Effect of Implementing Enhanced Recovery After Surgery Pathway for Women Undergoing Cesarean Section on Maternal Outcomes and Satisfaction

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Abstract

The enhanced recovery after surgery (ERAS) pathway is a multidisciplinary approach and evidence-based strategy to enhance clinical services throughout the perioperative period. **This study aimed to** determine the effect of implementing an enhanced recovery after surgery pathway for women undergoing cesarean section on maternal outcomes and satisfaction. **Research design**: A non-randomized controlled clinical trial research design was conducted at the obstetric and gynecologic inpatient and post-cesarean section wards at El-Shatby Maternity University Hospital in Alexandria Governorate. A sample of 80 women was conveniently assigned to two groups ,40 for each . A control group received routine hospital care, and a study group for whom ERAS was implemented. Data were collected by the post-cesarean maternal outcome assessment sheet, the visual analog scale, and women's satisfaction with ERAS. **Results**: A highly statistically significant difference was detected among women in the control and experimental groups in relation to their intensity of post-caesarean pain immediately and at discharge as measured by the visual analog scale (VAS), where p = 0.001 and p = 0.001, respectively. In addition, highly statistically significant differences were found among the study and control groups, where p = 0.001, respectively, in favor of the study group regarding maternal outcomes such as length of hospital stay, occurrence of nausea, vomiting, hypoglycemia, and hypotension, presence of flatulence, getting out of bed, initiation of breast feeding, and need for analgesics. **Conclusion**: Implementing ERAS significantly had positive maternal outcomes, as well as improving the level of maternal satisfaction with the intervention. **Recommendations**: The ERAS pathway should be recommended for women undergoing cesarean sections to improve their maternal outcomes post-surgery.

Keywords: Enhanced recovery after surgery pathway, Cesearean section, Maternal outcomes, Satisfaction.

Introduction

A cesarean section (CS) is a crucial surgical procedure aimed at preserving the lives of both women and their infants. It involves the delivery of the baby by creating an incision in the uterus. CS is recognized as a prevalent surgical intervention, although the excessive utilization of this procedure is currently a significant global public health issue. An extensive survey across multiple countries, encompassing 178 member states, suggested that the rate of CS should not surpass 19%, as higher rates have been linked to elevated levels of maternal and neonatal mortality. Furthermore, disproportionately high rates of cesarean deliveries have adverse effects at the individual, familial, and national levels in terms of the well-being of women, healthcare costs, and the efficient allocation of resources **(Oraby, 2023).**

The incidence of cesarean section (CS) has exhibited a significant surge on a global scale. Within Egypt, the rate of cesarean deliveries has experienced a notable escalation, escalating from 27.6% in 2010 to 55% in 2016, and further climbing to 72.2% in 2021 **(Oraby, 2023).** Notably, Egypt recorded the most substantial uptick in CS rates at 2.7. Various factors contribute to the heightened prevalence of CS in Egypt, including financial incentives, obstetricians' inclination towards efficient time management, ambiguity in medical guidelines

concerning the appropriateness of CS, restricted opportunities for junior medical practitioners to engage in vaginal deliveries, inadequate availability of pain relief medications in public healthcare facilities, and a scarcity of anesthesiologists with expertise in managing pain during vaginal deliveries **(Abd Elatay et al., 2021).**

There are many indications for cesarean sections, such as poor progress of labor, cephalopelvic disproportion, fetal compromise, abruptio placentae, placenta previa with hemodynamic instability or placenta previa major, cord prolapse with a live fetus, transverse lies in labor, footling breech in labor, previous caesarean in labor, prolonged second stage, and failed assisted delivery**.** Therefore, a caesarean section should be performed for medical reasons only. If used unnecessarily, it can lead to many consequences **(Heeba et al., 2019).**

The primary consequences of a cesarean delivery commonly involve postpartum hemorrhage, shock, wound dehiscence, sepsis, visceral injury, deep vein thrombosis, and prolonged pelvic pain. The presence of pain represents a significant consequence, as it serves as a predisposing factor for additional complications and has the potential to instigate anxiety and depressive symptoms among females. Inadequate management of acute postoperative pain may contribute to the onset of persistent pain; this phenomenon is observed in 10%–50% of individuals subsequent to various routine surgical procedures, with 2%–13% of patients experiencing enduring pain even after a span of two years. Hence, adherence to contemporary guidelines is imperative in order to mitigate the severity of pain and associated issues subsequent to surgical interventions. Among the prevailing recommendations, the enhanced recovery after surgery (ERAS) pathway stands out as a crucial protocol in present-day healthcare practices **(Macones et al., 2019).**

The utilization of the enhanced recovery after surgery pathway represents a comprehensive approach grounded in evidence-based principles aimed at improving healthcare delivery across the entire perioperative continuum, spanning from preoperative assessment to surgical intervention and the subsequent postoperative phase. Surgical procedures are well-recognized as significant physiological stressors, and the implementation of ERAS pathways is designed to optimize patient care with the goal of expediting the restoration of normal physiological function. While the inception of ERAS can be traced back to the 1990s, it required more than a decade to refine these concepts into a standardized protocol supported by empirical evidence specifically tailored for colonic surgical interventions. Subsequently, various surgical specialties have embraced the ERAS framework, leading to the publication of consensus guidelines endorsed by the International ERAS Society in diverse fields such as gynecology and gynecologic oncology **(Macons et al., 2019).**

Implementation of an enhanced recovery after surgery pathway in obstetrics, achieved through the utilization of standardized care protocols, has demonstrated efficacy in reducing length of stay, lowering costs, minimizing postoperative complications, and enhancing patient satisfaction across diverse clinical environments. Satisfaction, being a psychological construct, encompasses a subjective sense of gratification and fulfillment, characterized by various significant elements such as attitudes, behaviors, and responses. Within healthcare contexts, satisfaction or discontent serves as an intermediary outcome, indicative of a facility's potential shortcomings in meeting clients' needs, fulfilling their expectations, or delivering an adequate level of care. Conversely, a noteworthy obstacle hindering the adoption of these pathways is attributed to the absence of structured educational programs for women and the reluctance of maternity nurses to deviate from established practices (Olivares et al., 2018).

