study

7.3 Study period: Jan2021 to Dec 2022

Based on the following inclusion and exclusion criteria, the study's participants were chosen.:

Inclusion Criteria

- Females admitted with Gestational age of 37 0/7 completed weeks or greater with an indication for delivery by emergency / elective caesarean section under spinal anaesthesia.
- Lower segment caesarean section

Exclusion Criteria--Subjects with gestational less than 37 weeks,Caesarean section done under general anaesthesia, Intraoperative and postoperative postpartum haemorrhage, Antepartum haemorrhage**,** Coagulation disorder**,** Moderate to severe anemia**,** Sepsis**,** Haemodynamic instability**,** Severe pre-eclampsia and eclampsia**,** Gestational diabetes mellitus, overt diabetes mellitus, Severe cardio-respiratory disease**,** Pre-existing gastrointestinal disorders.

Sample Size Total of 150 with 75 in ERAS group and 75 in Conventional group by alternate sequence.

Methodology:
The components of the enhanced recovery protocol included several evidence based recommendations: early diet initiation, early ambulation early removal of urinary catheter.

Enhanced recovery after Caesarean section comprised of

- Women in the early feeding were given 200–250 mL of liquid (water, tea, milk, packed fruit juice) 6 hours after surgery.
- If the liquid diet was well tolerated, a solid diet was started within 24 hours after surgery.
- Early Ambulation-within the first eight hours following surgery, the side of the bed with her feet dangling and sat in a chair, then walking at least once within the first 24 hours, then walking three to four times per day after that.
- Early removal of urinary catheter-Removal of urinary catheter after 8 hours.

Conventional care protocol comprised of*: -*

- Ambulation after 24 hours, initiation of clear fluids by 12 hours, regular diet initiation after 24 hours, urinary catheter removal after 24 hours.

Outcome measures

Primary outcomes- Gastrointestinal and renal outcomes include pain abdomen, anorexia, abdominal distension, persistent nausea and/or vomiting.

Secondary outcomes- Postoperative complications include urinary tract infections, wound complication and hospital readmission

SUMMARY

The incidence of urinary tract infection and postoperative wound infection were statistically significantly different between the conventional and ERAS groups

CONCLUSION

The present study shows that ERAS protocol can be effectively and safely implemented for Caesarean section with less postoperative complications without an increase in the hospital readmission rates. Significant difference is observed between the two groups in this study regarding post operative urinary tract infection and wound infection and hence, ERAS group patient not only recovered well without any complication but were also fit to be discharged sooner.

“INTRODUCTION”

At a rate of about 21.1% (2010–2018) of all live births globally, caesarean delivery (CS) is one of the most frequently carried out surgical procedures in the obstetric population.. According to World Health Organization this figure will increase further to 28.5% by the year 2030.[1] This huge volume of cesarean deliveries and increasing cesarean section rate has an incremental burden on healthcare system, leading to higher bed occupancy and financial pressure on the patients and health facilities. More significantly, the rate of caesarean births at the mother's request—the primary cause of unneeded CS—was equally high, at more than 28%.[2]A global analysis reveals that over the past few decades, the CS rate has steadily increased and has not shown any signs of decreasing. More significantly, the rate of caesarean births at the mother's request—the primary cause of unneeded CS—was equally high, at more than 28%. [2] According to a global analysis, the CS rate has been steadily rising over the past three decades with no signs of abating. More significantly, the rate of caesarean births at the mother's request—the primary cause of unneeded CS—was equally high, at more than 28%. [2]. Worldwide research demonstrates that the CS rate has increased.[3] As a result, the massive number increase in the number of caesarean births and the CS rate put a burden on healthcare systems, driving up bed occupancy and driving up costs for patients and healthcare institutions.[4,5]. It is clear that CS will always be a required procedure for obstetricians, even though the CS rate must decline.. Hence, it is not surprising that better perioperative care for CS would receive more attention. The majority of caesarean section patients are young, healthy women who have the potential for a quick recovery after surgery. Wilmore and Kehlet originally discussed enhanced recovery in 1997. The idea of speeding up recovery following surgery was first presented in colon surgery and is now used in gynaecology, urology, and orthopaedic surgery, among other surgical specialties.[6,7] The elements of improved post-operative recovery vary greatly amongst different specialisations, but the fundamentals are the same. [8-10] pregnant women are given preoperative information,

good perioperative nutrition and hydration, minimally invasive surgical technique, efforts are made to maintain normothermia, postoperative nausea and vomiting are prevented, effective postoperative pain relief is provided, early postoperative oral intake is initiated, and urinary catheter removal is initiated as soon as possible after surgery, and early post-operative mobilisation are just a few of the factors that contribute to improved recovery after surgery.[11] Together, these elements have a synergistic effect that lowers stress and cytokine levels, encourages trauma repair, and lessens problems.[12,13] The advantages of enhanced recovery (ER) for elective caesarean sections include shorter hospital stays, lower medical expenses, and higher patient satisfaction.

The benefits of CS for the clinical and healthcare systems, which have been found to encourage early discharge and rehabilitation, can be improved particularly well through enhanced recovery care. [14] In order to maintain the balance of recovery from major abdominal surgery and infant care, early recovery after caesarean (ERAC) guidelines were first introduced in 2018, a significant amount of time after enhanced recovery after surgery (ERAS) protocols must be developed in other surgical disciplines. According to The National Institute for Health and Care Excellence, early hospital discharge (after 24 hours) and follow-up care at home should be offered to women who are healing well, are apyrexic, and do not have complications following CS because it is not linked to an increase in infant or maternal readmissions.[15]

A multimodal and interdisciplinary strategy called "enhanced recovery after surgery" aims to improve perioperative care and results. [16] The fundamental principles of the ERAS, which are positioned throughout the whole surgical care continuum with the goals of reducing the postoperative stress response, fostering functional recovery, and achieving speedy recovery, have already been described. [17,18] Gynecologic, colorectal, urologic, and hepatobiliary surgery are just a few of the surgical disciplines where ERAS has been

extensively used. [19,20] Unlike to other surgical subspecialties, obstetrics has lagged behind in the adoption of ERAS. [21]

ERAC has gone popular and well adopted in Western countries but in developing countries like India the implementation is facing network and infrastructural issuesThe main obstacles to the adoption of ERAC for this segment of the population are the low literacy rate of the target population, the wide rural-urban divide, the inability to recognise early warning indicators, and a lack of qualified staff for ERAS protocols..[22]

While the ERAS idea was first put forth in the context of obstetric surgery, its application to CS has been adopted more slowly. Some maternity hospitals are currently attempting to adopt the ERAS protocol in their clinical practise, demonstrating some benefits above traditional care in CS. [23] In the past five years, a number of observational studies and randomised controlled trials (RCTs) have both been published to assess the effectiveness and practicality of ERAS for CS.. These studies have improved our understanding of the relationship between ERAS implementation and maternal outcomes, such as shorter hospital stays, fewer complications, and quicker functional recovery. [24,25]

More study is required to create and assess pathways for enhanced recovery in elective caesarean section because there is currently very little information on the elements that are required for the obstetric population's enhanced recovery after surgery. The goal of the current study was to evaluate the impact of enhanced recovery after surgery (ERAS) on post-operative recovery in patients undergoing caesarean sections.

REVIEW OF LITERATURE

A uterine incision and an open abdominal incision (laparotomy) are required for a caesarean section to deliver a foetus (hysterotomy). The caesarean section was first performed in 1020 AD, and since then, the procedure has made tremendous advancements. [26] The majority of surgeries performed in the United States today are caesarean sections, which are used by over 1 million women every year to give birth. Caesarean births increased in frequency, from 5% in 1970 to 31.9% in 2016. [27] Even though there are ongoing efforts to lower the number of cesarean sections, experts do not expect to see a noticeable decrease for at least ten to twenty years. [28] Caesarean delivery may be the safest or perhaps the only option for some women to give birth to a healthy baby, despite the dangers connected with both short-term and long-term difficulties.

There is a chance of severe bleeding both during and after a caesarean section, just like with every birth and surgery in general. The primary cause of substantial maternal morbidity in the United States is bleeding. [29] Long labours, foetal macrosomia, or polyhydramnios could raise the risk of uterine atony and consequent haemorrhage prior to a caesarean surgery. Excessive blood loss may also result from intraoperative situations like the requirement for extensive adhesiolysis or lateral hysterotomy extension into the uterine vessels. Blood product transfusion may then be required as a result of bleeding during birth, which carries its own set of dangers. Hemorrhage at delivery is known to cause Sheehan syndrome.

After a caesarean delivery, there is a large risk of infection, as was previously mentioned. The other typical consequences following a caesarean section include wound infection and endometritis in addition to postpartum bleeding. A study looking into the efficacy of vaginal hygiene found that cleaning reduced postoperative endometritis from 8.7% to 3.8%. [30] The additional antibiotic decreased serious adverse events from 2.9% to

1.5% and wound infection from 6.6% to 2.4%, according to a study looking at adjunctive azithromycin.[31] These statistics, however, nevertheless constitute a sizable proportion of women who experience infectious problems given that more than a million women undergo caesarean sections annually.

The overall risk of morbidity was 4.6% for women who attempted to labour spontaneously compared to 3.2% for women who purposefully underwent repeat caesarean births, according to data from 2010. For elective repeat caesareans, the same data revealed a 0.46% blood transfusion rate, a 0.3% to 0.6% surgical injury rate, and a 0.16% hysterectomy rate.[32] Anesthesia problems and thromboembolism are also possible.

There are hazards associated with foetal delivery in this way, despite the fact that the caesarean section is safer for the foetus. Around 1% of caesarean deliveries result in foetal trauma, including cephalohematoma, facial or brachial plexus nerve injury, skin laceration, and skull or clavicle fractures. [33] Compared to vaginal deliveries, these risks are generally smaller. There are dangers for the newborn.

For the patient and her unborn child, caesarean births come with short- and long-term hazards in addition to surgical issues. As was previously indicated, a woman's uterus has a vertical scar that necessitates a caesarean birth for subsequent pregnancies. The hazards of surgery rise along with the number of caesarean sections. Adhesion formation might raise the risk of unintentional harm and make subsequent caesarean deliveries more challenging.The chance of an incorrect placentation increases with each successive surgery. Women who have had one caesarean surgery have a 0.3% probability of placenta accreta, while those who have had five or more have a 6.74% chance. [35] A placenta that is morbidly adherent poses a danger of substantial bleeding and potential infertility.

“Enhanced Recovery after Surgery”

ERAS is an evidence-based, multidisciplinary technique for improving surgical care all throughout the perioperative period. By lowering the physiologic response during surgery, ERAS seeks to improve patient outcomes without increasing postoperative complications. Accelerated Recovery after Cesarean (ERAC), which addresses issues specific to obstetrics, expands ERAS theories.

History of ERAS

Early ERAS guidelines placed a high priority on enhancing the surgical outpatient patient experience. Enhancing pain management and lowering postoperative nausea and vomiting were the initial priorities. [36] Shorter hospital stays were made possible by early ambulation, fast surgical pain relief, and the nausea that is frequently caused by anaesthetic medicines. ERAS was initially created for colorectal surgery [37]. [38] Preoperative risk factor management contributed to lower preoperative pathophysiologic responses and lower morbidity. [39] Treatment of pre-existing conditions, dietary improvement, and alcohol addiction monitoring were the main preoperative treatment priorities. There were intraoperative efforts to reduce the workload of the procedure, prevent intraoperative hypothermia, and preserve blood. Controlling discomfort, avoiding nausea and vomiting, and refeeding as soon as feasible to avoid ileus were the postoperative goals. Doctors put a lot of emphasis on

In order to prevent muscle mass loss, other interventions included restricting the use of drains and nasogastric tubes and forcing patients to actively participate in rehabilitations. Better patient outcomes were obtained as a result of standardising care through these guidelines. ERAS procedures for numerous different surgical subspecialties have been established throughout time.

The most frequent abdominal operation in North America is still caesarean delivery, and despite efforts to reduce primary caesareans, its rates have remained high.[40] ERAC guidelines were released in 2018, a very long time after several other surgical specialties developed their ERAS protocols. Taking care of a newborn while recovering from major abdominal surgery can be challenging for new mothers. The postpartum phase includes diaper changes, breastfeeding, and the emotional toll of a potentially unexpected procedure. It is difficult to comprehend the benefits of using ERAC immediately away because of these factors.

ERAC's fundamental elements include evidence-based procedures.

Prior to Surgery: Considerations

Depending on whether a caesarean delivery was scheduled or unscheduled, different ERAC delivery criteria apply. The pathway begins for patients whose scheduled caesarean births at 10 to 20 weeks of gestation.[40] Delivery of comorbidities is optimised, including improving glycaemic management for diabetic patients and screening for and treating iron deficient anaemia.

