Effects of Implementing an Enhanced Recovery after Surgery pathway on Hysterectomy Postoperative Outcomes

Nehal Shalaby Awad Mahmoud[(1)], Hanan Abdelrahman Mostafa Kandeel [(2)], Samar Elrefaey Elrefaey Abaza [(3)]

(1) Lecturer of Obstetrics & Gynecologic Nursing, Faculty of Nursing, Alexandria University, Egypt.
(2) Assistant professor of Obstetrics & Gynecologic Nursing, Faculty of Nursing, Alexandria University, Egypt.
(3) Lecturer of Maternal and Neonatal Health Nursing, Faculty of Nursing, El- Fayoum University, Egypt.
Corresponding author: nehal.shalaby@alexu.edu.eg

Abstract

Background: The implementation of an Enhanced Recovery after Surgery (ERAS) pathway for women undergoing hysterectomy represents a rigorously evidence-based strategy aimed at improving postoperative outcomes, mitigating complications, facilitating expedited recovery, and ultimately enhancing the quality of life alongside overall healthcare efficacy. **Aim:** To examine the effect of implementing an enhanced recovery after surgery pathway on hysterectomy postoperative outcomes. **Research design:** A quasi-experimental design was adopted. **Setting**: This research was conducted at the Obstetrics and Gynecology Department of Fayoum University Hospital, El-Fayoum Governorate, Egypt. **Subjects**: A convenience sample comprising 120 women undergoing hysterectomy was recruited based on specific inclusion criteria. **Tools**: Four tools were used: a structured interview questionnaire, a Numerical Rating Scale, a Postoperative functional recovery checklist, and Women' Satisfaction Record. **Results:** There were statistically significant differences concerning all postoperative outcomes between the study and control groups ($p = 0.001$), along with a notable reduction in postoperative pain intensity observed in the study group in comparison to the control group on the second and third postoperative days ($p = 0.001$). **Conclusion:** The results concluded that the implementation of the enhanced recovery after surgery pathway for women undergoing hysterectomy markedly early ambulation so that early removal of time of bladder catheter, early return bowel motility, reduced postoperative pain, complication and hospital duration, and increased women's satisfaction. **Recommendation:** It is suggested to apply the ERAS pathway as a standard practice for all women undergoing elective gynecologic surgeries to enhance postoperative outcomes, minimize complications, and promote rapid recovery.

Keywords: Enhanced recovery after surgery pathway, Hysterectomy, Postoperative outcomes.

Introduction

Hysterectomy represents one of the most prevalent and significant gynecological surgical interventions conducted globally, in which the uterus, and frequently the cervix, is excised either wholly or partially. The procedure may necessitate the resection of adjacent organs and tissues, such as the ovaries and fallopian tubes, contingent upon the underlying rationale for the surgery. It ranks as the second most frequently performed procedure among females, following cesarean deliveries. Depending on the surgical approach utilized, it can be classified as abdominal, vaginal, or laparoscopic-assisted. The duration of recovery is contingent upon the specific surgical technique employed **(Amarin, 2022; American Congress of Obstetricians and Gynecologists (ACOG), 2021; Carugno & Fatehi, 2025; Nwadike & Eske, 2020; Schneider et al., 2020; Sharma & Gupta, 2020).**

Post-hysterectomy, individuals will no longer experience menstruation or possess the capacity for conception, which can engender both emotional and physiological ramifications. This represents a momentous decision that necessitates thorough deliberation and discussion with a qualified healthcare professional. Worldwide, more than 1.5 million women need hysterectomy surgery each year. Approximately 20–40% of women may have undergone a hysterectomy by age 60. Over 600,000 hysterectomies are estimated to be performed annually in the US. One in three American women will have undergone a hysterectomy by the time they are 60, according to the Centers for Disease Control and Prevention (CDC). Over 100,000 procedures were carried out in Germany **(Carugno & Fatehi, 2025; Centers for Disease Control and Prevention (CDC), 2022; Hill, 2021; Office on Women's Health (OASH), 2022).**

There are numerous benign reasons to have a hysterectomy, including abnormally heavy uterine bleeding, uterine fibroids (leiomyomas), uterine prolapse, severe menstrual pain, chronic pelvic pain, conditions involving the uterine lining, such as hyperplasia, recurrent uterine polyps, endometriosis, and adenomyosis. In contrast, malignant indications for cancer prevention include cancer of the cervix, uterus, fallopian tube, ovaries, and endometrium, or abnormalities that may result in cancer. In the treatment of severe postpartum bleeding, a hysterectomy may be carried out as a life-saving procedure, in addition to other justifications for obstetric complications **(American Congress of Obstetricians and Gynecologists (ACOG), 2021; Sharma & Gupta, 2020).**

A hysterectomy has risks and complications that can lead to mild to severe morbidity and mortality. Pain, scarring, vaginal bleeding or spotting, constipation, difficulty urinating, digestive problems, damage to blood vessels, nerves, or surrounding organs, delayed healing, and infections are some of these risks and side effects. Blood clots, severe infections, heavy bleeding, urinary tract damage, gastrointestinal tract injuries, and anesthesia-related complications are some of its complications **(American Congress of Obstetricians and Gynecologists (ACOG), 2021; Nwadike & Eske, 2020).**

Enhanced recovery after surgery (ERAS) care constitutes an evidence-based, multidisciplinary, and collaborative protocol for perioperative management, grounded in scientific principles aimed at facilitating expedited recovery post-surgery by preserving preoperative organ functionality and mitigating the substantial physiological stress response that ensues following surgical interventions. As the patient travels from preoperative, intraoperative, and postoperative stages of surgery, these care pathways create an integrated continuum **(American Association of Nurse Anesthesiology (AANA), 2022; Kate, 2023; Noh et al., 2020).**

ERAS has numerous benefits, including accelerating functional recovery, enhancing patient satisfaction, improving postoperative outcomes, such as pain, bowel function returning more quickly, improving cardiopulmonary function, accelerating recovery, reducing hospital stays, and lowering healthcare costs while reducing complications and readmission rates **(American Association of Nurse Anesthesiology (AANA), 2022; Garg et al., 2021).**

Practice is necessary for the successful implementation of the ERAS; an organized, cooperative, multidisciplinary approach combined with an education and awareness campaign may prove beneficial. This team includes nurses, gynecologists, anesthesiologists, nutritionists, other service personnel involved in patient care, and a representative from the institution's quality control department **(American Association of Nurse Anesthesiology (AANA), 2022).**