Fig (1): Components of Enhanced Recovery Protocol for Cesarean Delivery **(Ismail et al., 2021).**

The composition of ERAS pathways varies by specialty and organization, but many cover these key elements: maternal preoperative education, which includes CS's day prior the woman eats her usual diet. Furthermore, she is permitted to eat solid foods for up to six to eight hours before her planned CS and clear liquids up to two hours prior to surgery to reduce the aspiration risk. After taking a shower or bath, women should clean the area around their abdomen for a minimum of 48 hours. She shouldn't wax or shave below the umbilicus prior to the CS. In addition, preoperative hemoglobin optimization and the maintenance of normothermia. On the morning of CS Day, women should not use nail polish or wear makeup. They should also remove all of their jewelry and be changed into hospital - owns by the nurse. Whereas, intraoperative elements include the insertion of an IV catheter, the administration of prophylactic antibiotics and thromboprophylaxis, fluids, and blood pressure management **(Ismail et al., 2021; Meng et al., 2021).**

Postoperative components encompass a variety of factors. Initially, a delay in umbilical cord clamping for a minimum of 30 seconds was advocated for preterm infants due to its association with a decreased risk of intraventricular hemorrhage, an elevation in hematocrit levels, and a reduction in the requirement for volume resuscitation. Subsequently, skin-to-skin contact is introduced. The early initiation of skin-to-skin contact offers numerous advantages for both the infant and the mother, including enhanced rates and duration of breastfeeding, as well as a reduction in maternal anxiety and postpartum depression. Following a cesarean section, women are administered long-acting medications like acetaminophen and ibuprofen to effectively manage their pain **(Wrench et al., 2015).**

Fourthly, it is advisable to recommend a prophylactic low-dose oxytocin infusion (15–18 U/hour) in order to prevent postpartum hemorrhage. The administration of a low dose has been shown to decrease the incidence of adverse events such as hypotension and myocardial ischemia, lower the likelihood of sepsis, shorten the time required for breastfeeding, and reduce the length of stay, according to Teigen et al. (2020). Fifthly, the early mobilization of the patient is crucial, and nurses should actively promote leg movement four to five times per hour while the patient is awake. This practice has been associated with enhancements in pulmonary function and tissue oxygenation, amelioration of insulin resistance, decreased risk of thromboembolism, and a shortened hospital stay.

Another facet of the postoperative recuperation process involves the consumption of food and beverages within the initial four hours following the surgical procedure. In cases where female patients are incapable of ingesting food or liquids, it is advised that they engage in the act of chewing sugar-free gum for a duration of thirty minutes, three times per day. Studies have indicated that the gastrointestinal system is capable of expediting its return to normal functionality post-surgery. The healthcare provider ought to have implemented preventative measures to mitigate the likelihood of the patient experiencing symptoms such as nausea and vomiting subsequent to the cesarean section **(Bollag et al., 2021).**

Additionally, the timely removal of the urinary catheter is deemed a critical element in the postoperative care regimen. As per Enhanced Recovery After Surgery (ERAS) guidelines, it is recommended that urinary catheters are extracted within a 24-hour timeframe. Limited research exists regarding the optimal timing for urinary catheter removal in women who have undergone

cesarean deliveries under spinal anesthesia. An analysis published on the outcomes of an ERAS protocol for cesarean deliveries revealed that urinary catheters were taken out 7 hours post-procedure to facilitate early mobilization, with no adverse events documented **(Mullman et al., 2020).**

Lastly, but not least, the guidelines by the ERAS pathway were established to provide support for cesarean section (CS) procedures, being the most prevalent surgical procedure in the realm of advanced industrial health. Research on the implementation of ERAS specifically for women undergoing CS has been limited.

Significance of the study

The incidence of cesarean sections has substantially escalated on a global level, currently surpassing 30%. In developing nations, particularly in Egypt, more than half of all childbirths are now conducted via cesarean section; Egypt holds the distinction of being the second highest in the world for cesarean deliveries **(Oraby, 2023).** Therefore, the guidelines by the ERAS pathway were established to provide support for cesarean section (CS) procedures, being the most prevalent surgical procedure in the realm of advanced industrial health. Research on the implementation of ERAS specifically for women undergoing CS has been limited.Thus, the primary objective of this research is to assess the impact of introducing the Enhanced Recovery After Surgery (ERAS) program for women undergoing cesarean section on both maternal outcomes and satisfaction levels to address the gaps in care continuity and enhance nursing services **(Heeba et al., 2019).**

Aim of the study

This study aimed to determine the effect of implementing the enhanced recovery after surgergy (ERAS) pathway for women undergoing cesarean sections on maternal outcomes and satisfaction.

Research hypotheses

H1: Women undergoing cesarean section on whom enhanced recovery after surgery (ERAS) pathway (ERAS) was implemented exhibit more positive maternal outcomes than those who received routine hospital care.

H2: Women undergoing cesarean section on whom enhanced recovery after surgery pathway (ERAS) was implemented exhibit a higher level of maternal satisfaction than those who received routine hospital care.

Operational definition

Maternal outcomes in this study refer to length of hospital stay (LOS), occurrence of nausea and vomiting, hypothermia and hypoglycemia, pain intensity, return of peristaltic movement, initiation of breast feeding, and presence of postoperative complications such as atonic postpartum hemorrhage.

Materials and Method

Materials

Research design

A non-randomized controlled clinical trial research design was used in this study, where the effect of implementing enhanced recovery pathway on women undergoing cesarean sections (an independent variable) on maternal outcomes and satisfaction (dependent variables) was examined.

Setting

This study was conducted at the obstetric and gynecologic inpatient and post cesarean section wards of El-Shatby Maternity University Hospital in Alexandria Governorate. The selection of this particular hospital was deliberate due to its high capacity of cesarean sections, which is conducive to the study, and the homogeneity in socioeconomic status among the women attending. Furthermore, the cooperation among staff to implement the intervention was seamless, aided by the hospital's educational nature, with no significant barriers encountered.

Subjects

A convenience sample of 80 pregnant women who were scheduled for elective cesarean sections was selected from the previously mentioned

setting according to the following inclusion criteria:

- 20-35 years' old
- Full term (37 to 40 weeks)
- Single fetus
- Schedule for elective cesarean section
- Receiving general anesthesia.

The exclusion criteria was women with medical disorders. The selected subject was assigned equally to either the control or the experimental group. Each group comprised 40 women, as follows:

- The control group: included 40 pregnant women who were scheduled for elective cesarean sections and received routine hospital care.
- The experimental group: included 40 pregnant women who were scheduled for elective cesarean sections and for whom an enhanced recovery pathway was implemented.

The Epi Info 7 statistical program was used to estimate the sample size using the following parameters:

A. Population Size =1500 /3 months

B. Expected Frequency= 50%

C. Acceptable Error=10%

D. Confidence Coefficient =95%

E. Minimal Sample size=80

Tools of data collection

Four tools were used to collect the necessary data:

Tool I: Socio-demographic, reproductive and clinical data structured interview schedule. This tool was developed and used by the researchers. It included 4 main parts:

Part I: Socio-demographic data such as age, level of education, occupation, and current residence.

Part II: Reproductive history, including gravidity, parity, previous abortions, mode of previous deliveries, and complications accompanying previous pregnancies; questions assessing the present pregnancy, such as weeks of gestation as well as number of antenatal visits.

Part III: Clinical data such as weight, height, and body mass index.

Part IV: Cesarean section-related data such as indications (maternal and fetal causes).