The clinician discusses with the patient the ERAC goals for the preoperative, intraoperative, and postoperative phases. [41] For women having caesarean sections, it's crucial to reduce the amount of time they must fast. A light breakfast is permitted up to 6 hours before surgery, and clear liquids are permitted up to 2 hours before the anaesthetic is administered. For unanticipated or urgent caesarean deliveries, the preoperative pathway is shortened into a 30- to 60-minute window before to birth. [40]

Factors During the Operation

The intraoperative pathway reduces surgical complications and gets patients ready for rapid recoveries so they can be released for unplanned or urgent caesarean deliveries.

Intravenous (IV) antibiotics should be given after a surgical incision within 60 minutes. [42] First-generation cephalosporins are indicated for all women without allergies, with azithromycin given for those who have ruptured membranes. The skin must to be thoroughly cleaned and given time to dry before making an incision. Moreover, patients must receive at least 2 distinct kinds of IV antiemetics as a prophylactic measure.[41]

The ideal method for caesarean birth is regional anaesthetic.[41] In contrast to epidurals, spinal anaesthetic produces blocks that start more quickly, and intrathecal morphine aids in the management of postoperative pain. The recommended treatment for people who don't receive epidural or intrathecal morphine is a transversus abdominis plane (TAP) block. There should be a ketorolac administration**.**

It is indicated to use prophylactic vasopressor infusion to prevent spinal anesthesia-induced hypotension and maintain baseline blood pressure. [41] Oxytocin should only be delivered in the amount necessary to establish and maintain a healthy uterine tone, according to established guidelines.

To help prevent intraoperative hypothermia, it is indicated to raise the mother's body temperature, the temperature of the IV fluids, and the temperature of the operating room.[42] Coagulopathy, irregularities of the heart, and an increased risk of infection are only a few of the negative impacts of hypothermia on mothers. The newborn should be cleaned immediately after birth and kept warm because neonatal hypothermia could be harmful to the youngster. [43,44] The postpartum infant care is likewise covered by the ERAC recommendations. The umbilical chord shouldn't be clamped for at least a minute when a baby is full-term.

Considerations After Surgery

The actions done during the preoperative and intraoperative phases will determine how well the postoperative pathway goes. Making sure patients resume baseline function and

move towards a good hospital release is the main objective. Allowing for early ambulation after the resolution of the neuraxial anaesthesia is one of the first steps in returning the patient to their precesarean functional condition. This is believed to lower the risk of thromboembolic complications.[41] It is preferred for women to undergo extra mechanical thromboembolism prophylaxis, such as pneumatic compression devices, if they are not already receiving pharmacologic thromboprophylaxis for another indication. [42]

Postoperative nausea and vomiting are less likely if euvolemia is maintained and hypotension is treated appropriately during surgery. Within 60 minutes of being admitted to the post-anesthesia care unit, it is suggested that patients start drinking water and ice chips orally.

It is advised to continue or else begin the multimodal pain regimen that was started in the operating room while in the post-anesthesia care unit. Acetaminophen and prescription nonsteroidal anti-inflammatory medications are encouraged in a therapeutic regimen.[45] Guidelines advise checking the patient for anaemia before discharge and checking the haemoglobin level on the first or second postoperative day for women who have experienced large blood volume losses. [41] Anemia sufferers need to receive the proper care.

Finally, services for outpatient assistance should be provided to moms at the time of release along with support for breastfeeding during the hospital stay.

What are the benefits of implementing ERAC principles?

The ERAS Society's goal is to enhance recovery by utilising the most cutting-edge medical research. This results in faster recovery times, financial savings, and a lower incidence of problems in the majority of professions. Generally, this is done by reducing postoperative discomfort and surgical trauma, which promotes a quick return to regular activities.

Duration of Stay

The implementation of ERAS procedures has significantly reduced postoperative stays in various surgical specialties.[46] Gynecologic surgery has demonstrated the same to be true. 47 Yet, for women having caesarean deliveries, the rate-limiting element is frequently not the recuperation from surgery. In addition to increasing the risk of medical issues including preeclampsia or intrauterine infections, caesarean deliveries may lengthen hospital stays independent of surgical recovery.

Also, after a caesarean delivery, many babies require two to three days of inpatient care., and an early mother's departure could result in the mother and child being split up, which is detrimental for a number of reasons. Infants that were discharged earlier would probably need more follow-up visits, with it being unknown how this would affect their neonatal outcomes.

The prevention of thromboembolism

However, considering the rarity of the event, there is a dearth of reliable evidence on thromboembolism prophylaxis following caesarean delivery. Whether promoting early ambulation in accordance with the recommendations of the guidelines actually The use of pneumatic compression devices over a brief delay in ambulation reduces the incidence of venous thromboembolism is currently unknown. Aggressively promoting early ambulation following a caesarean delivery may be harmful when compared to the probable increased risk of maternal falls and injuries associated with ambulation in the scenario of diminishing neuraxial anaesthesia. In order to ensure patient safety, more care should be taken to follow nurse recommendations if an ERAC protocol calls for early ambulation.

Early Foley Catheter Removal

Nowadays, it is advised that women who do not require continued urine output assessments have their Foley catheters removed as soon as possible after caesarean delivery.

Top specialists have expressed disagreement regarding this. One issue is the dearth of information on prompt Foley catheter removal when long-acting neuraxial opioids are present.

Thus it makes sense that removing the Foley catheter right after might increase the risk of hypovolemia that isn't recognised. It is difficult to assess blood loss at the time of birth, despite ongoing efforts to improve blood loss calculations and the use of quantitative blood loss assays. With intermittent urination, it may be more difficult to identify hypovolemia, and decreasing urine flow is frequently the first sign that a transfusion is necessary.

Reducing Opioid Use

After a caesarean delivery, patients' need for opioids is reduced with multimodal pain management plans. Concurrent administration of long-acting intrathecal morphine and TAP blocks, two different postoperative pain control techniques, reduces the impact. In reality, despite the fact that majority of the studies involved women receiving intrathecal morphine and/or TAP block, No decrease in opioid use was found by researchers of several studies measuring opioid usage after the implementation of ERAC protocols.[48,49] Using a multimodal regimen resulted in a significant decrease in postoperative opioid use at our facility, where neither intrathecal morphine nor TAP block were routinely used. [50]

Using nonopioid medicines prevents the gastrointestinal adverse effects of opioids, such as nausea, vomiting, constipation, and impaired stool motility. drugs for pain that are less sedative.

Clinical Studies

Gupta S et al in 2022 conducted a study at the Geetanjali Medical College and Hospital in Udaipur, Rajasthan, India, comparing the Enhanced Recovery After Cesarean (ERAC) protocol to the caesarean section standard of care (CS). The ERAC protocol was applied to

elective CS patients for the first six months (Group A; n = 100), and the standard regimen was applied for the remaining six months (Group B; n = 100). Other goals included perioperative complications. Examples include obstacles to using ERAC components, urine retention and the need for recatheterization, intraoperative hemodynamic management and the need for vasopressors, a comparison of Visual Analogue Scale (VAS) readings, and the need for analgesics throughout the course of a 24-hour period. The primary outcome was a comparison of hospital total length of stay (readiness for discharge). The study's findings demonstrated a considerable decline in LOS preparedness.

Patients undergoing colorectal surgery were the target audience for the improved post-operative recovery concept, but it has since been adopted by other surgical specialties with commensurately positive outcomes. According to a review Ituk U and Habib AS conducted in 2018, the use of improved recovery following surgery in the community of obstetric patients is quickly gaining popularity. To find compliance and areas for development, objectives should be defined and targets audited frequently. Coordination with the neonatology team and lactation specialists is crucial in order to avoid release delays brought on by issues with newborn tests and evaluations or breastfeeding training. An enhanced recovery programme for caesarean deliveries should include the greatest perioperative care for the parturient research.

Meng X et al in 2021, Systematic review and meta-analysis have been done in an effort to thoroughly examine the security and efficacy of ERAS techniques for the Caserean segment. A complete literature search was done using Embase, PubMed, and the Cochrane Library up until October 2020. The length of hospital stay (LOS), readmission rate, incidence of surgical complications, postoperative pain score, use of postoperative opioids, and hospitalisation expenditures were the variables that were studied in this study to compare the impact of ERAS protocols and standard care. The analysis included both randomised controlled trials and the essential observational studies employing ERAS for patients

undergoing CS (RCTs).. All statistical calculations were done with RevMan 5.3. Ten studies totaling 16,391 patients were taken into account in this meta-analysis, including four RCTs and six observational studies. Surgery-related complications were less common (RR: 0.50, 95% CI: 0.37 to 0.68, p 0.00001) and the LOS was lowered by ERAS (WMD -7.47 h, 95% CI: -8.36 to -6.59 h).According to pooled analysis, the ERAS group also had significantly lower postoperative pain scores, opioid use, and hospital costs than the conventional treatment group (WMD: -1.23, 95% CI: -1.32 to -1.15; SMD: -0.46; and SMD: -0.54). The readmission rate (RR: 0.86, 95% CI: 0.48 to 1.54, p = 0.62) showed no appreciable change.

In 2016, Duryea El et al. carried out a study to compare the effects of ERAS on post-operative recovery in patients following elective caesarean sections. From January 2014 to December 2014,The NMCH, Patna's Department of Obstetrics and Gynecology was where the study was carried out. 100 people (n=100) who had elective caesarean sections took involved in the research. The cases were divided into two categories. 60 trial participants (n=60) adhered to the ERAS protocol. A 40-patient control group (n=40) adhered to the recommended postoperative care procedure. Two groups were compared with regard to recovery traits, postoperative issues, and satisfaction levels. Findings showed that the ERAS group released more patients on post-operative day 4 than did the control group.

Mullman L et al in 2020, examinedthe outcomes of a study on quality enhancement that put an improved recovery after surgery (ERAS) programme in place for caesarean deliveries. Beginning in December 2018, a patient's preoperative, intraoperative, and postoperative therapy will follow an evidence-based ERAS approach. Before to and following the adoption of the pathway, Using a prepost approach, changes in opioid use and duration of stay were evaluated for all caesarean birth patients. The results showed that 3,679 caesarean sections (both planned and unplanned) were performed between Between January 1, 2018, and August 31, 2019, 1,508 events took place after the implementation on December 17, 2018, while 2,171 events took place before it.. Following a caesarean delivery, 84% of

patients received opioids as inpatients in the pre-implementation phase compared to 24% in the post-implementation phase (odds ratio [OR] 16.8, An ERAS method for patients undergoing caesarean deliveries was concluded.[55]

Patel K et al in 2021, carried as review with the purpose to know the newest improved post-c-section healing components.Latest studies on improved healing following caesarean birth (ERAC), This provides an evidence-based technique to improve maternal outcomes, functional recovery, mother-infant connection, and patient experience, according to the author's review. A complete, complex approach that emphasises a quicker functional recovery has replaced a one-dimensional pain score for postoperative recovery.The anesthesiologist, obstetrician, nursing staff, hospital, and patient work together to create ERAC. ERAC entails preoperative patient education, restricted fasting, carbohydrate loading, restricting opioid use during and after surgery, using planned non-opioid analgesics, and supplementing for women who are more likely to experience pain. ERAC methods shorten hospital stays, decrease opioid use, and enhance maternal and newborn outcomes. According to this review's conclusion, implementing ERAC-standardized care will

Improved Recovery After Surgery, a comprehensive care strategy, aims to speed up recovery after surgery. It has a positive impact on lowering hospital stays and improving the level of care. To assess how well ERAS was applied in terms of cutting down on hospital stays for caesarean deliveries, Tamang T et al. conducted a study in 2021. The Department of Obstetrics and Gynecology at Mongar Regional Referral Hospital used a sample of women who had caesarean births between January and December 2020 to undertake an ERAS protocol pre- and post-implementation study. Data obtained retrospectively were analysed using a t-test in SPSS (IBM SPSS trial version), which was used to compare the length of hospital stays between the two groups.