ERAS covers the following phases include preoperative patient counseling, nutrition and fating, bathing, bowel preparation, prophylactic antibiotics, prophylaxis against thromboembolism, multimodal analgesia, and warmth; intraoperative anesthesia, intravenous fluids, prophylactic nausea and vomiting, and urinary catheter insertion; postoperative fluid management, nutrition and early oral intake initiation, multimodal analgesics, appropriate use of drains, tubes, and catheters, early mobilization, and physical activity **(Enhanced Recovery Canada (ERC), 2021).**

Nurses play a crucial role in the ERAS pathway by delivering comprehensive preoperative care for women upon their admission to the healthcare facility, which encompasses the collection of baseline data (including vital signs, allergies, medical history, obstetric and menstrual history), ensuring the completion of preoperative diagnostic tests (such as CBC, blood type, coagulation profile, and urinalysis), elucidating the surgical procedure, types of anesthesia, potential complications, and postoperative anticipations (including pain management, catheterization, and ambulation), providing psychological reassurance, and addressing inquiries to alleviate anxiety and fear **(American Congress of Obstetricians and Gynecologists (ACOG), 2021; Stovall, 2022).** Furthermore, they instruct patients on mandated fasting (NPO) for a duration of six hours before the surgical procedure, administer prescribed preoperative medications, assist with preoperative hygiene measures (such as shaving and antiseptic

bathing, if necessary), remove any jewelry, dentures, and nail polish, and meticulously document all nursing assessments and interventions **(American Congress of Obstetricians and Gynecologists (ACOG), 2021).**

Intraoperatively, nurses are pivotal in ensuring patient safety while assisting the surgical team. Their duties encompass the verification of patient identity, informed consent, and surgical site, maintaining a sterile operative environment, ensuring accountability for all surgical instruments, positioning the patient appropriately to prevent injury while ensuring comfort, monitoring vital signs and promptly responding to alterations in the patient's clinical condition, providing necessary supplies, handling surgical instruments to the surgical team, and upholding aseptic techniques throughout the surgical procedure **(American Congress of Obstetricians and Gynecologists (ACOG), 2021; Siedhoff et al., 2020).**

Postoperatively, nurses concentrate on facilitating recovery, managing pain, and preventing complications. This care entails the monitoring of vital signs, level of consciousness, and oxygen saturation, as well as the maintenance of intravenous fluids and medications as directed. In terms of pain management, they administer analgesics and advocate for relaxation techniques **(American Congress of Obstetricians and Gynecologists (ACOG), 2021).** Additionally, they observe surgical dressings for any signs of bleeding or infection while maintaining a sterile environment, encourage gradual mobilization to mitigate the risk of thromboembolism and to enhance bowel functionality, meticulously record urinary output following catheter removal, initiate clear fluid intake, and progressively advance the diet as tolerated. They also educate patients and their families regarding wound care, activity limitations, signs of infection, postoperative exercise, follow-up consultations, and address emotional responses related to the loss of the uterus and alterations in body image **(Siedhoff et al., 2020; Wall, 2020).**

Significance of the study: Hysterectomy is one of the most common gynecological treatments performed worldwide. Its incidence rate is 5% in Africa and 7% in Asia. According to the National Center for Health Statistics, there were 165 hysterectomies performed in Egypt annually for every 100,000 people **(Centers for Disease Control and Prevention (CDC), 2022; Huque et al., 2018; Rania et al., 2018; Statistisches Bundesamt (Destatis): Fallpauschalenbezogene Krankenhausstatistik (DRG-Statistik), 2020).**

Women's lives may be significantly impacted by this disorder on a physical, psychological, social, and sexual level. There was little research that discussed improving postoperative outcomes and satisfaction of women undergoing hysterectomy by implementing an enhanced recovery after surgery pathway. Therefore, this study was carried out to examine the effects of implementing an enhanced recovery after surgery pathway on hysterectomy postoperative outcomes.

This research holds significant educational value, as it enhances the comprehension of contemporary, patient-centered surgical care among nursing students and healthcare practitioners. Moreover, it advances nursing practice by fostering the implementation of standardized, evidence-based protocols that elevate the quality of care, reduce the duration of hospital stays, and improve patient satisfaction levels. Additionally, it supports future research endeavors by supplying data and insights that advocate for ongoing assessment and innovation within perioperative nursing, ultimately culminating in enhanced surgical outcomes, improved patient satisfaction, and increased healthcare efficiency.

Operation Definition:

Postoperative outcome in this study includes postoperative pain as measured by the Numerical Rating Scale and Postoperative Functional Recovery, which includes mobility, nutrition, bowel motility, follow-up to avoid postoperative complications, and time of hospital discharge as measured by the Postoperative Functional Recovery Checklist. As well as women's satisfaction as measured by the Satisfaction Record.

The aim of the study:

Was to examine the effect of implementing an enhanced recovery after surgery pathway on hysterectomy postoperative outcomes.

Hypotheses:

To reach the aim of this study, the following hypotheses were formulated:

1- Women undergoing hysterectomy who are managed under an ERAS pathway will report lower postoperative pain levels than those under standard hospital care.

2- Women undergoing hysterectomy who are managed under an ERAS pathway will report a lower mean duration of hospitalization than those under standard hospital care.

3- Women undergoing hysterectomy who are managed under an ERAS pathway will report a higher level of satisfaction than those under standard hospital care.

Subjects and Method:

Research design:

A quasi-experimental design, specifically referred to as the posttest non-equivalent control group design, was adopted in the current investigation to investigate the effect of implementing an enhanced recovery after surgery pathway on hysterectomy postoperative outcomes. A quasi-experimental design can be delineated as a category of research methodology that exhibits parallels with experimental research, yet does not conform to the standards of true experimental research. The non-equivalent groups design, a subtype of between-subjects design, is characterized by the absence of random assignment of participants to varying conditions. In the context of a posttest design, the dependent variable, namely postoperative outcomes, was evaluated after the implementation of the ERAS pathway.

Settings:

This research was conducted at the Obstetrics and Gynecology Department of Fayoum University Hospital, El-Fayoum Governorate, Egypt. Fayoum University Hospital provides free health services to the Fayoum governorate population and its surrounding governorates. This particular setting was selected due to its status as the primary hospital in Fayoum Governorate that offers obstetric and gynecological services, as well as a high turnover of women undergoing hysterectomy, thereby facilitating the researcher in achieving the requisite sample size.