Tool II: Post cesarean maternal outcomes assessment sheet

This tool was developed by the researchers after a thorough review of the relevant literature (Ubom et al., 2023) and was used to assess maternal outcomes. It included length of hospital stay after cesarean section, occurrence of nausea and vomiting, occurrence of hypothermia, initiation of breast feeding, as well as post-caesarean complications.

Tool III: Visual analog scale (VAS)

The tool was developed by Katz and Melzack (1999). It was adopted and used by the researchers. The VAS is a self-report device consisting of a horizontal line used to subjectively assess the woman's pain. It includes a 10-point numerical scale corresponding to the level of pain, with zero representing no pain and 10 representing the worst level of pain. Between these two opposite ends, words like no pain, mild, moderate, or severe are assigned every 3 cm distance. The women were asked to place a mark on the line at the point representing the intensity of their pain.

The total score ranged from 0-10 as follows:

- No pain (0)
- Mild pain (1-3)
- Moderate pain (4-6)
- Severe pain (7-9)
- Unbearable pain (10)

Tool IV: Women's satisfaction with enhanced recovery pathway after cesarean section structured interview schedule

This tool was developed by the researchers and guided by **Karki and Saha (2021)** and was used to assess post - cesarean women's

satisfaction level with the implementation of an enhanced recovery pathway. This tool is comprised of 15 statments. The responses of the female participants to each statement varied based on a 5-point Likert scale, which ranged from strongly agree to strongly disagree, reflecting their level of agreement with the components. These components included aspects such as the quality of preoperative information, the kindness of healthcare personnel, pain control, timeliness of oral fluid initiation, early mobilization, prescribed diet and activity within the initial 24 hours post-surgery, incidence of postoperative nausea or vomiting, adequacy of information provided by the nurse at discharge, professionalism and competence of healthcare providers, willingness to undergo the same surgical procedure following the current protocol, likelihood of recommending the procedure to a friend, and experiences of disappointment, sadness, and depression. Additionally, the components encompassed feelings of comfort, ability to care for the infant (e.g., holding, breastfeeding), early skin-to-skin contact, and the participants' perspectives on hypothermia management. management. The adopted scoring system for positive statements was: Strongly agree = 5 ; Agree = 4; Neutral = 3; Disagree = 2; Strongly disagree = 1

The total score ranged from (15-75) as follows:

- From (15 to less than 42) unsatisfied.

- From (42 to less than 59) had moderate satisfaction.

- From (59 to 75) had high satisfaction.

Method

The study was accomplished as follows:

1. An approval from the Ethics Research Committee, Faculty of Nursing, University of Alexandria was obtained.
2. An official letter was directed from the Faculty of Nursing, Alexandria University, to the responsible authorities of the study settings to get their permission for data collection after explaining the purpose of the study.
3. Tools (I, II, IV) were developed by the researcher after extensive review of recent and relevant literature, and tool (III) was adopted and checked for content validity by a jury of five experts in the field.
4. Tools (II, III, IV) were tested for reliability by using the Alpha Cronbach test, and the results were statistically acceptable. The value of tool (II) was 0.76 and tools (III, IV) were 0.87 and 0.85.
5. A pilot study was conducted on 8 women who were excluded from the study's main sample to test the clarity and applicability of the tools, and the necessary changes were undertaken.
6. Data collection: The present study was implemented in four phases (preparation, assessment, implementation, and evaluation phase).

Phase I: Preparation Phase

It included adequate preparation of the researchers, enhanced recovery pathway development, and team preparation.

Researcher preparation

Prior to commencing data collection, the researchers established a theoretical and practical framework regarding the enhanced recovery pathway for women undergoing cesarean section by reviewing recent and pertinent literature.

Enhanced recovery pathway development:

The researcher prepared an enhanced recovery pathway for women undergoing cesarean sections.

Team preparation

The researchers presented themselves to the collaborative pathway team of experts, including the surgery doctor, anesthesiologist, and nursing staff of the cesarean section department who were involved in establishing the enhanced recovery pathway for women undergoing cesarean section, and discussed the objectives, design, and advantages of the study. Educational material developed by the researchers based on reviewing recent related literature, including pre-, intra-, and postoperative care, was distributed to them.

Phase II: Assessment phase

Each woman was interviewed by the researchers to collect the necessary sociodemographic and clinical data using tool I

on the day of admission. The interview was completed between 20-30 minutes.

Phase III: Implementation of the enhanced recovery pathway

The researchers categorized the female participants into two distinct groups, namely the control group and the experimental group. The commencement and conclusion of the control group preceded that of the experimental group to prevent any potential cross-contamination of samples. The control group was subjected to the routine hospital care procedures for CS, both pre- and post-operation, in adherence to hospital regulations. This included preoperative fasting starting at midnight, bowel preparation through methods like enema and laxatives, administration of medication, utilization of tubes like urinary catheters, and delayed initiation of oral feeding until bowel motility was established. Pain management post-operation involved the intravenous administration of Ketolac (50 mg, 4×1) and non-steroidal anti-inflammatory drugs. Conversely, the experimental group was subjected to an enhanced recovery pathway. This pathway was structured around three distinct phases.

Stage I: Preoperative intervention

The researchers initiated preoperative nursing interventions from the time of admission until the beginning of the operation. These interventions encompassed the provision of information regarding the enhanced recovery pathway for cesarean sections and an explanation of what to anticipate during the hospitalization period. Additionally, they involved physical preparation, such as fasting for a duration of six to eight hours for solid food and the consumption of clear oral fluids up to two hours before the administration of anesthesia. Women were advised to ingest clear fluids, including carbohydrate-rich beverages like milk-free tea, coffee, and pulp-free fruit juices, up to two hours preceding the surgical procedure. Furthermore, they were directed to remove all makeup, jewelry, and nail polish. Subsequently, the participants were instructed to change into a hospital gown and were enveloped in a blanket to maintain warmth half an hour prior to the surgery. Prophylactic antibiotics were administered as per the physician's directive within an hour before making an incision in the skin, which notably reduced the occurrence of postoperative maternal infections.

Stage II: Intraoperative intervention

During the operation, women were given warm intravenous fluids prescribed by the physician to maintain their normal body temperature as much as possible, and the operating room temperature was maintained at 23 °C to decrease the incidence of maternal and neonatal hypothermia. Leg compression stockings of varying sizes (small, medium, and large) were utilized for female patients in order to prevent thromboembolic complications following cesarean section.fig (2)

Fig (2): Leg compression stockings

The administration of a range of medications, as prescribed by the healthcare team, aimed to mitigate symptoms of nausea and vomiting. Post-anesthesia, the vaginal area was sterilized using iodine, and a urinary catheter was aseptically inserted in a completely sterile setting with the application of an antiseptic solution, typically an alcohol solution containing chlorhexidine. Upon the completion of fetal and placental delivery, delayed cord clamping for a minimum of one minute was performed, with immediate skin-to-skin contact in the operating room encouraged post-delivery. Subsequently, the administration of Ecbolic to the newborn was standard practice to diminish the likelihood of postpartum hemorrhage. Following delivery, the mother and infant were transferred to the recovery room for postpartum care.