Suharwardy S and Carvalho B in 2020, described improved post-operative recovery (ERAS) and its use in caesarean delivery. ERAS is a multidisciplinary, standardised method

for enhancing surgical patient care, from preoperative planning to operation and recovery. Many advantages of ERAS include better patient outcomes and satisfaction, shorter hospital stays, and lower costs. In comparison to other surgical subspecialties, obstetrics has lagged in the application of ERAS protocols. Given the prevalence of caesarean deliveries globally, expanding the use of ERAS could significantly improve care quality and costs. This study summarised that It is important to create ERAS routes unique to caesarean deliveries since they can raise the standard of care. [58]

Qiang H and Yuanshui S in 2020**,** determined whether, in comparison to traditional perioperative care, An "enhanced recovery after surgery" (ERAS) pathway at the time of caesarean birth will enable shorter postoperative recovery times and higher postoperative patient satisfaction . Both ERAS and SC were randomly assigned to trial participants who underwent a non-emergent caesarean section at or before 37 weeks of gestation. As part of ERAS, numerous evidence-based treatments were merged into a single regimen. The main outcome was discharge on postoperative day 2 (POD#2). Secondary outcome criteria included nursing rates, the requirement for pain medication, and various measures of patient satisfaction. The findings revealed that 58 women were at random assigned to the ERAS and 60 to the SC between September 27, 2017, and May 2, 2018. The groups were comparable in terms of demographics, perioperative variables, and medical comorbidities. When ERAS was compared to standard care, the rate of POD#2 discharges was not considerably greater (8.6% vs. 3.3%; OR: 2.74, 95% CI 0.51-14.70), but the median postoperative length of stay (LOS) was significantly lower (73.5% [(IQR): 71.08-76.62)] vs. 75.5 [(IQR): 72.5% [(IQR): 72.5%]). The authors draw the conclusion that, notwithstanding the possibility that this was caused by factors other than the patients' medical readiness for discharge, ERAS post-caesarean did not enhance the number of women who were discharged on POD#2. The reported reduction in overall postoperative LOS, higher patient satisfaction, and an increase in breastfeeding rates provide evidence that ERAS after caesarean may be able to enhance

outcomes like day of discharge. Better ERAS provider and patient experiences might lead to even greater outcomes. [59]

Pan J et al in 2020, compared the management of pain, hospitalisation, cost, and adverse reactions for patients undergoing elective caesarean deliveries while employing an accelerated recovery after surgery (ERAS) regimen. The ERAS group or the control group was randomly assigned to patients who underwent elective caesarean births, and each group got care in accordance with the ERAS protocol or the conventional methodology. The results of the study showed that intraoperative nausea and Visual analogue scale (VAS) grades > 3 during rest and motion in the first 24 and 48 hours after surgery were considerably less common in the ERAS group than in the control group. In terms of the need for additional analgesics, the frequency of vomiting, shivering, hypotension, postoperative nausea, or itching, there were no intergroup differences. Nobody in either patient group had any postoperative vomiting. In the ERAS group, patient satisfaction as measured by the VAS was considerably higher than in the control grou**.** Both groups had postoperative stays that were comparable in length overall and in terms of the expense of the anaesthesia.Also, the ERAS group's average daily hospitalisation expense was significantly lower than that of the control group. The results of the study showed that the ERAS protocol is efficient in reducing postoperative pain, the prevalence of intraoperative nausea, the average cost of hospitalisation, and enhancing patient satisfaction. Those having elective caesarean deliveries frequently use it, which seems to be advantageous. [60]

Without compromising patient pleasure or the standard of treatment, we must find a way to expedite recovery and enable earlier discharge, improving recovery entails simplifying different aspects of patient care. A better recovery path for women who have caesarean deliveries may have positive effects on postoperative outcomes and postoperative length of stay, according to a small number of randomised trials. To compare the effectiveness of ERAS to conventional care for caesarean deliveries in terms of complications

and hospital stay, Junaidi DS et al. conducted a prospective randomised control study in 2020. The experiment was open to participants who scheduled caesarean deliveries at a tertiary care institution between August 2020 and September 202040 of the trial's 80 participants—40 in total—were randomly assigned to either Group A (the ERAS group) or Group B. (Standard of Care group). Pre-operative prophylaxis was administered to study participants in both groups, including the giving of antibiotics 30 minutes before to surgery, anaesthesia, post- and intraoperative nausea and vomiting (PONV/IONV), and DVT prevention. Only individuals who were in the ERAS Group received active warming during section. According to the study, there were significant differences between the two groups in terms of the median duration of IV infusion, oral intake of liquids and solids, catheter removal, initial ambulation following CS, and length of hospital stay.All of the aforementioned metrics took longer in the ERAS group compared to the non-ERAS group. In conclusion, ERAS is the greatest method for improving maternal and neonatal healthcare through the efficient use of standards and protocols. Better delivery care for the mother and the child will result from the introduction of ERAS programmes and continuing performance evaluations. [61]

In a prospective study conducted in 2021 by Mangala JK et al., In comparison to the traditional care group, the implementation of the ERAS (Enhanced recovery after surgery) pathway and its effect on the length of the hospital stay following surgery and the various stages of post-operative care were investigated. This study was conducted at the Amrita Institute of Medical Sciences in Kochi, Kerala. Between September 2020 and October 2020, elective caesarean section patients were compared to patients who received the surgery while receiving normal perioperative care. Patients with medical or surgical comorbidities and women who had emergency or urgent caesarean deliveries were excluded. The same surgical procedure was used on both arms. Goal-directed intravenous hydration was used.After two hours, oral feeding with liquids was begun; solids were added four hours later. Diclofenac

and paracetamol were commonly administered intravenously. Fentanyl and tramadol were additionally administered intravenously as needed in addition to these analgesics. The Foley's catheter was removed after 12 hours. The standard care group adhered to a 6-hour fast both before and after surgery. The catheter was left in place for 24 hours; the first day, 2500 ml of IV fluids were given, and the second day, 1000 ml. Clinical recommendations were used by the medical staff to determine the length of the hospital stay. The outcomes demonstrated that the ERAS arm's post-operative hospital stay was significantly shorter than that of the group getting standard care. Early hydration, early ambulation, prompt catheter removal, and multimodal and preventive analgesia (53.91 versus 77.71 h-p = 0.00).

A multidisciplinary standardized care program was conducted by Kinay T et al in 2022, which aimed to improve the preoperative, surgical treatment, and postoperative care of patients. According to recent studies, caesarean deliveries have successfully used the ERAS guidelines. The main components of the ERAS programme in cae are preoperative medical optimization, preanesthetic medication, limited fasting time, carbohydrate supplementation, intraoperative anaesthetic management, surgical site infection prevention, maintenance of normothermia and euvolemia, appropriate surgical technique, newborn care, postoperative analgesia, prevention of nausea and vomiting, early feeding, early mobilisation, and thromboemboli. The addition of these components led to better maternal/newborn outcomes and shorter hospital stays. To produce a uniform, internationally adopted ERAS technique for caesarean birth, however, more research is needed than is currently available in the literature. To improve the care plan and suggestions, more research is necessary. [63]

Teigen NC et al in 202**,** determined whether, in comparison to routine perioperative treatment, A shorter postoperative stay would be possible witha quicker road to recovery following surgery during caesarean delivery, which would also improve postoperative patient satisfaction. Prior to 37 weeks of gestation, patients who experienced a non-emergent caesarean delivery were randomly assigned to either standard treatment or expedited

recovery. Several evidence-based therapies were combined into one programme to improve recovery following surgery. The main result was discharge on day two after surgery. Nursing rates, the need for pain medication, and different patient satisfaction metrics were secondary outcome factors. Between September 27, 2017, and May 2, 2018, 58 women in total were randomly assigned to receive increased post-operative recovery care, whereas 60 women received conventional care. Demographics, perioperative traits, and medical comorbidities were comparable between the groups. The average postoperative stay was reduced by statistically significant amounts (73.5 hours on average; interquartile range, 71.08–76.62 vs. 75.5 hours on average; interquartile range, 72.86–76). A substantially greater proportion of postoperative day 2 discharges was not linked to improved postoperative recovery (8.6% vs. 3.3%; odds ratio, 2.74; 95% CI, 0.51-14.70). 117.16 54.17 milligramme equivalents of morphine as opposed to 119.38 47.98 milligramme equivalents; mean difference: -2.22; 95% confidence interval: -20.86 to 16.42.A decline in opioid use was not associated with improved postoperative recovery. Those who were randomly allocated to the regimen for speedy recovery after surgery reported nursing more frequently after they were discharged (67.2% vs. 48.3%; P =.046). When queried about them six weeks after giving birth, patients in the group that experienced a quick recovery from surgery were more likely to say that they were still nursing and that their expectations had been realised. Also, they were more likely to believe that their postoperative goals had been accomplished early.

In a prospective study, mothers who delivered by emergency c-section were randomised to the ERAS or a “standard of care”(SOC) recovery arm, randomised, single-blind, controlled trial carried out by Baluku M et al in 2020. A modified ERAS strategy that comprised multimodal analgesia, prophylactic antibiotics, antiemetics, normothermia, and restricted fluid administration was used to treat participants in the ERAS arm. Also, they began mobilising, feeding, and having their urethral catheters removed early on. The length of hospital stays served as the main endpoint. Complications and readmission rates served as

the secondary end points. The average length of stay was compared between the intervention and control groups using t tests. Version 13 of STATA was used for the statistical analysis (College Station, TX). According to the outcomes, 80 participants were randomly assigned to each arm out of the total 160 patients who participated in the trial. The difference in stay time between the ERAS and SOC arms of 18.5 hours (P.001, 95% CI, -23.67, -13.34) was statistically significant.In the ERAS arm compared to the SOC, there were noticeably fewer instances of complications from severe pain and headache (P =.001 for both problems). However, more pruritus was reported by ERAS participants than SOC participants (P =.023). According to the study, it is feasible to use an ERAS method for women. [24]

AIMS AND OBJECTIVES

1. To ascertain the effects of enhanced recovery surgery protocol on post operative outcomes in women undergone caesarean section.
2. To determine the effects of conventional treatment protocol on post operative outcomes in women undergone caesarean section.
3. To compare post operative outcomes between these two protocols in women undergone caesarean section.

METHODOLOGY

Source of Data

This is a prospective comparative study conducted in the department of obstetrics and gynecology, R.L.Jalappa hospital and research centre, following approval from institutional ethical committee of R. L.Jalappa hospital and research centre, over a period of one year from January 2021 to December 2022. The study included pregnant women visiting hospital who fulfilled the inclusion criteria. Demographics, perioperative traits, and medical comorbidities were comparable between the groups. Improved postoperative recovery was not linked to a statistically higher proportion of postoperative day 2 discharges (8.6% vs 3.3%; odds ratio, 2.74; 95% confidence interval, 0.51-14.70). Written informed consent was obtained from all participants who met the inclusion criteria after a thorough explanation of the study's goal, procedure, and anticipated results was given to each participant before the study began..

Data Collection

Study subjects were enrolled on the day of caesarean delivery and after obtaining informed consent they are divided into two groups by selecting the patient in each group with alternate sequence. In one group enhanced recovery after surgery (ERAS) protocol was implemented and other group conventional care was given. Preoperative surgical preparation and antibiotic prophylaxis followed standard institutional protocols of caserean section.

Based on the following inclusion and exclusion criteria, the study's participants were chosen.: -

Inclusion Criteria

- Females admitted with Gestational age of 37 0/7 completed weeks or greater with an indication for delivery by emergency / elective caesarean section under spinal anaesthesia.
- Lower segment caesarean section

Exclusion Criteria

- Subjects with gestational less than 37 weeks
- Caesarean section done under general anaesthesia
- Intraoperative and postoperative postpartum haemorrhage,
- Antepartum haemorrhage
- Coagulation disorder
- Moderate to severe anemia
- Sepsis
- Haemodynamic instability
- Severe pre-eclampsia and eclampsia
- Gestational diabetes mellitus, overt diabetes mellitus,
- Severe cardio-respiratory disease
- Pre-existing gastrointestinal disorders

Sample Size

Assuming 7.5 change from sample to control and with baseline control of 92.5% among the conventional care, confidence interval of 95%, power of 80% with 1:1 allocation ratio

between two groups the minimum sample size was calculated to be 75 in each of the two groups i.e., a total of 150. The sample size was calculated using below mentioned formula

$$n = \frac{Z\alpha^2 * p * q}{d^2}$$

Where P = Estimate of expected proportion with the valuable of interest in the population (literature review or pilot study)

D = Margin of error (Absolute precision)

Z α = standard normal variable at desired level of confidence (usually 95% confidence level)

Based on the calculation a total of 150 pregnant women divided in to ERAS group (n=75) and conventional group (n = 75). Grouping was done using alternate sequence.

Methodology

The components of the enhanced recovery protocol included several evidence-based recommendations: early diet initiation, early ambulation early removal of urinary catheter.

Enhanced recovery after Caesarean section comprised of

- Women in the early feeding were given 200–250 mL of liquid (water, tea, milk, packed fruit juice) 6 hours after surgery.
- If the liquid diet was well tolerated, a solid diet was started within 24 hours after surgery.
- Early Ambulation-within the first eight hours following surgery, the side of the bed with her feet dangling and sat in a chair, then walking at least once within the first 24 hours, then walking three to four times per day after that.
- Early removal of urinary catheter-Removal of urinary catheter after 8 hours.

Conventional care protocol comprised of*:* -

- Ambulation after 24 hours, initiation of clear fluids by 12 hours, regular diet initiation after 24 hours, urinary catheter removal after 24 hours.