Subjects:

A convenience sample comprising 120 women undergoing hysterectomy was recruited based on specific inclusion criteria such as women aged 20 years or more; planned elective total or subtotal abdominal hysterectomy; educated women who were able to understand instructions; hysterectomy for benign diseases; normal to overweight body mass index (BMI); having a phone for follow up and consenting to partake in the study. Conversely, women were excluded from this study if they had an emergency hysterectomy, required extensive additional care, had complaints of any medical or psychological diseases or cognitive impairment, had genital neoplasia, an inability to follow postoperative instructions, or attend follow-up, and a BMI of 30 KG/m^2 or more.

The Epi Info 7 statistical program was utilized to ascertain the sample size by employing the following parameters: population size 170 over 3 months, expected frequency 50%, acceptable error 5%, confidence coefficient 95%, and minimal sample size 118. The finalized sample size was established at 120 to account for potentially normal responses. The selected subjects were allocated evenly to either the control group or the experimental group .

- The experimental group encompassed 60 women who received the enhanced recovery after surgery pathway .
- The control group was composed of 60 women who received the standard hospital care .

Tools:

Four tools were employed to gather data.

Tool (I): Structured interview questionnaire

This tool was developed and employed by the researchers. This tool consisted of two segments: The first segment encompassed demographic data, including age, marital status, educational level, occupation, residence, income, and body mass index. The second segment, Reproductive History, comprised: gravidity and parity, mode of previous deliveries, and complications associated with prior pregnancies, deliveries, and postpartum experiences and causes for hysterectomy.

Tool (II): Post-operative pain assessment scale (Numerical Rating Scale)

This particular pain rating scale was initially introduced in 1921 by **Hayes (1921)**. It was adopted and utilized by the researchers. This self-report instrument consists of a horizontal line designed for the subjective assessment of pain. It features a 10-point numerical scale, which corresponds to varying degrees of pain, with zero signifying the absence of pain and 10 indicating the most severe pain. Between these two extremes, descriptors such as mild, moderate, and severe are assigned to every 3 cm interval, respectively. Women were instructed to mark the line at the point that best represented the intensity of their pain to evaluate pain severity **(Alghadir et al., 2018; Delgado et al., 2018; Karcioglu et al., 2018).**

The total score ranged from 0 to 10, categorized as follows: no pain (0), mild pain (1-3), moderate pain (4-6), severe pain (7-9), and unbearable pain (10).

Tool (III): Postoperative Functional Recovery Checklist

It was adapted from the works of Ibrahim et al. (2023) and Heeba et al. (2019) and subsequently modified by the researchers to evaluate postoperative functional recovery. This instrument comprised six principal categories of inquiries, including: mobilization (sitting in bed post-surgery, ambulation beyond the bed post-surgery), nutrition (initiation of oral fluid intake post-surgery, initiation of a regular diet post-surgery), bowel motility (first passage of flatus, first passage of stool), timing of bladder catheter removal, postoperative follow-up (monitoring of postoperative complications and readmission to the hospital), and time of hospital discharge.

Tool (IV): Women's Satisfaction Record

This tool was adapted from the work of Emile Gohar et al. (2023) and informed by the frameworks established by Karki and Saha (2021), subsequently modified by the researchers for the purpose of assessing the satisfaction levels of women post-hysterectomy concerning the Enhanced Recovery After Surgery. It consists of twelve distinct statements. The responses from women to each statement were measured using a 5-point Likert scale, which spanned from strong agreement to strong disagreement, thereby indicating their level of concurrence with the various components. These components encompassed elements such as the quality of preoperative information, the compassion exhibited by healthcare personnel, pain management efficacy, promptness of initiating oral fluids, early physical mobilization, prescribed dietary and activity guidelines within the first 24 hours postoperatively, the occurrence of postoperative complications, the sufficiency and clarity of information dispensed by nursing staff at discharge, the professionalism and expertise of healthcare providers, the propensity to recommend the ERAS pathway to acquaintances, as well as experiences of disappointment, sadness, and depression. 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) neutral. - From (59 to 75) satisfied.

Validity and reliability of the tools:

A jury consisting of three experts in the field of Obstetrics and Gynecologic Nursing appraised the tools for content validity, after which requisite modifications were implemented. Tools (II) and (IV) underwent reliability testing via Cronbach's Alpha test, yielding satisfactory results of 0.902 and 0.899, respectively.

Ethical consideration:

Research code: EC 23181, preliminary approval date: 15/11/2023, and final approval date: 27/7/2015. Official permission was obtained from the Research Ethics Committee at the Faculty of Nursing, Fayoum University, to validate the tools and conduct the study. Furthermore, women provided written informed consent after a thorough explanation of the research objectives and their significance. The researchers emphasized the voluntary nature of participation, permitting women to withdraw without justification. Assurance was provided regarding the confidentiality of personal information, their right to privacy, and the protection of data integrity.

Pilot study:

A pilot study was conducted involving 10% of the study sample (12 women undergoing abdominal hysterectomy), who were subsequently excluded from the main study sample. This pilot study aimed to ascertain the applicability and clarity of the tools, as well as to gauge the time required for women to respond to them, after which necessary modifications were implemented.

Method

The data was collected through the following phases:

Preparatory phase:

- Tool (I) was developed by the researchers after a comprehensive review of contemporary and pertinent literature, while tools (III), and (IV) were adapted by the researchers; Tools (II) and (IV) were also translated into Arabic for data collection purposes.
- Approval was sought from the vice-dean of graduate studies and research at the Faculty of Nursing, Fayoum University, to obtain the necessary permissions from the relevant authorities at the study settings, accompanied by an explanation regarding the study's purpose.

Assessment phase:

- At the onset of the study, the researchers engaged with women within the admitted ward before surgical intervention. They proceeded to introduce themselves and elucidated the title and objectives of the research, subsequently acquiring written informed consent from the women. Following this, the researchers conducted individual interviews with each woman to complete Tool (I). The duration necessary for the interviews typically varied between 15 and 20 minutes, contingent upon the participants' levels of comprehension and their responsiveness to the inquiries posed.
- The researchers conducted visits to the aforementioned setting four days per week, specifically on Saturdays and Mondays for the control group, and on Tuesdays and Wednesdays for the study group, from 9:00 AM to 1:00 PM.