Stage III: Postoperative intervention

The nursing role involved monitoring during the initial 6–8 hours and held significant importance. Regular assessment of vital signs, including pulse, blood pressure, uterine contractions, lochia, and catheterization, was conducted. Emphasis was placed on ensuring

the comfort and warmth of the women. Administration of fluid sodium chloride (0.9%) or Ringer's lactate intravenous drip was sustained until a minimum of 2–2.5 liters of the solution had been infused. The removal of the catheter occurred promptly upon the restoration of the woman's mobility. Prolonged-release analgesics were recommended by healthcare providers, such as oral or intravenous administration of acetaminophen 1 gram every 8 hours, as well as ibuprofen, to manage pain levels. Pain intensity was evaluated using a visual analog scale. Introduction of gradual oral intake in liquid form commenced after 2 hours. Women were advised to chew on sugar-free gum to facilitate the restoration of regular bowel function.

The researcher applied nursing care (nonmedication) to prevent post-CS nausea and vomiting. Also, early ambulation was encouraged after delivery, as the women were instructed to raise each of their legs straight up in the air while lying on their beds, then dangling their feet on the edge of the bed and sitting in the chair for a while. After that, they were encouraged to stand for a minute beside the bed to check for their balance, and then were supervised by the researcher to walk to the toilet. Additionally ,early breast feeding was initiated by the women.

Phase IV: Evaluation of the enhanced recovery pathway

This phase consists of an assessment of the:

- Maternal outcomes, which included length of hospital stay, occurrence of nausea and vomiting, occurrence of hypothermia, occurrence of hypoglycemia, removal of urinary catheter, return of peristaltic movement, ambulation, eating and drinking, initiation of breast feeding, and presence of postoperative complications using tool II.
- Pain intensity immediately and at discharge using tool III.
- Women satisfaction with the implementation of the enhanced recovery clinical pathway using tool IV.

7. Data was collected over a six-month period that started in February 2023 and ended in July 2023. Four days/week, from 8 a.m. to 8 p.m., the researchers were available in the study settings.

8. Statistical analysis

Following the completion of data collection, the requisite statistical analysis was conducted. The impact of the implementation of an enhanced recovery pathway was assessed by examining the maternal outcomes across the two groups. The collected data underwent analysis using the IBM SPSS software package, version 23.0. The Shapiro-Wilk test was employed to validate the distribution normality of the variables. Group comparisons for categorical variables were performed utilizing the Chi-square test (Monte Carlo). Furthermore, the Student t-test was utilized to evaluate the two groups concerning normally distributed quantitative variables. The significance level for the obtained findings was set at 5%.

9. Ethical Considerations:

- Written informed consent was obtained from women before data collection after an explanation of the study's aim.
- Confidentiality of data was maintained during the execution of the study.
- Women were informed that their participation in the study is voluntary, and they can withdraw at any time.
- Women's privacy was secured.

Results

Table 1 shows that the mean age for the control group was 28.15 ± 3.17 and 27.93±3.06 for the experimental group. Concerning level of education, 70% of the control group and 60% of the experimental group had secondary education and its equivalent. In addition, more than two-thirds (67.5%&70%) of the control and experimental groups, respectively, were housewives. As regard the current residency, 60% and 62.5% of the control and experimental groups, respectively, were urban dwellers. No statistically significant difference was found among both groups in relation to their socio-demographic characteristics. When the body mass index was examined, overweight was found among 52.5% and 47.5% of the control and experimental groups, respectively, and the mean weight of the control group was 28.89±2.98 and 27.77±3.70 for the

experimental group, with no statistically significant difference between both groups in this respect where P=(0.621).

As regard gravidity, table (2) displays that 50% and 35% of the control and experimental groups, respectively, stated they were pregnant four times or more. Concerning parity, it was observed that more than half (55%) of the control group compared to two-fifths (40%) of the experimental group, had delivered two times. Moreover, it was noticed that 62.5% and 55% of the control group and the experimental group, respectively, had no history of abortion, while 55% of the control group and 40% of the experimental group have two children.Furthermore, the type of last delivery indicates that 42.5% and 25% of the control and experimental groups, respectively, had previous normal vaginal deliveries with episeotmy compared to 47.5% and 65% of the two groups who had cesarean section deliveries.

The time of the last delivery was also investigated in this study, where 40% of the control was from three years ago while the previous delivery for more than two fifths (42.5%) of the experimental group was from two years ago.Previous pregnancy complications elucidate that 50% of the control group compared to 40% of the study group stated that they had no complications during their last pregnancy, and the same percent, 62.5% of the control group, had no complications during their last labor and their last postpartum period, respectively, compared to 55% and 67.5% of the experimental group, respectively. Finally, vaginal bleeding was reported by the same percent (17.5%) in both groups as a previous postpartum complication. No statistically significant differences were found between the two groups regarding the examined parameters.

It can be observed from Table 3 that the mean weeks of gestation were almost the same (37.18±0.87 & 37.23±0.77) among the study and control groups, respectively, with no statistically significant difference found between the two groups where P = 0.790. All the women (100%) in both groups carried out antenatal follow-up, where 85% of the control group had attended from 2 to 4 visits during the whole pregnancy compared to 52.5% of the experimental group.As regard the causes of the current cesarean section, it was observed that it was performed due to maternal causes in more than two-thirds (72.5% & 67.5%%) of the control and experimental groups, respectively. However, a previous caesarian section was stated by 47.5% of the control group compared to 65% of the experimental group as a maternal cause to perform a cesarean section.

Fig. 3 showed that women in the control group received routine hospital care according to hospital policy as preoperative night fasting (8 hours) from food and drink, as the mean time of restriction from fluid was 8.00±1.78 hours compared to women in the study group who were fasting six to eight hours for solids and up to two hours for clear oral fluid intake before the induction of anesthesia with a mean time of 2.25±0.90 hours. Moreover, a highly significant difference was detected among the two groups, respectively, as P was (0.000*).

Tool two: Post cesarean maternal outcome assessment checklist

Table (4): number and percent distribution of the studied subjects according to their post-cesarean maternal outcome assessment checklist. As regard the mean length of hospital stay, it was 12.08±3.47 hours for the control group and 7.03±1.23 for the experimental group. Concerning the occurrence of vomiting after cesarean section, it was found that 60% of the control group had vomiting compared to only 12.5% of the experimental group. Also, hypothermia was observed among half (50%) of the control group compared to 27.5% of the experimental group, as the mean body temperature was 36.43±0.20 & 36.79±0.47 for the control and experimental groups, respectively.