Outcome measures

Primary outcomes

Gastrointestinal and renal outcomes include pain abdomen, anorexia, abdominal distension, persistent nausea and/or vomiting.

Secondary outcomes

Postoperative complications include urinary tract infections, wound complication and hospital readmission

Investigations

Urine routine

CBC prior and post procedure

Urine culture and sensitivity

Wound swab culture

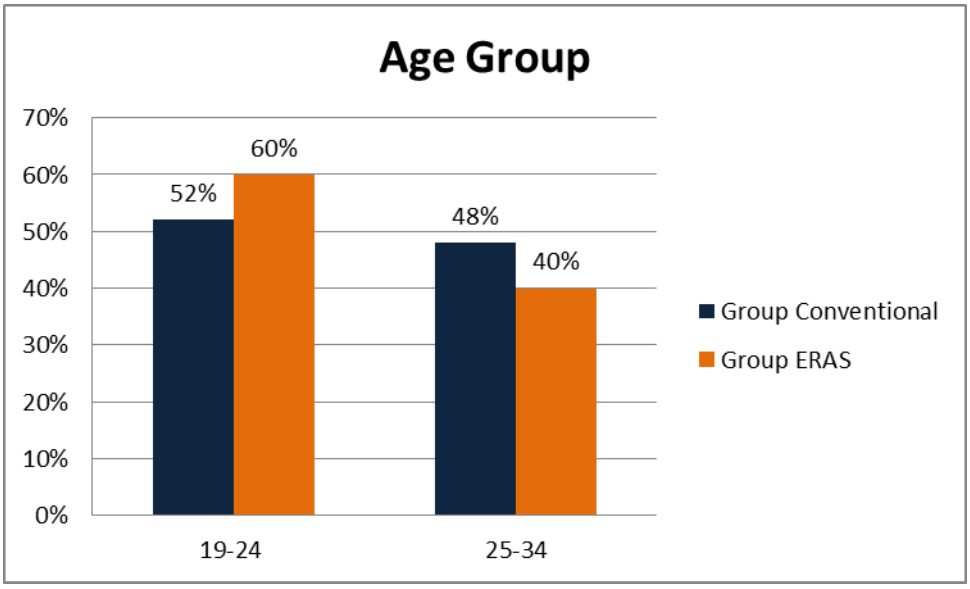
Statistical Analysis

Data was entered in Microsoft Excel. Statistical analysis was performed by the SPSS program for Windows, version 17.0 (SPSS, Chicago, Illinois). Continuous variables were presented as mean ± SD, and categorical variables were presented as absolute numbers and percentage.

RESULTS

Table 1: Distribution of study subjects based on age

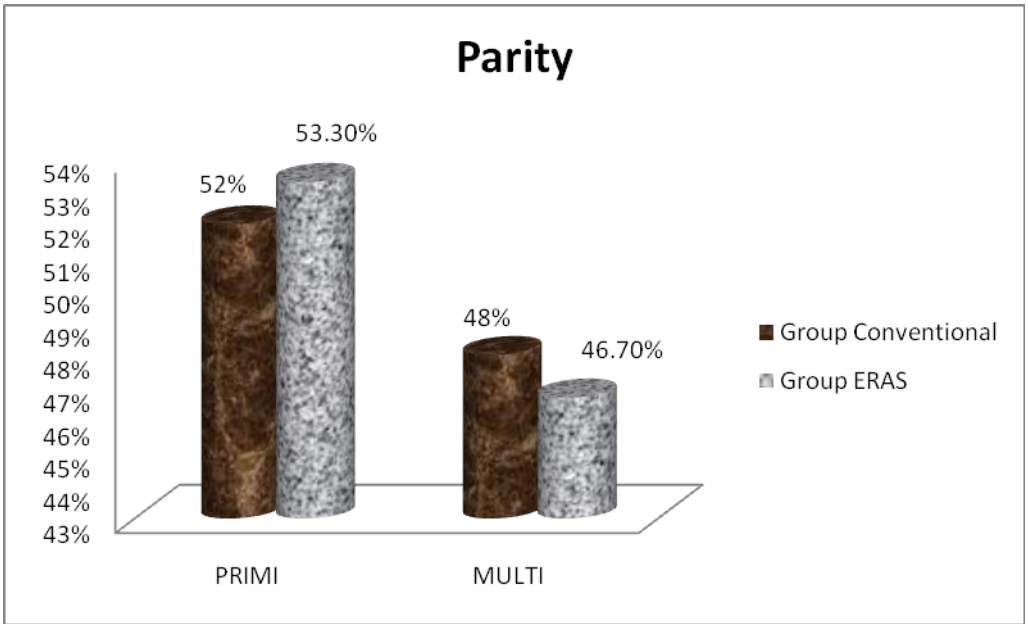
Age (years)	Group		Total	X^2	p
	ERAS	Conventional			
19-24 years	39 (52.0)	45 (60.0)	84 (56.0)	0.974	0.324
25-34years	30 (40.0)	36 (48.0)	66 (44.0)		
Total	75	75	150		



From the above statistical analysis The bulk of the subjects in both the conventional and ERAS groups were between the ages of 19 and 24. Between the two groups, there was no statistically significant difference..

Table 2: Distribution of study subjects based on parity

Parity	Group		Total	X^2	P
	ERAS	Conventional			
PRIMIGRAVIDA	40 (53.3)	39 (52.0)	79 (52.7)	0.027	0.870
MULTIGRAVIDA	35 (46.7)	36 (48.0)	71 (47.3)		
Total	75	75	150		



From the above statistical analysis it can be observed that, majority of subjects in both conventional and ERAS groups were primigravida. There was no statistically significant difference between both the groups.

Table 3: Distribution of study subjects based on catheter removal

Catheter removal	Group		Total	X^2	P
	ERAS after 8hours	Conventional After 24hours			
NO	0 (0.0)	2 (2.7)	2 (1.3)	2.027	0.497
YES	75 (100.0)	73 (97.3)	148 (98.7)		
Total	75	75	150		

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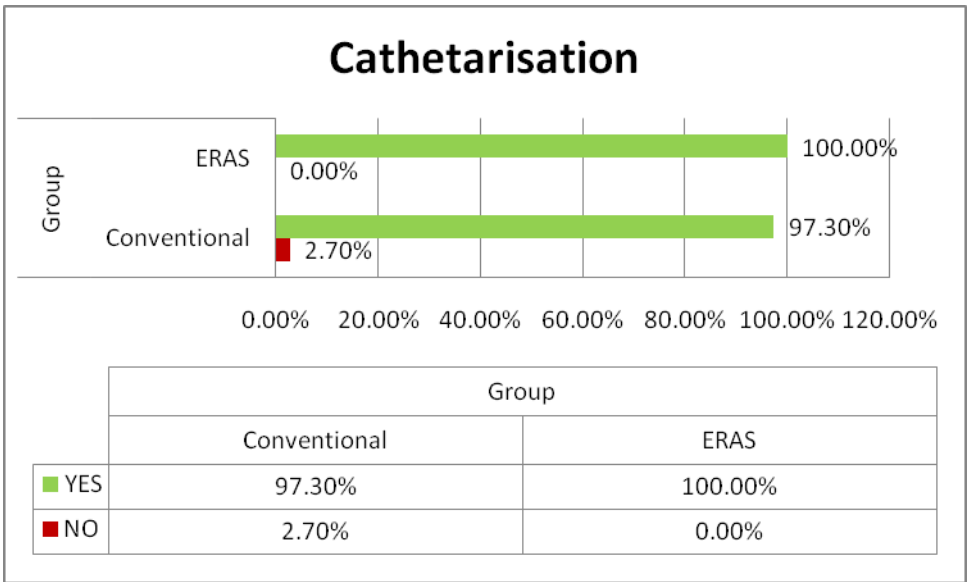
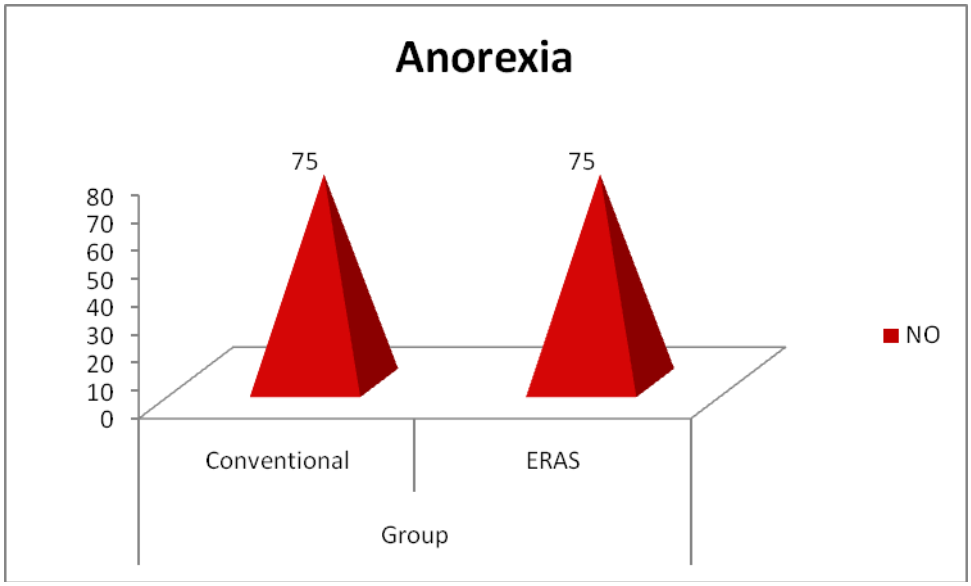


From the above statistical analysis it can be observed that, 97.3% of subjects in conventional got catheter removed after 24hours and all in ERAS group has catheter removed after 8 hours. However the association was not found to be statistically significant

Comparison of primary outcomes between conventional and ERAS groups

Table 5: Comparison of anorexia between conventional and ERAS groups

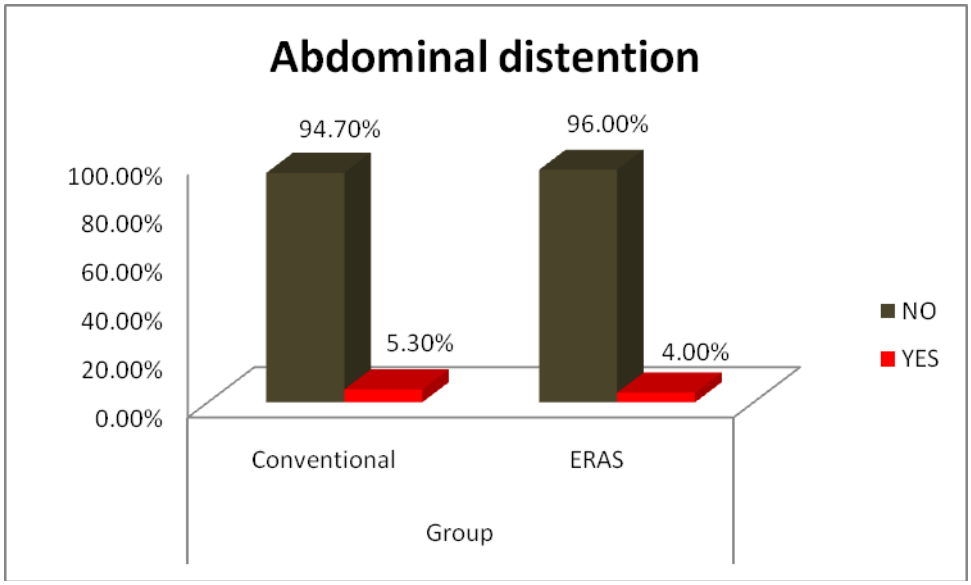
Anorexia	Group		Total
	ERAS	Conventional	
NO	75	75	150



None of the subjects in both groups reported anorexia

Table 6: Comparison of abdominal distention between conventional and ERAS groups

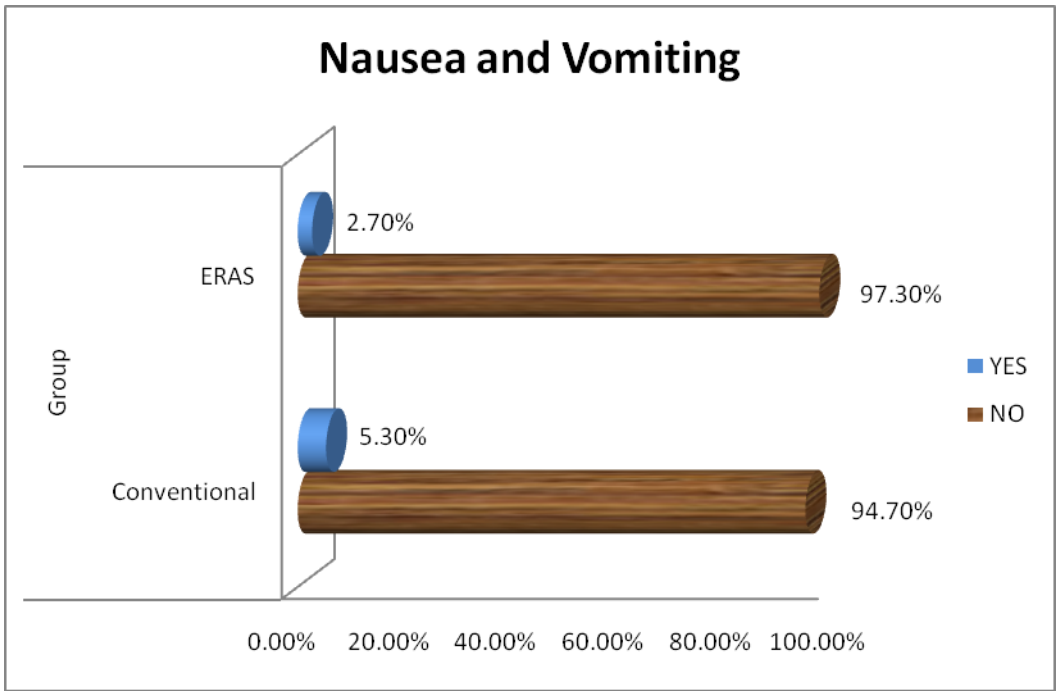
Abdominal Distention	Group		Total	X^2	P
	ERAS	Conventional			
NO	72 (96.0)	71 (94.7)	143 (95.3)	0.150	0.699
YES	3 (4.0)	4 (5.3)	7 (4.7)		
Total	75	75	150		



From the above statistical analysis it can be observed that, 4 (5.3%) subjects in conventional and 3 (4.0%) in ERAS group reported to have abdominal distention. Between the two groups, there was no statistically significant difference.