Implementation phase:

- The data collection phase spanned a duration of 12 months, commencing in January and concluding in December 2024.
- Women in the control group adhered to the standard hospital care protocols by nurse role, which encompassed:
  - Preoperative measures included instructing women to fast overnight for a duration of eight to twelve hours from both food and drink, providing routine mechanical bowel preparation entailing the administration of an enema and laxative medications, as well as utilizing appropriately fitting compression stockings before their admission to the operating room.
  - Intraoperatively, maintained a sterile operative environment, monitored vital signs, supplied necessary materials, and handled surgical instruments throughout the procedure.
  - Postoperatively, administered intravenous fluid until the restoration of intestinal motility was observed, provided NSAID analgesics accordance to the physician's prescriptions, and removed the abdominal drain contingent upon the presence of bowel motility. Initiated oral or enteral nutrition once the woman exhibited the ability to pass flatus. Encouraged ambulation for women after 4-6 hours postoperatively on the first day of surgery.

For the study group

- The Enhanced Recovery after Surgery pathway (ERAS) is characterized by a patient-centered, evidence-based, and multidisciplinary team approach. This team comprised a gynecologist, an anesthetist, nurse specialists, and ward nurse managers.
- The researchers articulated the components of the ERAS pathway to all members of the team, encompassing the preoperative, intraoperative, and postoperative phases, before the implementation of care for the study groups.
- The researchers maintained an active presence alongside all team members and oversaw the application of the ERAS pathway during the preoperative, intraoperative, postoperative, and discharge phases from the hospital.

Implementation of ERAS (American Congress of Obstetricians and Gynecologists (ACOG), 2021; Enhanced Recovery Canada (ERC), 2021; Siedhoff et al., 2020)

Preoperative intervention: This intervention was provided after the women's admission to the hospital by a nurse.

The researchers systematically monitored vital signs, allergies, medical history, and obstetric and menstrual histories, while also ensuring that all requisite preoperative diagnostic assessments (including complete blood count, blood typing, coagulation profile, and urinalysis) were conducted. According to nutrition, the researchers advocated for women to consume a normal meal as bread with cottage cheese, on the night preceding surgery, as well as a light snack up to six hours before the surgical procedure for solid food; clear fluids were permitted until two hours before surgery. Women received a clear carbohydrate fluid intake of 250-500 mL (1-2 cups), such as apple juice, cranberry juice, and orange juice, in order to mitigate the effects of fasting.

They recommended that the women engage in bathing the night before surgery and on the morning of surgery, utilizing either the suggested or provided chlorhexidine soap or an alternative antiseptic agent. The researchers refrained from utilizing rectal enemas and mechanical bowel preparations for women. Prophylaxis against thromboembolism, women were instructed to wear well-fitting compression stockings before their admission to the operating room. Intravenous prophylaxis antibiotics were administered 60 minutes before the surgical incision, as per the surgeon's prescriptions.

Preoperative multimodal analgesia was initiated, incorporating the administration of acetaminophen and a non-steroidal anti-inflammatory drug (NSAID). Comprehensive risk assessments were performed to identify potential complications, with nurses facilitating consultations with anesthesiology to formulate a suitable anesthesia strategy. Women were required to be pre-warmed for a period of 20-30 minutes before the induction of anesthesia. Psychological support mechanisms were implemented to mitigate patient anxiety and foster open communication.

Intraoperative intervention:

The researchers meticulously verified patient identity, secured informed consent, and confirmed the surgical site, while maintained a sterile operative environment, continuously monitored the vital signs and overall condition of women throughout the surgical intervention, assisted the surgical team with the administration of regional anesthesia, conducted the insertion of a urinary catheter, ensured accountability for all surgical instruments, and positioned the patient appropriately to avert injury while simultaneously ensuring comfort.

Moreover, the researchers provided intravenous fluids, as prescribed by a physician, were administered, alongside the use of under-body warming mattresses to ensure the maintenance of normal body temperature, provided prophylactic measures for the prevention of nausea and vomiting were implemented through the administration of dexamethasone at a dosage of 8 mg via the intravenous route during the intraoperative period as prescribed by a physician, handled supplies and surgical instruments to the surgical team and avoided abdominal drainage whenever feasible.

Postoperative intervention:

The researchers assessed and evaluated for recovery status and return optimum function, for example: level of consciousness, monitored vital signs such as temperature, pulse, and blood pressure, pain intensity, signs indicative of cardiovascular dysfunction, respiratory dysfunction, and lower body strength to inform decisions regarding mobilization, exercise, and necessary interventions to assist in the transition back to activities of daily living.

According to Fluid Management**,** women were administered crystalloid fluids totaling 500 mL during the initial 24-hour period, after which the infusion was discontinued as prescribed by a physician. Systematically documented and reviewed fluid balances, clinical evaluations of women in the postoperative phase should include assessments for indications of fluid retention and regular weight measurements considered essential during this period.

In relation to nutrition, the researchers administered postoperative laxatives to mitigate ileus and facilitate the prompt reestablishment of

intestinal function. Women should be offered and encouraged to progressively resume oral intake of food and fluids as early as four hours post-surgery. This should begin with high-protein oral nutritional supplements, followed by warm drinks, and subsequently a semisolid diet consisting of yogurt, overcooked carrots, and broccoli, before advancing to solid food options.

Moreover, women capable of tolerating oral intake should aim for a minimum fluid consumption of 25-30 mL/kg per day; monitoring women's dietary intake is imperative. Those who consistently consume less than 50 percent of their food intake over 72 hours, or when clinically indicated, should undergo a thorough nutritional assessment. Families and friends should be encouraged to provide preferred foods from home to enhance appetite and to receive education on optimal dietary choices .

The researchers administered a multimodal analgesic regimen, which included oral paracetamol at a dosage of 500 mg and diclofenac at 50 mg administered three times daily as per physician directives, to effectively manage postoperative pain and facilitate early mobilization and re-initiation of an oral diet, and they employed the numerical rating pain scale to evaluate the intensity of pain experienced. The researchers advocated for the prompt removal of all tubes, drains, and catheters within a six-hour window following an uncomplicated abdominal hysterectomy, and continuous monitored of urinary output was deemed necessary.

The researchers promoted early progressive ambulation for women, encouraging activity within two hours postoperatively on the first day of surgery, which included passive leg exercises, deep breathing and coughing exercises, positional changes, sitting in bed, utilizing a wheelchair, and eventually walking with and without assistance four to six times daily. Women should be encouraged to resume their normal daily activities once they have been discharged from the hospital.