Moreover, hypotension occurred in 45% of the control group while it occurred in 22.5% of the experimental group. When blood glucose was measured, hypoglycemia was found in a quarter (25%) of the control group compared to only 7.5% of the experimental group. The presence of flatulence was observed in more than two-thirds (67.5%) of the control group and 90% of the experimental group, and the mean time of accumulation of flatulence was 3.70±2.78 hours and 1.65±0.97 hours in both groups, respectively. Furthermore, the mean time of removing the

catheter after the cesarean section was 6.90±1.60 hours and 3.18±1.11 hours for the control and experimental groups, respectively.

All (100%) of the women in both groups eat and drink postoperatively; the mean time of initiation of eating and drinking was 4.73±1.04 hours for the control group and 1.80±0.46 hours for the experimental group. Regarding ambulation, the results of the study showed that three quarters (75%) of the control group get out of bed compared to all (100%) of the experimental group, with the mean time of getting out of bed being 6.30±1.36 hours and 2.45±1.13 hours in the control and experimental groups, respectively. On the other hand, the mean time of initiation of the breast feeding was longer in the control group, as it was 3.60±0.78 hours compared to 1.10±0.45 hours in the experimental group.

When the need for pain relief was investigated, more than four-fifths (82.5%) of the control group received analgesia compared to 57.5% of the experimental group. The mean frequency time of requested analgesia by women in the control and experimental groups was 4.03±2.08 hours and 6.58±3.43 hours, respectively. Moreover, more than one third (37.5%) of the control group received analgesia after one hour of the Cs, while more than two fifths (42.5%) of the experimental group received it after five hours of the operation. Finally, none (0.00%) of the control and experimental groups had postoperative complications. Regarding the previously mentioned items of maternal outcomes: length of hospital stay, occurrence of nausea, vomiting, hypoglycemia, and hypotension, presence of flatulence, getting out of bed, initation of breast feeding, and need for analgesics, there was a highly significant difference among the study and control groups, where $p > 0.001$*, respectively, in favor of the study group.

From Table 5, it can be observed that none (0.0%) of the control group had mild pain compared to 32.5% of the experimental group immediately postoperatively. Moreover, 22.5% and 55.5% of the control and experimental groups, respectively, had moderate pain. Surprisingly enough, severe pain was stated by 65% of the control group compared to only 10.0% of the experimental group. That means that pain intensity was higher in the control group than in the experimental group immediately after the cesarean section. Another picture was obsevered at discharge as post-cesarian pain intensity revealed that severe pain was observed among 70.0% of the women in the control group compared to only 2.5% of the experimental group. A highly statistically significant difference was detected among women in the control and experimental groups in relation to their intensity of post-caesarean pain immediately and at discharge as measured by the visual analog scale (VAS), where P = > 0.001 and P = 0.001, respectively. Accordingly, it can be deduced that the application of an enhanced recovery pathway for women undergoing caesarian section has a significant effect in reducing post-caesarean pain intensity in medicine and at discharge among the studied groups.

Table 6: It was observed that more than two-thirds (70%) of the women in the experimental group were highly satisfied with the application of the enhanced recovery pathway, while the same percentage (15.0%) were either moderately satisfied or unsatisfied regarding the application of the enhanced recovery pathway after cesarean section.

Table (1): Number and percent distribution of the studied groups according to their socio-demographic characteristics and clinical data

Socio-demographic characteristics and clinical data	Control group (n=40)		Experimental group (n=40)		Test of significance	p
	N	%	N	%		
Age /years						
20-30 years	31	77.50	31	77.50	0.00	1.00
>30 years	9	22.50	9	22.50		
Min. – Max.	22.0 – 34.0		22.0 – 34.0			
Mean ±SD	28.15±3.17		27.93±3.06		t = 0.323	0.748
Level of education						
- Primary & preparatory	3	7.50	9	22.50	3.558	0.169
- Secondary & its equivalent	28	70.00	24	60.00		
- University	9	22.50	7	17.50		
Working condition						
- House wife	27	67.50	28	70.00	0.058	0.809
- Working	13	32.50	12	30.00		
Current residence						
- Urban	24	60.00	25	62.50	0.053	0.818
- Rural	16	40.00	15	37.50		
Body mass index					0.953	0.621
- Normal	4	10.0%	7	17.5%		
- Overweight	21	52.5%	19	47.5%		
- Obese	15	37.5%	14	35.0%		
Mean ± SD	28.89±2.98		27.77±3.70		t=1.486	0.141

χ^2: Chi square test MC: Monte Carlo t: Student t- test

Table (2): Number and percent distribution of the studied groups according to their reproductive history

Reproductive history	Control group (n=40)		Experimental group (n=40)		Test of significance	^{MC}p
	N	%	N	%		
Gravidity						
1	4	10.0%	1	2.5%	6.695	0.074
2	4	10.0%	12	30.0%		
3	12	30.0%	13	32.5%		
4+	20	50.0%	14	35.0%		
Parity						
0	4	10.0%	4	10.0%	4.736	0.298
1	6	15.0%	14	35.0%		
2	22	55.0%	16	40.0%		
3	7	17.5%	5	12.5%		
4+	1	2.5%	1	2.5%		
Abortion						
0	25	62.5%	22	55.0%	1.406	0.856
1	13	32.5%	15	37.5%		
2	2	5.0%	2	5.0%		
3	0	0.0%	1	2.5%		
Number of living children						
0	4	10.0%	4	10.0%	4.736	0.299
1	6	15.0%	14	35.0%		
2	22	55.0%	16	40.0%		
3	7	17.5%	5	12.5%		
4+	1	2.5%	1	2.5%		
Number of still birth	0	0.0%	0	0.0%	-	-
Type of previous delivery						
Vaginal delivery & episiotomy	17	42.5%	10	25.0%	2.904	0.200
CS	19	47.5%	26	65.0%		
Not applicable	4	10.0%	4	10.0%		
Time of last delivery (years)						
0	4	10.0%	4	10.0%	3.874	0.272
1	0	0.0%	0	0.0%		
2	9	22.5%	17	42.5%		
3	16	40.0%	11	27.5%		
4+	11	27.5%	8	20.0%		
Mean ± SD	2.84±1.25		2.64±1.34		t = 0.690	0.490
Previous pregnancy complication						
Not applicable	4	10.0%	1	2.5%	3.583	0.492
No	20	50.0%	16	40.0%		
Anemia	9	22.5%	13	32.5%		
Vaginal bleeding	3	7.5%	5	12.5%		
Vaginal bleeding + anemia	4	10.0%	5	12.5%		
Previous labor complication						
Not applicable	4	10.0%	4	10.0%	1.676	0.908
No	25	62.5%	22	55.0%		
Bleeding during labor	2	5.0%	1	2.5%		
Prolonged labor	4	10.0%	7	17.5%		
Preterm labor	1	2.5%	2	5.0%		
Tear & laceration	4	10.0%	4	10.0%		
Previous postpartum complication						
Not applicable	4	10.0%	4	10.0%	0.744	0.909
No	25	62.5%	27	67.5%		
Anemia	4	10.0%	2	5.0%		
Vaginal bleeding	7	17.5%	7	17.5%		