Table 7: Comparison of persistent nausea and vomiting between conventional and ERAS groups

Nausea	Group		Total	X^2	P
	ERAS	Conventional			
NO	71 (94.7)	73 (97.3)	144 (96.0)	0.694	0.405
YES	2 (2.7)	4 (5.3)	6 (4.0)		
Total	75	75	150		



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From the present study it can be observed that, 4 (5.3%) subjects in conventional and 2 (2.7%) in ERAS group reported to have persistent nausea/ vomiting. There was no statistically significant difference between both the groups

Comparison of secondary outcomes between conventional and ERAS groups

Table 8: Comparison of Urinary tract infection between conventional and ERAS groups

Urinary tract infection	Group		Total	X^2	P
	ERAS	Conventional			
NO	75 (100.0)	71 (94.7)	146 (97.3)	4.110	0.043
YES	0 (0)	4 (5.3)	4 (2.7)		
Total	75	75	150		

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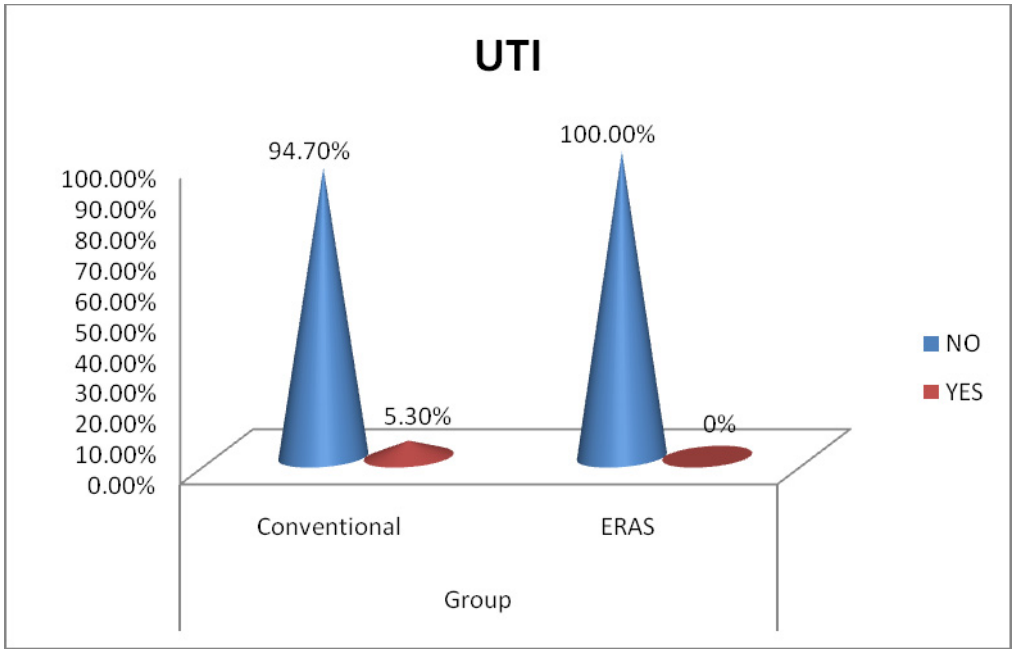

Urinary tract infection

From the above statistical analysis it can be observed that, 4 (5.3%) subjects in conventional and none in ERAS group reported to have urinary tract infection. The difference between the two groups was found to be statistically significant.

Table 9: Comparison of wound complication between conventional and ERAS groups

Wound complication	Group		Total	X^2	P
	ERAS	Conventional			
NO	75 (100.0)	71 (94.7)	146 (97.3)	4.110	0.043
YES	0 (0)	4 (5.3)	4 (2.7)		
Total	75	75	150		

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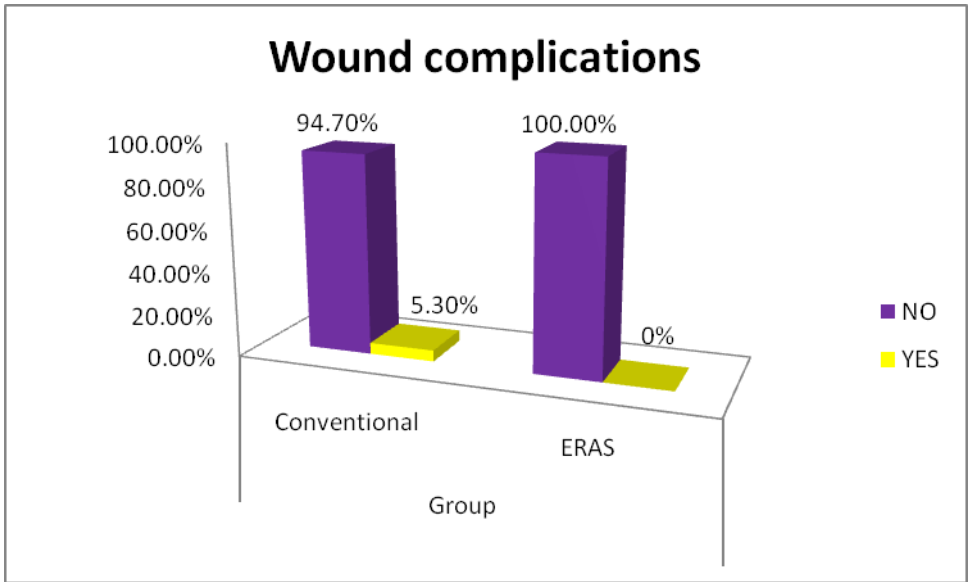

From the above statistical analysis it can be observed that, 4 (5.3%) subjects in conventional and none in ERAS group reported to have wound complication. There difference between both the groups was found to be statistically significant

Table 10: Comparison of hospital readmission between conventional and ERAS groups

Hospital Readmission	Group		Total	X^2	P
	ERAS	Conventional			
NO	75 (100.0)	73 (97.3)	148 (98.7)	2.800	0.497
YES	0 (0)	2 (2.7)	2 (1.3)		
Total	75	75	150		

From the above analysis it can be observed that, 2 (2.7%) subjects in conventional and none in ERAS group had hospital readmission. There was no statistically significant difference between both the groups.

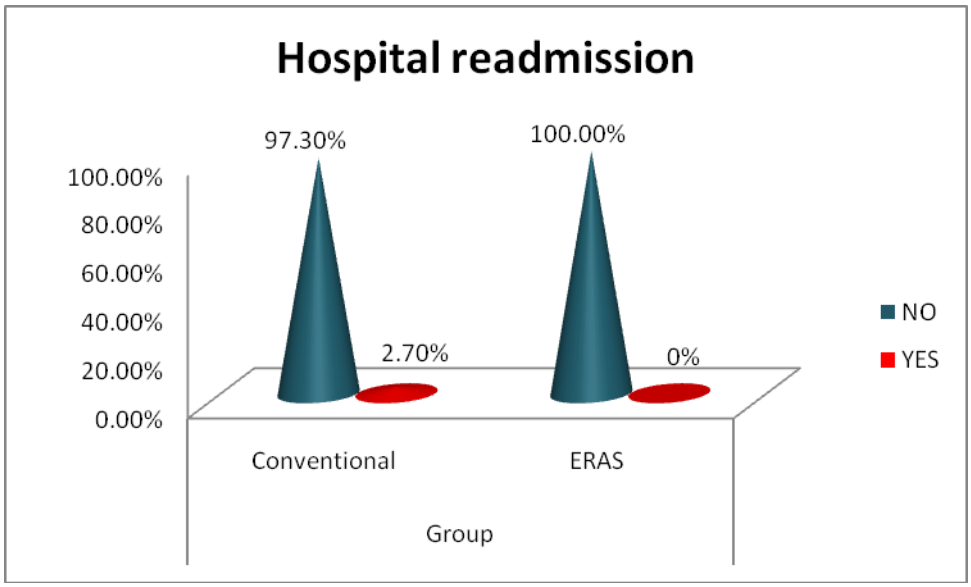

Table 11: Distribution of variables in ERAS group

Variables	YES	NO	Total
EARLY FEEDING (LIQUID) 6 HOURS AFTER SURGERY (sips)	73	2	75
SOLID DIET WITHIN 24 HOURS OF SURGERY	75	0	75
EARLY AMBULATION- DANGLING FEET WITHIN 8 HOURS	72	3	75
WALKING 1-2 TIMES WITHIN 24 HOURS POST OPERATIVE	75	0	75
WALKING 3-4 TIMES AFTER 24 HOURS	75	0	75
EARLY REMOVAL URINARY CATHETER AFTER 8 HOURS POST OPERATIVELY	75	0	75

From the above statistical analysis it can be observed that, all the subjects in ERAS group, could have solid diet within 24 hours of surgery, walking 1-2 times within 24 hours post operative, walking 3-4 times after 24 hours and early removal urinary catheter after 8 hours post operatively. 73 subjects could initiate early feeding of liquids as sips 6 hours after surgery and 72 subjects could have early ambulation- dangling feet within 8 hours.

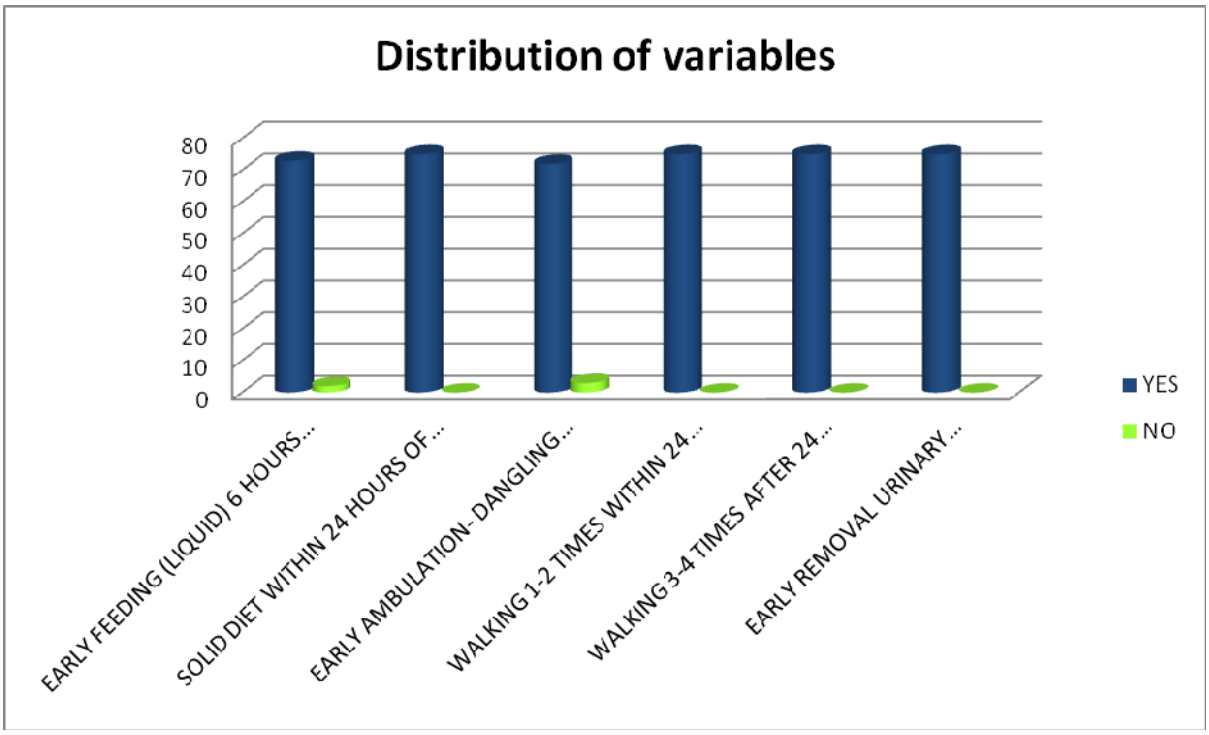

Table 12: Distribution of variables in Conventional group

Variables	Yes	No
Initiation of clear fluids after 12hours	75	-
Initiation of regular diet after 24 hours	75	-
Ambulation after 24 hours	73	2
Removal of catheter after 24 hours	73	2

From the above statistical analysis it can be observed that, all the subjects in conventional group, could have Initiation of clear fluids after 12hours, Initiation of regular diet after 24 hours, 73 subjects could ambulate after 24 hours and removal of catheter after 24 hours.