Hospital Discharge Criteria:

The researchers assessed the following criteria before discharging women from the hospital include satisfactory oral intake of food (as measured by begins with liquids and ultra-soft foods, progressing to purees, and then to soft, easily chewable foods as you heal), restoration of bowel function (return bowel function as pass flatus and stool), pain and discomfort are effectively managed with oral analgesics, adequate mobility without assistance and absence of clinical or laboratory indicators of postoperative complications include minor complication such as nausea, vomiting and pain, and major complication such as shock, bleeding and wound infection then notified to doctor to discharge.

The researchers provided educational resources to patients and their families regarding wound care, activity limitations, signs of infection, postoperative exercise protocols, follow-up appointments, and addressed emotional responses associated with the loss of the uterus and changes in body image, alongside offering telephonic reinforcement of the discharge plan.

Evaluation phase:

- The researchers evaluated postoperative outcomes across two groups at three intervals: the first follow-up immediately post-operation, the second follow-up before hospital discharge, and the third follow-up conducted via telephone after discharge, utilizing assessment tools (II), (III), and (IV).
- By comparing the postoperative outcomes scores between the two groups following the intervention, the effect of implementing an enhanced recovery after surgery pathway on these outcomes was ascertained.

Statistical analysis:

After being gathered, the data was input into the computer. Software called the Statistical Package for Social Sciences (SPSS/version 24) was used to do the statistical analysis. The following is the statistical test that was used: Arithmetic mean, standard deviation. For normally distributed data, the independent t-test was used to compare the two independent variables, and the Chi-square test was used for classified parameters. The significance threshold was set at 0.05

Results

Table (1) presents a comprehensive comparison of demographic characteristics between the study group and the control group. The analysis revealed that the two groups are

statistically comparable across all measured variables, with **no significant differences**. Regarding **age**, both groups exhibited similar distributions across the age categories, with mean ages of **44.7±8.11 years** (study group) and **47.1±7.88 years** (control group). **Occupation** status was predominantly housewife in both groups (85.0% in the study group and 78.3% in the control). According to **education levels,** 48.3 % & 41.7 % of the study and control groups, respectively, had secondary education. **Marital status** and **residence** also showed close alignment between groups, with 71.7% of the study group compared to 61.7% of the control group being married, and 80% & 66.7% of both groups, respectively, residing in rural areas. In terms of **monthly income**, 65.0% in the study and 81.7% in the control group reported their income as "not enough,". Finally, **BMI classifications,** 66.7% study vs. 73.3% control, fell into the overweight category. The BMI means (27.4 ± 5.3 kg/m² in the study group and 27.8 ± 4.4 kg/m² in the control group).

As shown in table (2), all reproductive variables—such as gravidity, parity, history of abortion, types of previous births, and associated complications—show no statistically significant differences between the study and control groups, with p-values consistently above 0.05.

Table (3) showed a significant improvement regarding postoperative pain intensity among the study and control groups. While both groups reported high levels of moderate to severe pain on the first postoperative day, the difference was not statistically significant (p = 0.092), though a trend toward lower severity was observed in the study group. By the second postoperative day, a statistically significant reduction in pain emerged (p = 0.001), with 15.0% of the study group reporting mild pain compared to none in the control group, and only 10.0% reporting severe pain versus 43.3% in the control group. This trend continued and became more pronounced on the third day, where 71.7% of the study group experienced mild pain and none reported severe pain, in contrast to 16.7% and 6.7%, respectively, in the control group (p = 0.001).

Table (4) demonstrated statistically significant improvements in postoperative functional recovery parameters among women in the two groups. Early postoperative mobilization was markedly better in the study group, with 83.3% able to sit within 3–4 hours after surgery compared to 23.3% of the control group, and 86.7% ambulating within 6 hours versus only 8.3% in the control group. So that, bladder catheter removal occurred earlier in the study group (mean = 3.01±1.25 hours) versus the control group (6.8±2.15 hours). Similarly, postoperative nutrition was resumed significantly earlier in the study group, with 95% of women in the study group initiated oral fluids within the first 3 hours after surgery, compared to 45% of them in the control group and 83.3% of woman started a regular diet within the first 12 hours after surgery, while 5% of them in the control group. Gastrointestinal recovery was also enhanced, as evidenced by earlier passage of flatus (mean = 1.72±0.88 hours) and stool (2.69±1.03 hours) compared to the control group (3.55±1.03 and 4.12±1.98 hours, respectively). Additionally, the incidence of postoperative complications was significantly lower in the study group (5.0%) compared to the control group (28.3%), and readmission rates were significantly lower. The data on hospital discharge time indicate a **statistically significant reduction** in the length of postoperative hospitalization for the study group compared to the control group (*p = 0.004*). Specifically, the **mean discharge time** for the study group was **3.4±1.15 days**, substantially shorter than the **4.0±1.12** reported for the control group.

Figure (1) displayed a **statistically significant difference** in women's satisfaction outcomes between the study and control groups following the applied intervention (*p = 0.001*). In the study group, a substantial **80.0% of participants were satisfied** compared to only **40.0%** in the control group. Furthermore, dissatisfaction was **markedly lower in the study group**, with only **3.3% not satisfied**, while the control group had a considerably higher proportion (**25.0%**) of dissatisfied participants.

Table (1): Distribution of the Studied and Control Groups Regarding Their Demographic Characteristics N=120

Demographic Characteristics	Study group "n=60"		Control group "n=60"		X^2 P value
	Freq.	%	Freq.	%	
Age					
<30	3	5	5	8.3	0.892
30-40	8	13.3	10	16.7	0.640
>40	49	81.7	45	75.0	
Range	25-48		26-49		0.62
Mean±SD	44.7±8.11		47.1±7.88		0.511@
Occupation					
Housewife	51	85.0	47	78.3	0.892
Worker	2	3.3	3	5.0	0.639
Employee	7	11.7	10	16.7	
Education level:					
Read or write	15	25.0	11	18.3	
Preparatory	12	20.0	18	30.0	2.511
Secondary education	29	48.3	25	41.7	0.473
University education	4	6.7	6	10.0	
Marital status:					
Married	43	71.7	37	61.7	1.894
Divorced	16	26.7	20	33.3	0.387
Widowed	1	1.7	3	5.0	
Residence					
Urban	12	20.0	20	33.3	2.72
Rural	48	80.0	40	66.7	0.098
Monthly income					
More than enough	0	0.0	0	0.0	4.261
Not enough	39	65.0	49	81.7	0.038
Barely enough	21	35.0	11	18.3	
BMI (kg/m2)					
Normal weight (18-24.9 kg/m2)	20	33.3	16	26.7	0.634
Overweight (25-29 kg/m2)	40	66.7	44	73.3	0.425
Range	20.8-32.1		21.3-32.9		0.421
Mean	27.4±5.3		27.8±4.4		0.63@
SD					