χ^2: Chi square test MC: Monte Carlo t: Student t- test

Table (3): Number and percent distribution of the studied groups according to their history of current pregnancy

Current pregnancy	Control group (n=40)		Experimental group (n=40)		Test of significance	^{MC}p
	N	%	N	%		
Weeks of gestation	37.18±0.87		37.23±0.77			
Mean ± SD					t = 0.270	0.790
Follow up						
Yes	40	100%	40	100%	-	-
No	0	0.0%	0	0.0%		
Number of antenatal visit						
2 – 4	34	85.0%	21	52.5%		
5 – 6	6	15.0%	14	35.0%	11.067*	0.001*
≥7	0	0.0%	5	12.5%		
Mean ± SD	3.55±0.90		4.60±1.50		t = 3.79*	<0.001*
Causes of CS						
Maternal causes	29	72.5%	27	67.5%		
Fetal causes	11	27.5%	13	32.5%	0.088	0.957
Maternal causes	**N=29**		**N=27**			
Previous CS	19	47.5%	20	65.0%		
Contracted pelvis	4	10.0%	3	7.5%		
Causes related to placenta	6	25.0%	4	17.5%	2.579	0.487
Fetal causes						
Fetal position	12	30.0%	11	27.5%		
Twins	5	12.5%	4	10.0%	0.238	0.901
No fetal causes	23	57.5%	25	62.5%		

χ^2: Chi square test MC: Monte Carlo t: Student t- test

Figure (3): Mean time of fasting before CS (fluid restriction by hours)/ preoperative preparation

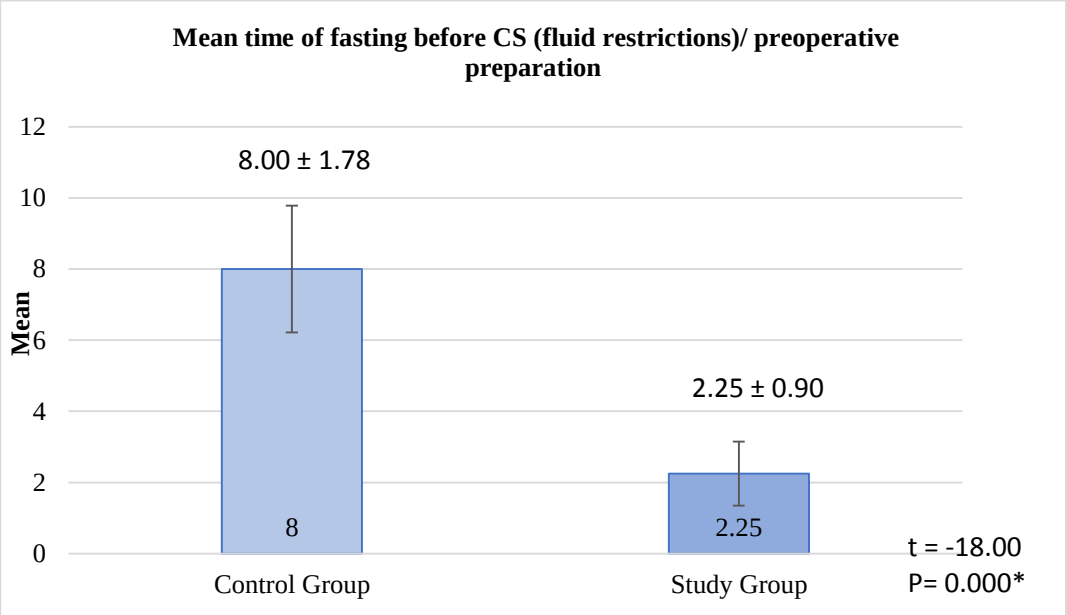

Table (4): Number and percent distribution of the studied groups according to their post cesarean maternal outcome assessment checklist.

Post cesarean maternal outcome assessment checklist	Control group (n=40)		Experimental group (n=40)		Test of sig.	^{MC}p
Hospital stay	12.08±3.47		7.03±1.23		t = 8.68*	p>0.001*
Nausea	**N**	**%**	**N**	**%**		
Yes	30	75.0%	10	25.0%	χ^2 = 20.00*	<0.001*
No	10	25.0%	30	75.0%		
Vomiting						
Yes	24	60.0%	5	12.5%	χ^2 = 19.527*	<0.001*
No	16	40.0%	35	87.5%		
Temperature	36.43±0.20		36.79±0.47		t = 4.40*	<0.001*
Hypothermia						
Yes	20	50.0%	11	27.5%	χ^2 =4.266*	0.039*
No	20	50.0%	29	72.5%		
Hypotension						
Yes	18	45.0%	9	22.5%	χ^2 =4.528*	0.033*
No	22	55.0%	31	77.5%		
Systolic blood pressure	99.13±8.08		106.30±9.50		t = 3.70	0.001*
Dystonic blood pressure	64.63±6.03		69.88±5.60		t = 4.03*	<0.001*
Blood glucose level						
Normal	30	75.0%	37	92.5%	χ^2 =4.501*	0.034*
Hypoglycemia	10	25.0%	3	7.5%		
Presence of flatulence						
Yes	27	67.5%	36	90.0%	χ^2 =6.050*	0.014*
No	13	32.5%	4	10.0%		
After what time flatulence occurred	3.70±2.78		1.65±0.97		t = 4.40*	<0.001*
Stool	0	0.0%	0	0.0%	-	-
Eating and drinking	40	100%	40	100%	-	-
Time of eating and drinking	4.73±1.04		1.80±0.46		t = 16.28*	<0.001*
Urinary catheter	40	100%	40	100%	-	-
Time of remove of urinary catheter	6.90±1.60		3.18±1.11		t = 12.12*	<0.001*
Get out of bed						
Yes	30	75.0%	40	100%	χ^2 = 11.429*	0.001*
No	10	25.0%	0	0.0%		
Time of getting out of bed	6.30±1.36		2.45±1.13		t = 13.75*	<0.001*
	40	100%	40	100%	-	-
Time of initiation of breast breastfeeding	3.60±0.78		1.10±0.45		t = 17.60*	<0.001*
Need for analgesics						
Yes	33	82.5%	23	57.5%	5.952*	0.015*
No	7	17.5%	17	42.5%		
Frequency of analgesics according to doctor (hours)	15.90±5.69		15.90±5.69		t = 0.00	1.00
Frequency of requested analgesics according to women (hours)	4.03±2.08		6.58±3.43		t = 4.02*	<0.001*
Start of analgesics after						
Immediately	8	20.0%	0	0.0%	χ^2 = 73.600*	^{MC}p <0.001*
1 hour	15	37.5%	0	0.0%		
2 hours	9	22.5%	0	0.0%		
3 hours	8	20.0%	2	5.0%		
4 hours	0	0.0%	7	17.5%		
5 hours	0	0.0%	17	42.5%		
Not requested by women	0	0.0%	14	35.0%		
Postoperative complication	0	0.0%	0	0.0%	-	-