DISCUSSION

A multidisciplinary perioperative care system called “Enhanced Recovery after Surgery” (ERAS) integrates evidence-based methods to accelerate and enhance patients' recovery. The ERAS pathway minimises the stress associated with surgery afterward and expedites early physiological and functional recovery. It has reduced readmission rates, the duration of hospital stays, potential complications, and the expense to the healthcare system. [65-68].

An international, interdisciplinary, the ERAS Society, a nonprofit organisation (www.erassociety.org), has developed recommendations and criteria for all surgical disciplines.[69] For better improvement of the mother and foetal health outcomes after Caesarean births (CD), The society suggests emphasising a patient-centric strategy and using some ERAS components during the perioperative period..[70-72] To increase the standard of patient care, the successful adoption of the ERAS protocol among CD requires a concerted multidisciplinary team effort. [73,74]. Using the ERAS route in postoperative care is still a novel idea in many hospitals, and it has not been adopted in all surgical specialties. There is mounting proof that the ERAS protocol in CD is secure, practical, and efficient. The ERAS society has published the most recent evidence and practises in three parts. [6-8] The Society for Obstetric Anaesthesia and Perinatology had just reached an agreement and published recommendations.[75] Hence, I was interested in contrasting the standard of care in this study's participants who had caesarean sections with the fast recovery after surgery regimen.

Several of the components of ERAS were already included in standard practise for the management of women having Caesarean deliveries, according to a 2013 assessment of UK facilities. [76] They included mostly employing localised (spinal) anaesthesia during surgery, minimising oral intake disruption, primarily using oral analgesia afterward, and moving quickly afterward. Yet, EROS differs significantly from the ERAS protocols from which it was formed in a number of significant ways. The majority of women who have a Caesarean

section are young and physically fit, and while the procedure is not easy, it nevertheless causes less physical harm than, say, bowel resection or aortic aneurysm surgery. The risk of death during surgery is very minimal.

A multidisciplinary team should create and plan any EROS pathway. Anaesthetists play a crucial part in this procedure and frequently take the lead. [77]. Information should be made available to all of them in order to support shared decision-making and to empower women, It is difficult to forecast which women will be able to leave the hospital the day following surgery, and for a very small number of them, this is the case (such those who have major comorbid diseases), this will certainly be inappropriate. During the recuperation stage, the ideal day for discharge should eventually be determined. While though EROS has considerable financial advantages, it's also crucial to remember that many women have great things to say about next-day hospital release and are glad that it's a possibility. Several of the features of EROS can be employed in emergency scenarios even though it was designed for elective Caesarean sections.

- In the study by Tshering Tamang et al.[78], a number of positive changes were observed, including: • Avoid prolonged fasting; • Limit parental fluid; • Encourag oral intake as early as 3 hours after surgery; • Assist with mobilisation after 6 hours; • Remove the urinary catheter at 6 hours; • Practice early essential newborn care (skin to skin contact); and • Discharge the mother home early.

Implementing the ERAS protocol is not difficult and it is associated with several improved maternal and fetal outcomes which are well documented and conveyed by earlier studies.[78,79]

Demographic variables

The majority of the individuals in both the traditional and ERAS groups were between the ages of 19 and 24. There was no statistically significant difference between the two groups,. Regarding parity, there was no statistically significant difference between the two groups.. All the women in both the groups were having term gestation.

97.3% of subjects in conventional and all in ERAS group had catheterization. However the association was not found to be statistically.

In concurrence with the present study, In the study by Sara Taha Mostafa et al.[80] The patients' ages ranged from 18 to 35 years old, per the demographic data on the patients in both groups, with no statistically significant difference between the two groups. The gestational ages of the two groups were examined in the same study, but no statistically significant difference was discovered.

In the study conducted by Tshering Tamang et al[78] et al The difference in the mean ages of the pre-ERAS group (29.26.1 years) and the post-ERAS group (29.66.3 years) was not statistically significant. Similar to the current study, mean parity did not statistically differ from zero.

Regarding the baseline values, In a study of a similar nature, Pravina P et al. found no difference between the two groups that was statistically significant. [81]. Both groups were compared in terms of age, weight, gestational age, parity, and blood loss following caesarean birth.

According to Tshering Tamang et alresearch, .'s 2020 saw 176 women undergo CD, 91 of were in the pre-ERAS arm and 85 of whom were in post-ERAS arm. The mean ages of the pre-ERAS (29.26.1 years) and post-ERAS (29.66.3 years) groups statistically did not differ. The parity difference was statistically insignificant as well. These findings coincided with those made during our investigation.

In a similar study by Shifa Junaidi, et al[83] among the study subjects, in the ERAS group majority of them were in age group of 26 to 30 years (65%) and in the Non-ERAS Group 70% of them were in the similar age group and it was found to be statistically non-significant. The comparative values are as shown in the table below. The age group of study subjects in both the groups was found to be similar and it was comparable to study findings of Sara Tasha Mostafa.[80]

Present study				Shifa Junaidi et al			
Age group	Group		P	Age group	Group		P
	Conventional	ERAS			Conventional	ERAS	
19-24	39 (52.0)	45 (60.0)	0.324	21-25	10 4(25.0%)	6 (15.0%)	0.479
25-34	36 (48.0)	30 (40.0)		26-30	26 (65.0%)	28(70.0%)	
Total	**75**	**75**		**>30**	**4 4(10.0)**	**6 (15.0%)**	

While in present study, primigravida and multigravida patients were almost equal, in the study by Shifa Junaidi et al ,among ERAS Group nearly 95% of them were Multigravida and in the Non –ERAS group it was 90%. This association was also found to be statistically insignificant. The comparative values are as shown in the table below.

Parity	Present study Group		p	Shifa Junaidi et al Group		p
	Conventional	ERAS		Conventional	ERAS	
PRIMIGRAVIDA	39 (52.0)	40 (53.3)	0.870	4(10.0)	2 (5.0%)	0.396
MULTIGRAVIDA	36 (48.0)	35 (46.7)		38(95.0%)	36(90.0%)	

Postoperative variables

Although ERAS is now being routinely emoployed in various surgeries, its implementation in Caesarean deliveries is still sparse. Very few studies were availaible in the literature for case to case comparison of the parameters, as most of them were RCTs based on previous studies or retrospective studies. Also, a number of clinical trials are still on going and results are still awaited. The following discussion is based on the available literature so far.

In the meta analysis by Meng X et al[84] there were postoperative problems documented in four studies. The forest plot demonstrated that there was no significant heterogeneity (I2 =45%, p = 0.14), and that ERAS group had lower rate of postoperative complications (RR: 0.50, 95% CI: 0.37 to 0.68, p0.00001, fixed-effect model).

After surgery, The ERAS advises early oral intake to help with bowel function recovery as well as early walking (improves pulmonary function, tissue oxygenation, improves insulin resistance, decreases risk of thromboembolism, and reduces length of stay). ERAS protocol also advises early removal of catheter within 8 hours of surgery in order to enable early ambulation. These treatments might speed up the healing process and make patients feel more comfortable after surgery.[85]

In a review by Corso E et al,[86] they identified 5 clinical protocols for ERAC with total of 25 components. Three of the 25 components (early oral intake, mobilization, Urinary catheter removal) were present in all 5 treatments. Postoperative complications, duration of stay, process outcomes, survival, and functional outcomes were the five most frequent outcomes.

Abdominal distention

4 (5.3%) subjects in conventional and 3 (4.0%) in ERAS group reported to had abdominal distention. Between two groups, there was no statistically significant difference..

Nausea/ vomiting

4 (5.3%) subjects in conventional and 2 (2.7%) in ERAS group reported to had persistent nausea/ vomiting. Between two groups, there was no statistically significant difference..

According to Sara Taha Mostafa et al research[80], .'s the improved recovery after surgery (ERAS) group experienced much reduced post-operative nausea and vomiting. Also, among women who started early oral intake in the ERAS protocol, the duration between the initial oral intake and the first intestinal sounds was shorter. In addition, women participating

in the ERAS programme were able to begin walking far faster than those receiving standard management. For IONV and PONV, this study demonstrated a substantial difference between the control group and the other two groups. They came to same conclusions as Kumar et al. [87]

In the landmark study by Macones et al[88] Specific ERAS postoperative care recommendations were made, including the use of sham feeding techniques like chewing gum to speed up the return of gastrointestinal function. Preventing nausea and vomiting is another suggestion. These two signs can lengthen the procedure and raise the haemorrhage risks and surgical damage. A known cause of maternal mortality is the risk of aspiration, can be considerably increased by these signs and symptoms. Nausea and vomiting could reduce patient satisfaction and delay hospital release. Maternal hypotension brought on by regional anaesthetic is the most frequent reason for nausea and vomiting. For the purpose of preventing hypotension brought on by spinal anaesthetic, a number of preventative measures are advised, including lower limb compression (by bandages, stockings, or inflatable boots) administration of ephedrine or phenylephrine intravenously as well as colloid or crystalloid pre-loading. Between 24% and 71% of caesarean deliveries result in nausea and vomiting. [89,90] These signs may result in a longer procedure, aspiration of stomach contents, haemorrhage, and abdominal organ damage.. As discussed earlier, maternal hypotension due to regional anesthesia is the common cause of these symptoms. Intravenous fluid loading with or without ephedrine or phenylephrine, lower limb compression could be used to prevent hypotension caused by regional anesthesia.[91] Antiemetic agents are also useful to prevent intraoperative and postoperative nausea and vomiting. Dopamine antagonists, 5-HT3 antagonists, sedatives, corticosteroids, antihistamines, and anticholinergic agents are effective to reduce nausea and vomiting.[91,92] Multimodal approach is more effective than the single agent use. Combination of 5-HT3 antagonists with dopamine antagonists or corticosteroids was reported more effective than 5-HT3 antagonist alone.[92]

Urinary tract infection

4 (5.3%) subjects in conventional and none in ERAS group reported to have UTI. The difference between two groups was found to be statistically significant.

Wound complication.

4 (2.7%) subjects in conventional and none in ERAS group reported to have wound complication. There difference between both the groups was found to be statistically significant.

Prophylactic antibiotic use, wound preparation and vaginal preparation should be carried out to reduce the surgical site infection risk after cesarean delivery. Although a cesarean delivery without chorioamnionitis or rupture of membrane is considered as clean incision, cesarean delivery in active phase of labor or second stage of labor , with rupture of membrane or chorioamnionitis is considered as clean contaminated incision.[93] Contamination with vaginal flora in addition to skin flora increases the risk of infection. The first-generation cephalosporin plus azithromycin prophylaxis in these women provides additional reduction in postoperative infection.[94] ERAS Society advised giving antibiotics 60 minutes before making a skin incision, instead of administration after cord clamping.[95] Studies showed that the preoperative use of antibiotics is more effective than using after cord clamping to reduce the risk of wound infection and endometritis .[96] There was no sufficient data indicating the higher antibiotic dose use or postoperative antibiotic administration could reduce the infection risk in obese women.