P was calculated by using the chi-square test for categorized data

@ p was calculated by using Student's t-test for numerical data. P was significant if ≤ 0.06

Table (2): Distribution of the Studied and Control Groups Regarding their Reproductive History N=120

Reproductive History	Study group "n=60"		Control group "n=60"		X^2 P value
	Freq.	%	Freq.	%	
Gravidity					
Once	7	11.7	5	8.3	0.932
Twice	19	31.7	16	26.7	0.627
Three times or more	34	56.7	39	65.0	
Parity					
Once	12	20.0	16	26.7	0.769
Twice	16	26.7	14	23.3	0.680
Three times or more	32	53.3	30	50.0	
***Previous pregnancy complications** No	37	61.7	41	68.3	
Vaginal Bleeding	2	3.3	1	1.7	
Hypertensive	4	6.7	3	5.0	2.070
Gestational diabetes	7	11.7	5	8.3	0.913
Preeclampsia	2	3.3	4	6.7	
Urinary tract infections	8	13.3	6	10.0	
Anemia	4	6.7	5	8.3	
Mode of previous deliveries:					
Normal vaginal delivery	26	43.3	20	33.3	3.459
Normal with episiotomy	12	20.0	16	26.7	0.326
Cesarean	20	33.3	18	30.0	
Vacuum-assisted	2	3.3	6	10.0	
Previous labor complications					
No	44	73.3	49	81.7	
Prolonged labor duration	4	6.7	3	5.0	0.780
Preterm birth	4	6.7	3	5.0	0.941
Bleeding during delivery	6	10.0	5	8.3	
Perineal tear	4	6.7	3	5.0	
***Previous postpartum complications**					
No	46	76.7	44	73.3	2.342
Postpartum bleeding	4	6.7	3	5.0	0.504
Puerperal fever	8	13.3	5	8.3	
Deep venous thrombosis	6	10.0	11	18.3	

*More than one answer

P was calculated by using the chi-square test for categorized data

P was significant if ≤ 0.06

Table (3): Distribution of the Studied and Control Groups Regarding their Post-Operative Pain intensity as measured by visual analogue scale (VAS) N=120

Post-operative pain	Study group "n=60"		Control group "n=60"		X^2 P value
	Freq.	%	Freq.	%	
1st postoperative day					
Moderate (4–6)	28	46.7	19	31.7	2.832
Severe (7–10)	32	53.3	41	68.3	0.092
2nd postoperative day					
Mild (1–3)	9	15.0	0	0.0	
Moderate (4–6)	45	75.0	34	56.7	23.03
Severe (7–10)	6	10.0	26	43.3	0.001*
3rd postoperative day					
Mild (1–3)	43	71.7	10	16.7	
Moderate (4–6)	17	28.3	46	76.7	35.69
Severe (7–10)	0	0.0	4	6.7	0.001*

P was calculated by using the chi-square test for categorized data

P was significant if ≤ 0.06

** significant at level 0.05*

Table (4): Distribution of the Studied and Control Groups Regarding Postoperative Functional Recovery. N=120

Postoperative functional recovery	Study group "n=60"		Control group "n=60"		X^2 P value
	Freq.	%	Freq.	%	
Postoperative mobilization					
Sitting in bed post-surgery (hours)					76.25 0.001*
< 3 h	10	16.7	0	0.0	
3–4 h	50	83.3	14	23.3	
> 4 h	0	0.0	46	76.7	
Ambulation beyond the bed post-surgery (hours)					74.02 0.001*
< 6 h	52	86.7	5	8.3	
6–12 h	8	13.3	52	86.7	
> 12 h	0	0.0	3	5.0	
Timing of bladder catheter removal (Hours)					4.18
Mean±S.D	3.01±1.25		6.8±2.15		0.005*@
Postoperative nutrition					
Initiation of oral fluids post-surgery (hours)					35.71 0.001*
< 3 h	57	95.0	27	45.0	
≥3 h	3	5.0	33	55.0	
Initiation of regular diet post-surgery					95.34 0.001*
< 12 h	50	83.3	3	5.0	
12–24 h	10	16.7	5	8.3	
>24 h	0	0.0	52	86.7	
Bowel motility (hours)					4.25 0.006*@
Mean±S.D	1.72±0.88		3.55±1.03		
First passage of flatus (hours)	2.69±1.03		4.12±1.98		2.68 0.036*@
first passage of stool (hours)					
Postoperative follow-up					
Postoperative Complications					
Yes	3	5.0	17	28.3	11.76 0.001*
No	57	95.0	43	71.7	
Readmission to hospital					8.086 0.004*
No	58	96.7	48	80.0	
Yes	2	3.3	12	20.0	
Time of hospital discharge (days)					1.98
Mean±S.D	3.4±1.15		4.0±1.12		0.004*@

P was calculated by using the chi-square test for categorized data
@ p was calculated by using Student's t-test for numerical data
P was significant if ≤ 0.06
** Significant at level 0.05*