χ^2: Chi square test MC: Monte Carlo t: Student t- test * Statistically significant p-value at ≤0.05

Table (5): Distribution of the studied groups according to their post- cesarian pain intensity as measured by Visual analog scale (VAS)

Post- cesarian pain as measured by (VAS)	Control group (n=40)		Experimental group (n=40)		*Test of sig.*	^{MC}p
	N	%	N	%		
Pain intensity immediately						
No Pain	0	0.0%	0	0.0%		
Mild pain	0	0.0%	13	32.5%	37.252*	<0.001*
Moderate pain	9	22.5%	22	55.0%		
Sever pain	26	65.0%	4	10.0%		
Intolerable pain	5	12.5%	1	2.5%		
Min -Max	6-10		6-10			
Mean ± SD	7.95	±1.34	7.68	±1.29		
Pain intensity at discharge						
No Pain	0	0.0%	0	0.0%		
Mild pain	0	0.0%	34	85.0%	62.388*	<0.001*
Moderate pain	11	27.5%	5	12.5%		
Sever pain	28	70.0%	1	2.5%		
Intolerable pain	1	2.5%	0	0.0%		
Min -Max	3-10		2-7			
Mean ± SD	5.15± 1.81		2.95 ±0.96			

χ^2: Chi square test
MC: Monte Carlo
* Statistically significant p-value at ≤0.05

Table (6): Distribution of the experimental group undergoing cesarean section total score of to their satisfaction of application of enhanced recovery pathway after cesarean section

Women's satisfaction with implementing ERAS	Experimental group (n=40)	
	No	%
Highly satisfied	24	70.0%
Moderately satisftied	6	15.0%
Unsatisafied	6	15.0%
Mean ± SD	47.65±8.29	

χ^2: Chi square test t: Student t- test * Statistically significant p-value at ≤0.05

Discussion

ERAS has been claimed to result in enhanced care and favorable results in various clinical settings, particularly in the field of maternity. **(Abdelati et al., 2020).** As a result, this study's purpose was to examine the effect of implementing the ERAS for women undergoing cesarean sections on maternal outcomes and satisfaction. The current study's findings proved the hypotheses and highlighted how the application of ERP improved functional recovery, maternal outcomes, maternal-infant attachment, and women's satisfaction **(Patel and Zakowski, 2021; Wang et al., 2023; Zheng et al., 2023).**

Generally speaking, on investigating the effect of implementing enhanced recovery after Cs on maternal outcomes, this study showed that there was improvement in maternal outcomes after implementation of ERAS, which include duration of hospital stay after Cs, occurrence of nausea and vomiting, occurrence of hypothermia, initiation of breast feeding, and post-cesarean complications. This finding may be consistent with **Mundhra et al. (2024).** They concluded in their study -about the efficacy of ERAS protocol on maternal outcomes following emergency Cs- that applying the ERAS had shown its value in improving post-cesarean outcomes, quick recovery, and reducing length of hospital stay, ultimately increasing quality of life and women's satisfaction even in urgent cesarean sections. Therefore, this similarity is consistent with what is elicited in almost all studies that researched the effect of application of ERAS on different surgeries; this may result as ERAS protocols include pre-, intra-, and postoperative' protocols as early oral feeding, mobilization, and

multimodal pain relief **(Altman et al., 2019; Kowa et al., 2022; Ubom et al., 2023).**

On examining the length of hospital stay, it is a significant visual indicator that reflects the recovery's speed, early improvement, and fewer postoperative complications. The current study's results displayed that the ERAS group had a shorter length of hospital stay than the control group, with a statistically significant difference among both groups in favor of the study group. The researchers attributed short hospital stays to early eating as well as mobilization and early removal of catheters after CS, which reflect early improvement and reduction of postoperative complications, and finally faster early hospital discharge.

The present study's results align with the findings of three other researchers: first, ***Darwish et al. (2022)*** conducted a randomized controlled trial titled "Enhanced Recovery after Cesarean Section (CS) versus Conventional Care in a Lower Middle-Income Country." They reported that almost all of the experimental group had a hospital stay of less than 12 hours. Second, ***Ismail et al. (2021)*** results revealed that the ERAS program demonstrated greater efficacy in enhancing mothers' general status compared to standard hospital care, where the control group had a statistically significant longer average length of hospitalization, with a mean of 1.8 days, in contrast to the ERAS group, which had a mean hospitalization duration of 1.2 days. Third, ***Corso et al. (2017)*** conducted a systematic review about enhanced recovery after elective cesarean section. They concluded that despite the varying implementation of enhanced recovery clinical protocols after elective cesarean sections across different studies, these protocols significantly decreased the length of hospital stay to one day or less.

This agreement between the findings of the previously mentioned studies and that of the current one is probably attributed to implementing an enhanced recovery clinical pathway protocol after surgery for women who are undergoing cesarean sections, which includes early mobilization, eating food early, early removing the urinary catheter, and also initiating breastfeeding during the first half hours after delivery. All of these factors reduce the occurrence of postoperative CS complications, such as postpartum hemorrhage and improving the bowel movement, and ultimately help in rapid recovery and early discharge from the hospital.

On the other hand, **Pan et al. (2020)** concluded that there was no statistically significant difference between the control and ERAS groups related to postoperative length of hospital stay, but the mean daily hospitalization cost was lower in the ERAS group than in the control group. They attributed the discrepancies in their results to several reasons. Firstly, the duration of the hospital stay is related to financial requirements such as insurance and reimbursement systems. Secondly, post-CS complications' occurrence is low at their medical institution for both groups. Lastly, this dissimilarity between the findings of the previously mentioned study and those of the current one may be ascribed to different study designs, sample sizes, and variables.