Following a caesarean delivery, surgical site infection is linked to higher rates of maternal morbidity, longer stays in the hospital, and higher healthcare expenses. Depending on the patient population, the infection surveillance system utilised, and the use of antibiotic prophylaxis, the prevalence of surgical site infections ranges from 3 to 15%. Age, whether a caesarean section is elective or emergency, a patient's BMI, and patient care practises

including antibiotic prophylaxis are all risk factors for surgical site infections after caesarean sections. In their research, Jasim et al.[97], SSI was found to significantly correlate with BMI in the obese group, higher blood loss during surgery (SSI increased 30% for every 100 ml blood loss), intrathecal analgesia, spinal anaesthesia, babies delivered with a breech presentation, and prolonged hospital stays. Because SSIs increase the price of healthcare, preventive actions must be given priority. Management of maternal weight throughout pregnancy and minimising intraoperative blood loss are two examples of prophylactic measures. This study suggests lowering 18 morbidity and SSIs by shortening hospital stays after caesarean sections and implementing strategies to minimise caesarean section frequency. According to Riley et al., surgical site infection is a significant cause of postoperative morbidity and rises in medical costs because of mother readmission.. With a caesarean delivery, two factors can result in surgical site infections: bacteria inoculating the surgical incision and vaginal bacteria ascending into the uterine cavity (SSIs). Post-obstetric/gynecologic surgery SSIs are frequently brought on by pathogens like Staphylococcus aureus (28.3%), coagulase-negative staphylococci (12.4%), Enterococcus species (10.1%), and Escherichia coli (9.6%). (Riley et al). A caesarean section SSI is defined by the CDC NHSN (2012) as a superficial, deep incision, or organ space infection (endometritis). By deploying bundles in US hospitals, in order to reduce hospital-acquired infections and preventable fatalities, evidence-based therapies can help reduce SSIs (Riley et al).Fundamental preventative measures for SSIs include perioperative normothermia maintenance, avoiding shaving with a razor, postoperative hyperglycemia control, maximising tissue oxygen delivery, the best choice of prophylactic antibiotics at the right time. Clinical staff and patients must be actively involved in the improvement process. To raise knowledge and spread ownership of the bundle, in-services about reduced transverse caesarean SSI rates should be offered. In line with this study (Riley et al.) SSIs following low transverse caesarean sections significantly and sustainably decreased when evidence-

based SSI prevention techniques, Clinical and patient interaction, effective infection prevention tools (CHG cloths) combined.

Pravina P et al[81] obsereved in their study found although there was a little reduction The incidence of stitch line discomfort and discharge was not statistically different between ERAS group and the traditional postoperative group.

In the study by Tamang et al,[82] Following surgery for thirty days, it was discovered that incisional infection was the primary reason for readmission in both groups. Three (3.4%) pre-ERAS individuals and two (2.4%) post-ERAS participants required in-office debridement and resuturing.

Hospital readmission

2 (2.7%) subjects in conventional and none in ERAS group had hospital readmission between two groups, there was no statistically significant difference. ERAC protocols reduce LOS and cost savings without an increase in unfavorable outcomes like 30-day readmission rates.[99] Though readmission rates were not observed in current study but Meng X et al.[100] conclude that implementation of ERAC does not increase the readmission rate, rather it decreases the readmission rate and also reduction in LOS reduces the hospital cost, Complication rates, postoperative pain rating, and painkiller usage. Early discharge not only represents faster recovery but also improves mother's bonding with child and overall satisfaction.[101] Most of the patients in ERAC group were ready to be discharged on 3rd postoperative day.

In a study by I.J. Wrencha et al[102] Over a period of more than two years, the percentage of patients who were released from the hospital on Day 1 following surgery increased from 1.6% in the first quarter of 2012 to 25.2% in the first quarter of 2014. From the 760 elective CS, 114 women (15.0%) were sent home on the first day. Women who were released from the hospital on $1^{st\ day}$ saw five readmissions (4.4%) after 30 days, which is comparable to Day 2 patients (21 out of 375, 5.6%). 35 out of 271 women who were discharged after Day 2 needed to be readmitted to the hospital (12.9%).

In the meta-analysis by Meng X et al,[100] In seven investigations with 15,353 patients, the readmission rate was reported. In comparison to the traditional group, ERAS reduced the readmission rate, as demonstrated by the forest plot (RR: 0.72, 95% CI: 0.55-0.94, p = 0.02, fixed-effect model). (I2 = 64%, p = 0.01) The reported heterogeneity was deemed to be moderate. The readmission rate between the two groups did not significantly differ, according to the pooled data based on the random-effect model (RR: 0.86, 95% CI: 0.48-1.54, p = 0.62); The study by Hedderson et al.[103] that shown a significant influence on heterogeneity was also supported by the sensitivity analysis. [26] According to the study by Hedderson et al.[103], the heterogeneity decreased (I2 = 16%) after elimination, and new findings also showed that there was no significant difference in the readmission rate (RR: 1.07, 95% CI 0.74-1.53, p = 0.73, I2 = 16%). Their results agreed with those of the current investigation. In the study by Pravina P et al), eight patients (13.33%) in the study group and seven patients (17.5%) in the control group (p=0.06) were readmitted..

Diet

In the ERAS group 73 subjects could initiate early feeding of liquids as sips 6 hours after surgery and all the subjects, could have solid diet within 24 hours of surgery.

All the subjects in conventional group could have Initiation of clear fluids after 12hours, Initiation of regular diet after 24 hours.

Macones et al[88] revealed that women can drink clear fluids during the initial recovery period and eat 12 hours following surgery in cases when regional anaesthesia has been utilised and monitoring has been good..[11]

According to Huang et alfindings [104], early oral hydration increased the recovery of gastrointestinal functions, whereas early ambulation reduced the risk of infection, sped up the initiation of breastfeeding, and reduced hospital stays. Women were instructed in this trial to begin eating as soon as it was practical in experimental group and after 6 hours in the control group. The results of the data analysis showed that study group's participants tolerated the

ERAS protocol well, as shown by a significant reduction in both IONV and PONV as well as a more rapid recovery of intestinal function activities, as indicated by a shorter time between onset of the first audible intestinal sounds. Teoh et al. found that earlier solid consumption increased nausea, which was self-limiting (10.2% versus 2%, with a p-value of 0. 033). In contrast, Lee et al.'s[105] study discovered that when ERAS technique was used on subjects with favourable results, early postoperative oral intake increased from 17% to 57% (p 0.001). Guo et al. 2015 [107] found that early oral feeding encouraged a speedy return of intestinal noises, flatus, bowel motions, and regular oral intake. They compared delayed oral feeding versus early oral feeding (P0.001 for all) "There are no obvious benefits to depriving a patient of hydration and food following a caesarean.". Early oral feeding does indeed provide some immediate advantages ". These go against the findings of Mangesi and Hofmeyr, 2002[108], who reported no changes in the amount of time between early and late oral intake groups before having a bowel movement or passing flatus.

Early oral intake and gut health promotion Reduced postoperative opioid use lowers ileus and facilitates bowel function recovery. Within two hours of surgery, the ERAS Society guidelines strongly encourage returning to a regular diet, and this advice is backed by high to moderate quality research. SOAP advises eating a regular diet, ideally within four hours, and drinking ice chips or water within an hour. The intravenous line should be clamped as soon as the oxytocin infusion is terminated and oral fluids are well tolerated..[88,109]. In a randomised control trial on gum chewing after caesarean delivery, it was discovered that women who started chewing gum 2 hours after surgery and continued every 2 hours while awake experienced quicker first bowel movements than those who drank oral fluids 6 hours after surgery or control group who received intravenous fluids (20.10.3 vs. 33.70.8 vs. 33.90.9h, P0.001).[110] The initial postoperative period's gum chewing is not strongly advised by the ERAS Society. [88] Studies revealed that early feeding after caesarean delivery is linked to better bowel function, maternal satisfaction, and a shorter hospital stay without an increase in

the risk of complications like gastrointestinal and infectious complications. However, early feeding was defined differently in these studies. Whereas the ERAS society advises early feeding and a regular diet after two hours of surgery,[88] the SOAP advises returning to ice chips and/or water within an hour and a regular meal within four hours after caesarean delivery.[112]

Oral intake after abdominal surgery has typically been delayed until the restoration of bowel function is confirmed by the passage of faeces, flatus, or bowel sounds. Contrary to what is now understood, that early oral intake promotes early ambulation and the restoration of bowel function, reduces risk of sepsis, shortens time before breast feeding, and reduces hospital stays.[104,107,111]

Early oral intake not only hastens bowel function recovery but also improves maternal satisfaction, and helps in early mobilization and discharge without developing issues such infection or an increase in nauseousness. In this study initiation of early oral feed could be implemented on scheduled time in all the patients in ERAC protocol group (100/100) with no rise in incidence of nausea/vomiting or other gastrointestinal complication like abdominal distention. Similar to this study, Cattin et al.[113] also administered drinks at 1 h and first meal at 4 h postoperatively (52.6% vs 100%, $P < 0.05$ and 63.1% vs 100%, $P < 0.005$) when compared between before and after ERAS groups. Lester SA et al.[114] also observed significantly faster time to first oral intake after delivery for both clear liquids and solid food (2.2 hrs vs 3.6 hrs, $P < 0.001$ and 8.8 hrs vs 12.5 hrs, $P < 0.001$) when compared between enhanced and pre‐enhanced recovery program groups.

In the study by Shifa Junaidi et al the administration of food in the form of liquid & solid was started to subjects within 6 hours and 12 hours postoperative respectively in ERAS group where in the non-ERAS group it was 24 hours respectively for liquid and solid foods with statistically significant association. Similar results were also seen in the study done by Huang et al.[104] study where early oral hydration among ERAS group prompted early

recovery of gastrointestinal functions. In the ERAS group the liquid food was started after 6 hours and in control group conventionally. In another study done by Lee et al.[105] Guo et al.[107] early administration of Food resulted in quick return of bowel movements, intestinal noises, and regular oral intake in ERAS Group and the association was also found to be statistically significant

Ambulation

72 subjects could have early ambulation- dangling feet within 8 hours. Walking 1-2 times within 24 hours post-operative, walking 3-4 times after 24 hours in the ERAS group. Ambulation after 24 hours was achieved in all the subjects in conventional group.

Early mobilisation decreases risk of thromboembolism, shortens hospital stay, and improves insulin resistance, pulmonary function, and tissue oxygenation. [115] Early postoperative mobilisation is made possible by efficient postoperative analgesia, which is a crucial component. After a caesarean delivery, mobilisation objectives should be discussed with the preoperative patient..

Early mobilisation following surgery is advised in line with ERAS bundles generally, while there isn't enough proof that it helps obstetric patients. There is a considerable range in how long a spinal block for a Caesarean section takes to wear off fully. So, it's crucial to make sure there are no remnants of anaesthesia before the mother takes the first postoperative steps and to remain by her side when she does so..[116]

In the study by Gupta S et al[117] postoperative time of ambulation was significantly decreased in ERAC group (7.73 ± 1.80 vs 63.63 ± 6.76, $P < 0.0001$), as was time of urinary catheter removal (6.56 ± 1.00 vs 62.68 ± 9.71, $P < 0.0001$). Ninety two out of hundred parturients were successfully mobilized in 6–10 hrs after cesarean while decatheterization in 6–10 hrs was done in 98/100 parturients. The time of early feeding between the groups was found to

be decreased in ERAC protocol group for Lozenges (2.35 ± 0.42 vs 0 hrs), liquids (4.18 ± 0.30 vs 16.09 ± 1.20 hrs), and semisolids (7.91 ± 0.75 vs 33.14 ± 4.97 hrs).

Early ambulation and early decatheterization decreases the incidence of venous thromboembolism and postoperative urinary tract infection. In this study the authors could implement these ERAC elements in almost all the parturients (ambulation in 92/100 and decatheterization 92/100) with no or minimal delay (avg 6–10 hrs). Similarly, Hedderson M et al.[118] saw reduction in postoperative mean time of ambulation after implementing ERAC protocol to the patients by 2.7 hrs (95% CI −3.1 to −2.4), and Lester SA et al.[119] also reported time to first ambulation as 9.76 hrs vs 32.89 hrs in ERAC and pre‐ERAC groups, respectively. ($P < 0.001$) Lester et al.[119] and Mazny et al.[120] also concluded that mean post‐operative ambulation time ($p < 0.001$) , “length of hospital stay” ($p < 0.001$) were significantly shorter without significant differences in early catheter removal on the prevalence of urine retention and recatheterization ($p = 0.371$).By preserving body homeostasis, facilitating early release, and minimising postoperative complications, very good analgesia, warmth while operating, and early postoperative oral feed all aid in expediting recovery..[121]

Early mobilisation reduces insulin resistance, postoperative venous thromboembolism (VTE), hypoxia, and muscular atrophy. [122–125] Although early mobilisation and/or frequent ambulation are components of all ERAS paths, there is very little information available regarding the precise timing, nature, and volume of ambulation. Immediately following the restoration of motor function, one should move around and ambulate. Within the first eight hours postoperatively, patients can hang their feet over edge of bed and sit in a chair. Within next 24 hours, they can walk at least once, and on the next postoperative day, they can walk three to four times per day. This is an illustration of a mobilisation schedule from SOAP that was used in our study.