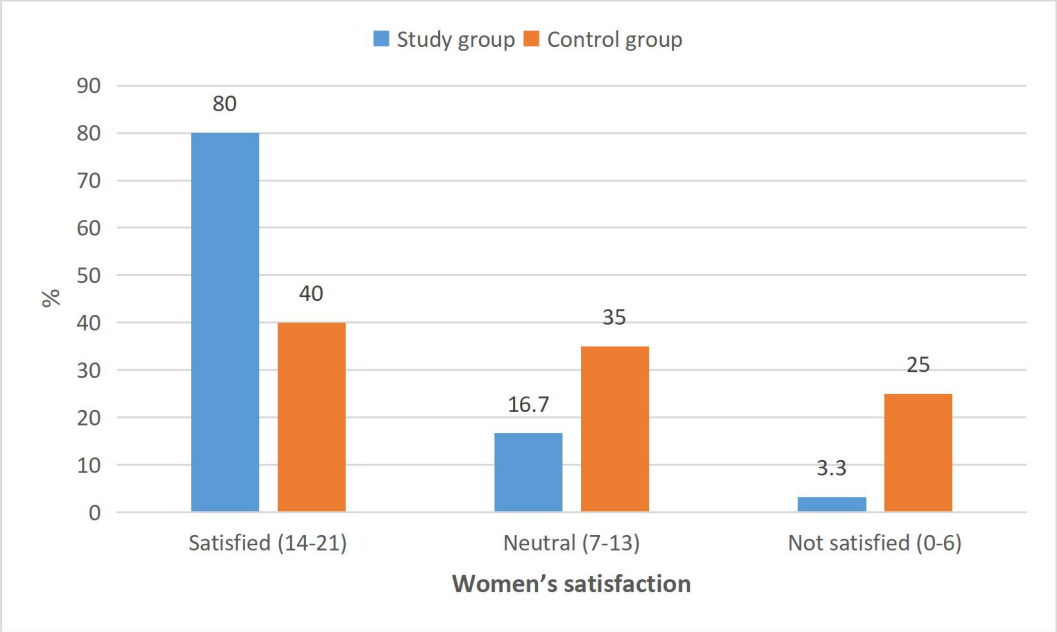

Fig (1): Distribution of Studied and Control Groups Regarding Patient Satisfaction. N=120 (X^2 =21.844, p = 0.001*)

Discussion

Enhanced Recovery After Surgery (ERAS) represents a holistic approach for perioperative management that aspires to alleviate stress, optimize recovery trajectories, and diminish complications subsequent to surgical interventions. Through the integration of evidence-based methodologies, including preoperative counseling, optimized anesthetic and analgesic protocols, early mobilization, and nutritional support, ERAS protocols have the potential to substantially enhance patient outcomes **(Malviya & Khanna, 2024).** So, the aim of this study was to examine the effect of implementing an enhanced recovery after surgery pathway on hysterectomy postoperative outcomes.

The study's principal findings confirmed the hypotheses: H_1: women undergoing hysterectomy who managed under an ERAS pathway will report lower postoperative pain levels than those under standard hospital care. H_2: Women undergoing hysterectomy who are managed under an ERAS pathway will report a lower mean duration of hospitalization than those under standard hospital care. H_3: Women undergoing hysterectomy who are managed under an ERAS pathway will report a higher level of satisfaction than those under standard hospital care.

Regarding age, both groups exhibited similar distributions across the age categories; most of both groups were aged more than 40 years old. this may be attributed to certain gynecological conditions (such as uterine fibroid, hormonal imbalance during perimenopause, endometrial Hyperplasia, pelvic organ prolapse, endometriosis, and ovarian or cervical cancer) becoming more common or severe in women more than 40 years old **(Office on Women's Health (OASH), 2022)**. This result is supported by the study of **Ibrahim et al. (2023)**, who showed that most of the study and control groups were aged 40 years or older. Another study by Ferghali et al. (2020) found that most of both groups were aged more than 40 years old.

In the current study, it was noted that no statistically significant differences existed across all demographic parameters. This observation may suggest that the study and control groups were demographically comparable at baseline, thereby augmenting the internal validity of the study and substantiating the attribution of any subsequent variations in outcomes to the intervention under scrutiny rather than to pre-existing disparities. This finding is similar to the

finding reported by **Shalaby et al. (2021),** who reported that there was no significant difference in patient demographics between the two groups.

According to pain intensity at the first postoperative day, the difference was not statistically significant (p = 0.092) between the study and control groups. By the second and third postoperative day, there was a statistically significant reduction in pain (p = 0.001). The findings of this analysis strongly indicate that the intervention administered to the study group, whether pharmacological or non-pharmacological, proved effective in managing and alleviating postoperative pain, particularly after the initial 24 hours, thereby offering a clinically meaningful strategy for enhancing post-surgical recovery **(American Association of Nurse Anesthesiology (AANA), 2022)**.

This finding matches the study done by **Ibrahim et al. (2023),** who found that pain intensity at the first postoperative day was similar with no statistically significant difference between the two groups, while at the postoperative second and third day, there was a highly statistically significant difference. Also, the results of this study are in line with the study conducted by **Heeba et al. (2019),** who observed that women in the study group experience a lower mean score of pain compared to those in the control group, thus they showed a lesser need for analgesia with a statistically significant difference. This may be because ERAS includes several evidence-based strategies that work together to control pain, reduce inflammation, and speed recovery **(American Association of Nurse Anesthesiology (AANA), 2022).**

In relation to postoperative mobilization, the results of the present study revealed that the majority of women in the study group were able to sit within 3–4 hours after surgery, compared to less than a quarter of the control group, and the majority of women in the study group ambulated within 6 hours, versus only less than one-tenth of the control group. The outcomes of the present study may be linked to the implementation of the ERAS pathway, which facilitates early mobilization that contributes to a reduction in postoperative complications and a decrease in hospital length of stay **(Kate, 2023).**

This finding is in accordance with studies of **Ibrahim et al. (2023),** who revealed that the mean time of sitting in bed and ambulation out of bed after surgery was less in the study group than the control group. Also, the study by **Abdelrazik and Sanad (2020)** concluded that the majority of women in the ERAS group ambulated within 6 hours the control group.

Moreover**,** it was revealed that bladder catheter removal occurred earlier in the study group versus the control group, with a significant difference (p = 0.005). This may be ascribed to the application of the ERAS pathway to the study group, which improves early mobilization, which contributes to facilitating the early removal of the bladder catheter **(Kate, 2023).** This finding conforms with the studies of **(Heeba et al., 2019; Shalaby et al., 2021),** who found that there were statistically significant differences between the two groups (p = 0.001) according to the time of removing the bladder catheter.

Concerning postoperative nutrition, it was noticed that the majority of women in the study group initiated oral fluids within the first 3 hours after surgery compared to less than half of them in the control group and also the majority of them started a regular diet within the first 12 hours after surgery, while only three women in the control group (p = 0.001 for both metrics). This may be attributed to ERAS promoting early reintroduction of oral nutrition following surgery, which promotes the prompt restoration of gastrointestinal functions **(Garg et al., 2021).**

This finding is consistent with **Ibrahim et al. (2023), who** found that the majority of women in the study group initiated oral fluid within the first 4 h after surgery, compared to less than half of the women in the control group. Meanwhile, the majority of those in the study group began a regular diet within the first 11 hours after surgery, compared to only three women in the control group. However, this finding is not similar to the study done by **Shalaby et al. (2021)**, who found that the majority of women in the study group initiated oral fluids within the first 10 hours and started a regular diet within the first 24 hours, while the control group showed delayed initiation times.