Concerning nausea and vomiting as a maternal outcome, the present findings revealed that the incidence of these symptoms was more common among the control group compared to the ERAS group. Additionally, the ERAS group was likely to start the oral fluid within less than two hours after surgery (p 0.001). Similar findings were reported **by Ismail et al. (2021)**; they revealed that nausea and vomiting as signs of hypotension were more common in the control group than in the ERAS group. In addition, it is in the same line with **Ituk and Habib (2018)**, who conducted "Enhanced recovery after cesarean delivery protocol"; they stated that the current evidence indicates that early oral intake facilities the restoration of bowel function and early ambulation, lowers the risk of sepsis, promotes breastfeeding, and shortens the duration of hospitalization. The researchers explained that these findings could be related to the return of gastrointestinal function, where the experimental group passed flatulence earlier than the control group. Moreover, reducing the use of opioids after CS reduces ileus and promotes the return of bowel function, as concluded by **Suharwardy and Carvalho (2020).**

Considering the early **initiation of breastfeeding,** the study findings revealed that a statistically significant difference was found among the study and control groups (p = <0.001) in favor of the study group, in which the study

group initiated the breastfeeding during the first hour after CS, whereas the control group started the breastfeeding within 4 hours after CS. The study findings come in agreement with **Darwish et al. (2022);** they reported that almost all of the women in the ERAS group initiated breast feeding after one hour of CS compared to the control group, who initiated breast feeding after 3 hours. Also, in **Ismail et al. (2021),** they stated that breastfeeding was initiated within two hours post-CS among half of the women in the study group, compared to the minority in the control group. **The researchers** clarified that the early initiation of breast feeding may result from the successful implementation of the ERAS protocol, which promotes early skin-to-skin contact with newborns, which in turn has been associated with increased rates of early initiation of breastfeeding, mother-infant bonding, and greater maternal satisfaction. Also, it may be that the women in the ERAS group experienced lower pain scores during breastfeeding, while the score was 6.7 on day 0 compared to the conventional group, which had a 7.3 pain score, as reported by **Mundhra et al. (2024).**

As regard postoperative complications, the current study revealed that there were no significant differences between the two groups regarding postoperative complications. This finding is consistent with **Mundhra et al. (2024),** who found that there was no significant difference between the two groups related to postoperative complications, blood loss, and readmission rates. In addition, Meyer et al. (2018) reported that there were no significant differences in complications or rates of readmission among the pre- and post-ERAS groups. On the other hand, this result is not congruent with ***Ibrahim et al. (2022)***; they studied the satisfaction of women undergoing abdominal hysterectomy after applying ERAC and reported that a statistically significant difference was found between the ERAS and the control groups related to postoperative complications after hysterectomy. ***The researchers have attributed*** the results of their study to the fact that the fact that there are no significant differences among the two groups related to causes of CS, reproductive history, or current pregnancy history. *Also*, women with medical conditions were excluded from the study. *In addition*, this maternity hospital is the main university hospital in Alexandria, where there is careful censorship and the complication rates have been very low, so it may be expected that there will be a reduction in the incidence of postoperative complications.

Controlling post-caesarian pain is one of the priority goals, as it has a negative effect on rehabilitation, delays mobilization, increases LOS, and affects maternal and infant attachment. Considering the *frequency of requested analgesics and postoperative pain*, the findings of this study noticed that a highly statistically significant difference was found among the women in both groups in relation to immediate and at discharge post-cesarean pain intensity (P = > 0.001). Where the mean pain intensity was higher in the control group than in the ERAS group immediately and at discharge after the cesarean section. Additionally, this study revealed that the ERAS group was less frequent in requesting analgesics compared to the conventional group, where the mean frequency of requested analgesics was higher in the ERAS group compared to the control group. In other words, the application of ERAS for women undergoing caesarian section seems to have a significant effect on reducing the post-cesarean section pain intensity immediately and at discharge among the experimental group.

Likewise, the present result is congruent with the findings of a study conducted by ***Ubom et al. (2023),*** which conducted a study entitled "Effect of ERAS after CS on opioid use and perception of pain." They concluded that applying multimodal pain regimens after Cs, including the ERAS pathway, which integrates pharmacologic (nonsteroidal-inflammatory drugs) and nonpharmacologic techniques such as deep breathing, can be effective in managing pain and may decrease postoperative analgesic prescribing needs, thereby decreasing the risk of opioid misuse and dependence. Additionally, ***Pan et al. (2020)*** stated in their study about the advantages of ERAS on acute pain management for elective CS women that ERAS was found to be helpful in lowering postoperative discomfort, and it seems worthwhile to adopt widely among women undergoing elective CS. Moreover, ***Meng et al. (2021)*** reported in their systematic review and meta-analysis that the ERAS protocol is safe, feasible, and effective for decreasing postoperative pain and the frequency of opioid

requests after CS. Moreover, the present study is relatively congruent with the findings of ***Grasch et al. (2023)***. Again, ***Darwish et al .(2022)*** observed that there was a significant decrease in pain intensity immediately postoperatively and at the time of discharge among the ERAS group. On the contrary, ***Meyer et al. (2018)*** stated there were no significant differences in the score of pain with and without ERAS implementation; however, the majority of the ERAS group had a reduction in opioid consumption, and the minority were opioid-free during admission up to the third postoperative day.

On assessing the satisfaction of women regarding implementing ERAS. The results of the present study revealed that the majority of the women in the experimental group were highly satisfied with implementing the ERAS protocol. The current findings are relatively in harmony with research accomplished by ***Darwish et al (2022)***, who concluded that women's satisfaction scores in the ERAS group were significantly higher than those in the control group after application of the clinical pathway after surgery. Also, ***Thangavel and Gerges (2021)*** in their study about patient satisfaction with the ERAS protocol after gynecological oncology reported that high levels of women's satisfaction were observed. Also, they recommended that the implementation of an ERAS protocol with gynecological oncological surgery be generalized. Likewise, ***Karki and Saha (2021)*** studied patient satisfaction after implementing the ERAS protocol for elective cesarean sections; their results clarified that almost all of the women undergoing cesarean sections were satisfied with the ERAS protocols, and the majority of them would prefer to undergo surgery under the ERAS protocol in the future. ***In the researcher's point of view***, it is a natural result because a woman's satisfaction can be affected by several factors, including postoperative pain and complications, LOS, the occurrence of nausea and vomiting, and breast feeding initiation. The implementation of an ERAS protocol is both a desirable and comprehensive solution to these problems. Moreover, it enhances therapeutic staff-patient communications, thereby alleviating anxiety and stress and promoting satisfaction.

From these results and discussion, in addition to more previous studies, it was confirmed that the implementation of an **ERAS** protocol for women undergoing cesarean sections was effective in improving maternal outcome, lowering the incidence of intra- and postoperative nausea and vomiting, postoperative pain, and average hospital stay, as well as increasing patient satisfaction.

Conclusion

Based on the findings of the present study, it can be concluded that implementing the enhanced recovery after surgery pathway (ERAS) significantly improved the level of maternal satisfaction as well as the positive maternal outcome for women undergoing CS with the intervention. So, the study aim and hypotheses were achieved within the framework of the present study.

Based on the findings of the present study, the following ***recommendations*** are suggested:

- In-service training programs should be carried out for intrapartum maternity nurses to increase their awareness about the importance of implementing the ERAS for positive maternal outcomes for women undergoing cesarean sections.
- A baseline information leaflet about the ERAS based on the recent relevant literature should be available to enhance maternity nurses' knowledge and practices regarding the implementation of the ERAS protocol for cesarean delivery.
- The health care setting should highlight the importance of coordination between health care members in accordance with the implementation of the evidenced key elements of the enhanced recovery pathway after surgery protocol for CS.

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