Study by Mostafa, S et al[80] showed that Early mobilisation enhanced insulin resistance, tissue oxygenation, and pulmonary functioning. In addition, as described by Fearon et al., it decreased the risks of thromboembolism and length of hospital stay. [126] In comparison to the control group in this trial, the ERAS protocol allowed early mobility after OR discharge. The findings of this study were consistent with those of Lee et al.[127], who discovered that when ERAS protocols were used on women following elective CS, early ambulation increased considerably (p 0.001) from 33% to 51%.

Early mobilization after abdominal surgery reduces the risk of venous thromboembolism, pulmonary complication, and length of hospital stay.[63] ERAS society and SOAP recommended early mobilization in women who underwent cesarean delivery, although there is not sufficient data in this population.[128]

The first measure in getting patient back to their before cesarean section status is early ambulation following the resolution of the neuraxial anaesthesia, which is thought to reduce the risk of thromboembolic complications. 8 Women who are not undergoing pharmacologic thromboprophylaxis for another indication should instead receive additional mechanical thromboembolism prophylaxis, such as pneumatic compression devices..[88]

Pravina P et al[81] found that to the control group, the ERAS group had significantly more patients who mobilised earlier within 6 hours, and the difference was significant (12.5 vs 41.66, p0.0003).

Removal of catheter

All the patients in the ERAS group had an early removal urinary catheter after 8 hours post operatively.All the subjects in conventional group had removal of catheter after 24 hours.

The length of stay is shortened when the urinary catheter is removed after surgery. [88] Although there are some worries that this could cause urine retention and a possibility of lifelong bladder injury, no proof of this has yet to materialise.

(1) Early urinary catheter removal is a component of almost all ERAS paths because it promotes movement, lowers the incidence of catheter-associated UTIs, and increases patient satisfaction by allowing for independent toileting. Urinary catheters should be removed once motor function has returned, monitoring and looking for acute urine retention, which could result from removing the catheter too soon.[129-132]

(2)The time of catheter removal has not been thoroughly examined, and different ERAS paths have different recommendations for when it should be done, ranging from immediately following surgery to 24 hours later. Removal between 6 and 12 hours after a caesarean delivery is a realistic strategy.[88]

Urinary catheterization during cesarean delivery widely carried out with the aim of measuring urinary output, reducing urinary tract injuries, and postoperative urinary retention. However, studies showed that the urinary catheter placement increased the rates of urinary infection, the time of patient ambulation, first voiding, and length of hospital stay postoperatively.[133] Another randomized trial showed that the catheter removal 12 hours after surgery was associated with the more bacteriuria, urinary symptoms, discomfortable micturition, delayed postoperative ambulation, delayed first voiding, and delayed hospital discharge than the immediate catheter removal. Therefore, ERAS society recommended immediate catheter removal after surgery if placed during cesarean delivery.[88]

In a published audit of an ERAS protocol for cesarean delivery, urinary catheters were removed 7 hours after the procedure to facilitate early ambulation with no complications reported.[134]

Nowadays, it is advised that women who do not require continued urine output assessments have their Foley catheters removed as soon as possible after caesarean delivery. Top specialists have expressed disagreement regarding this. One issue is the dearth of information on prompt Foley catheter removal when long-acting neuraxial opioids are present. The benefits of early ambulation have not been proved, hence this lack of

information must be considered. Therefore, it stands to reason that removing the Foley catheter right away could raise the chance of undiagnosed hypovolemia. It is probably more challenging to detect hypovolemia with intermittent voiding, and decreased urine flow is frequently a first indicator that necessitates transfusion.

Recatheterization was done in 5 patients (8.33%) of the trial group and 4 patients (10%) of control group in the study by Pravina P et al. [81] (p=0.73).

In the study done by Aluri S and Wrench J,[1351] 72% mobilised patients within 12 hours of surgery under ERAS & 28% removed urinary catheter after 12 hours which is in comparison with our study findings where Mean duration for urinary catheter removal was lesser in ERAS group than Non ERAS group.

In the study by Shifa Junaidi, there was a significant difference between the two groups in terms of median duration of IV fluids/infusions, oral intake, catheter removal, initial ambulation following CS, and length of hospital stay. Compared to the ERAS group, all of the aforementioned criteria were delayed in the Non-ERAS group..

SUMMARY

- The incidence of urinary tract infection was statistically significantly different between the conventional and ERAS groups, is higher in the conventional group with a p value of 0.043.
- The incidence of postoperative wound infection was statistically significantly different between the conventional and ERAS groups, with a p value of 0.497, the traditional group was found to have more.
- There was no statistically significant difference in the incidence of anorexia, abdominal distension, or znausea and vomiting between the traditional and ERAS group.
- There was no statistically significant change in the frequency of hospital readmissions between the conventional and ERAS groups.
- Early resumption of liquids and solid diet, early mobilization and was achieved in the ERAS group without any complications.

CONCLUSION

ERAS is an approach through which maternal and fetal healthcare can be taken care of irrespective of the patient in preoperative, intraoperative, and post operative state. The present study shows that ERAS protocol can be effectively and safely implemented for caesarean section with less postoperative complications without an increase in the hospital readmission rates.

The present study shows that the incidence of urinary tract infection and woud infection were more in conventional group when compared to ERAS group. In ERAS group, early initiation of oral intake was well tolerated. ERAS protocol can be implemented for post operarive term caserean sections care for rapid recovery with less complications.

ERAS protocols are well promising and there should be no delay in the implementation of it as well established evidences of its efficacy are provided by different studies as well as present study. Certainly, further more feedbacks, close monitoring is required for improving the quality of ERAS protocol. ERAS is just beginning of the revolution in the caesarean protocols in order for better healthcare system and at same time enhancing the recovering of the patient in much less time. ERAS not only improved the outcome of the patient after caserean section but also gave mental satisfaction as time spent in hospital was peaceful without any complication and mother connected to her baby at much earlier time as compared to conventional protocol.

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ANNEXURE I

PATIENT CONSENT FORM

I Mr./Mrs. _____ have been explained in my own understandable language, that I will be included in a study which is **"THE COMPARATIVE STUDY OF ENHANCED RECOVERY AFTER SURGERY PROTOCOL VS CONVENTIONAL CARE IN PATIENTS UNDERGOING CAESAREAN SECTION IN A TERTIARY CENTRE"**

I have been explained that my clinical findings, investigations, postoperative findings will be assessed and documented for study purpose.

I have been explained my participation in this study is entirely voluntary, and I can withdraw from the study any time and this will not affect my relation with my doctor or the treatment for my ailment.

I have been explained about the interventions needed possible benefits and adversities due to interventions, in my own understandable language.

I have understood that all my details found during the study are kept confidential and while publishing or sharing of the findings, my details will be masked.

I have principal investigator mobile number for enquiries.

I in my sound mind give full consent to be added in the part of this study.

Signature of the patient:

Name:

Signature of the witness:

Name:

Relation to patient:

Date: Place:

ANNEXURE-II

PROFORMA

THE COMPARATIVE STUDY OF ENHANCED RECOVERY AFTER SURGERY PROTOCOL VS CONVENTIONAL CARE IN PATIENTS UNDERGOING CAESAREAN SECTION IN A TERTIARY CENTRE

NAME:

AGE:

ADDRESS:

UHID NO:

I.P NO:

DATE/ TIME OF ADMISSION:

DATE/ TIME OF DISCHARGE:

CHIEF COMPLAINTS:

OBSTETRICAL HISTORY: Booked/ Unbooked/ Referred

Married Life:

Consanguinous marriage: Yes/ No

Obstetrical Score:

MENSTRUAL HISTORY:

LMP:

EDD:

POG:

cEDD:

PAST HISTORY:

PERSONAL HISTORY:

FAMILY HISTORY:

GENERAL PHYSICAL EXAMINATION:

Pallor/ Icterus/ Cyanosis/ Clubbing/ Lymphadenopathy/ Edema

Pulse: BP:

RR: Temp:

CNS:

CVS:

RS:

Per Abdomen:

Per Speculum:

Per Vagina:

Provisional diagnosis:

Investigations after lscs:

urine routine

cbc

urine culture and sensitivity

wound swab culture

REMARKS:

ANNEXURE III

PATIENT INFORMATION SHEET

STUDY TITLE: . THE COMPARATIVE STUDY OF ENHANCED RECOVERY AFTER SURGERY PROTOCOL VS CONVENTIONAL CARE IN PATIENTS UNDERGOING CAESAREAN SECTION IN A TERTIARY CENTRE

INVESTIGATOR: DR. SABAH HUSSAIN

STUDY SITE: R.L Jalappa Hospital and Research Centre, attached to Sri Devraj URS Medical College,Tamaka, Kolar.

DETAILS:- All patients admitted with gestational age 37 0/7 completed weeks or greater with an indication for delivery by emergency /elective using spinal anesthesia.

- The caesarean has to be lower segment caesarean section

This study aims to implement enhanced recovery after surgery protocols on post caesarean section patients and comoare their benefits on patient's recovery with standard protocol care.

Procedures and protocol: This will be a prospective comparative study enrolling pregnant women at the R.L JALAPPA HOSPITAL AND RESEARCH CENTRE in urban academics hospital setting. This study will be conducted after obtaining ethical clearance from institutional ethics committee and written informed consent will be obtained from all the women prior to enrolment. Participants are enrolled on the day of casearean delivery and after obtaining informed consent , they are divided into two groups . In one group ERAS protocol is implemented and the other group conventional care given. preoperative surgical preparation and antibiotics prophylaxis will follow standard instituitional protocols.

Reimbursements- You will not be given money or gifts to take part in this research.

Confidentiality- We will not be sharing the identity of the participant. The information we collect from you will be kept confidential and only researchers involved in this project will have access to it.

Right to Refuse or Withdrawl- You do not have to take part in this research if you do not wish to do so and you can refuse to participate.

Whom to contact- If you have any questions you may ask us now or later ,even after the study has started, you may contact the following person:

For more information contact

DR. SABAH HUSSAIN

Post Graduate in obstetrics and gynecology

Sri Devraj Urs Medical College, Tamaka , Kolar

Mobile no: 9901898155 E-mail id: sabahhussain91@gmail.com

ANNEXURE IV

MASTERCHART

SL. No.	UHID	AGE	GRAVIDA	GESTATION	LIQUIDS (6HRS)	SOLID	DANGLING (8HRS)	WALKING (WITHIN 16HRS)	CATHETER (8HRS)	ANOREXIA	DISTENTION	NAUSEA	UTI	WOUND	READMISSION
1	912910	28	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
2	912440	24	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
3	913343	21	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
4	913385	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
5	913431	29	MULTI	TERM	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO
6	912537	31	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
7	913687	21	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
8	899936	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
9	913957	22	PRIMI	TERM	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO	NO
10	913977	19	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
11	914035	20	PRIMI	TERM	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
12	914273	25	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
13	914585	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
14	914591	21	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
15	914593	19	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
16	912053	24	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
17	900899	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
18	910415	28	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	YES	NO	NO	NO
19	888024	26	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
20	915675	27	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
21	915670	29	PRIMI	TERM	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO
22	916817	26	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
23	916859	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
24	901534	23	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
25	916195	21	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
26	916204	19	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
27	916360	27	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
28	916506	22	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
29	916680	26	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
30	916672	25	MULTI	TERM	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO	NO
31	916863	26	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
32	916964	26	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
33	917307	26	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
34	917278	21	PRIMI	TERM	NO	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
35	917309	20	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
36	917294	26	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
37	917311	22	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
38	917304	19	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
39	917261	22	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
40	917385	25	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO

41	917428	24	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
42	915795	29	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
43	917729	20	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
44	917758	19	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
45	917649	26	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
46	918510	24	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
47	918772	26	PRIMI	TERM	YES	YES	NO	YES	YES	NO	NO	NO	NO	NO	NO
48	919204	26	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
49	919207	23	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
50	919168	20	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
51	919582	19	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
52	919637	20	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
53	919858	22	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
54	919864	20	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
55	919960	25	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
56	919283	27	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
57	920010	32	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
58	920111	29	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
59	920207	20	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
60	920102	25	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
61	920350	34	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
62	920096	30	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
63	918604	23	PRIMI	TERM	YES	YES	YES	YES	YES	NO	YES	NO	NO	NO	NO
64	920810	21	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
65	920863	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
66	920796	24	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
67	920921	22	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
68	919691	21	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
69	921059	20	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
70	919494	22	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
71	921141	22	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	YES	NO	NO	NO
72	921185	20	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
73	921298	28	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
74	921273	23	PRIMI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO
75	918856	31	MULTI	TERM	YES	YES	YES	YES	YES	NO	NO	NO	NO	NO	NO