In addition to bowel motility, the current study showed that earlier passage of flatus and compared to the control group, with statistically significant differences (p = 0.006 and p = 0.036). This may be connected to the researcher's

avoidance of rectal enemas and mechanical bowel preparations for women before surgery, alongside the early initiation of oral fluids postoperatively, which aids in the resumption of defecation and bowel activity **(Enhanced Recovery Canada (ERC), 2021).** This finding matches the studies of **Heeba et al. (2019), Yilmaz et al. (2018)**, who found that women in the study group were more likely to have a shorter mean time of first passage of flatus and first defecation after operation than the control group.

Also, it was found that the incidence of postoperative complications was significantly lower in the study group compared to the control group ($p = 0.001$). This outcome may be a consequence of the application of the ERAS protocol to the study group, which resulted in a reduced hospital length of stay with earlier discharge that leading to a decreased incidence of postoperative complications **(American Association of Nurse Anesthesiology (AANA), 2022)**. This finding is in harmony with **Ibrahim et al. (2023)**, who reported that there was a statistically significant difference between the studied groups regarding postoperative complications. This finding is also consistent with the study done by **Liang et al. (2016)**, who found that the ERAS protocol group had a significantly lower rate of complications than the control group.

According to readmission to hospital, statistically significant differences were noticed in readmission rates, in which two patients in the study group and twelve patients in the control group required hospital readmission after discharge. This is attributable to the implementation of the ERAS protocol, which has been shown to mitigate postoperative complications and decrease rates of hospital readmission **(American Association of Nurse Anesthesiology (AANA), 2022).** This finding is supported by **Ibrahim et al. (2023)**, who noticed that there was a statistically significant difference between the studied groups, in which two women in the study group, compared to nine women in the control group, required hospital readmission after discharge.

Furthermore, the current study showed that the mean time of hospital discharge for the study group was shorter than the control group, with statistically significant differences between them ($p=0.004$). The nearly 9-hour variance observed suggests that the intervention applied to the study group promoted a more rapid recovery, facilitating earlier mobilization, restoration of physiological functions, and readiness for discharge. Clinically, this result indicates enhanced efficiency in postoperative management and potential reductions in healthcare expenditures and bed occupancy, rendering the intervention both medically advantageous and resource-efficient **(American Association of Nurse Anesthesiology (AANA), 2022).**

The results of the present investigation were corroborated by **Sarhan et al. (2021),** who demonstrated that the mean hospital discharge time for the study group was shorter than the control group with statistically significant ($p=0.001$). Furthermore, the research conducted by **Myriokefalitaki et al. (2016)** illustrated that the mean length of stay in hospital for patients adhering to the Enhanced Recovery After Surgery (ERAS) pathway was markedly lower than the control group, with statistically significant differences between them ($p = 0.001$). Conversely, this observation is not aligned with the findings of **Patel et al. (2018)**, who indicated that no statistically significant difference in length of hospital stay was evident in clinical outcomes between the study and control groups.

The present study also indicated a statistically significant difference in patient satisfaction outcomes post-intervention ($p = 0.001$) between the study and control groups, with a substantial proportion of women in the experimental group reporting elevated levels of satisfaction, in contrast to two-fifths of participants in the control group. This finding aligns with the research conducted by **(Heeba et al., 2019; Shalaby et al., 2021),** which revealed that over half of the women who underwent the ERAS protocol expressed satisfaction, whereas less than one-tenth reported dissatisfaction.

These findings imply that the intervention implemented in the study group, encompassing clinical, educational, supportive, or procedural elements, exerted a considerable positive effect on patients' overall experiences and satisfaction regarding their postoperative care. Patient satisfaction serves as a pivotal indicator of healthcare quality, significantly impacting not only psychological well-being but also adherence,

recovery, and the reputation of healthcare institutions. Consequently, the markedly higher satisfaction rates among the study group furnish compelling evidence for the efficacy and acceptability of the instituted intervention, underscoring its potential for wider clinical integration to enhance patient-centered care.

Conclusion

The results concluded that the implementation of the enhanced recovery after surgery pathway for women undergoing hysterectomy marked early ambulation, early removal of time of bladder catheter, early return of bowel motility, reduced postoperative pain, complications, and hospital duration, and increased women's satisfaction.

Recommendations

In light of the findings from the present study, the following recommendations are proposed:

- Apply the ERAS pathway as a standard practice for all women undergoing elective gynecologic surgeries to enhance postoperative outcomes, minimize complications, and promote rapid recovery.
- Raise awareness among healthcare providers regarding the advantages of the ERAS pathway in gynecologic surgeries to augment quality of life.
- Incorporate the enhanced recovery after surgery pathway approach into the policies of maternity healthcare facilities, thereby improving clinical care practices.
- Conduct educational sessions for the healthcare team concerning the execution of the ERAS pathway throughout the perioperative, intraoperative, and postoperative phases.
- Integrate the ERAS pathway into the obstetrics and gynecology curricula across diverse educational environments to enhance postoperative outcomes and improve women's satisfaction.

Further research:

- Assess the satisfaction levels of women undergoing hysterectomy regarding the enhanced recovery after surgery pathway.
- Assess nurses' knowledge and practice according to the enhanced recovery after surgery pathway.
- Conduct a replication of the current study within a multicenter framework, utilizing a larger sample size to facilitate the generalization of findings.

Acknowledgments:

We extend our gratitude to all individuals who contributed to this study.

References

Abdelrazik, A. N., & Sanad, A. S. (2020). Implementation of enhanced recovery after surgery in gynecological operations: a randomized controlled trial. *Ain-Shams Journal of Anesthesiology, 12*(1), 70. https://doi.org/10.1186/s42077-020-00116-4.

Alghadir, A. H., Anwer, S., Iqbal, A., & Iqbal, Z. A. (2018). Test-retest reliability, validity, and minimum detectable change of visual analog, numerical rating, and verbal rating scales for measurement of osteoarthritic knee pain. *Journal of Pain Research, 11*, 851-856. https://doi.org/10.2147/jpr.s158847.

Amarin, Z. O. (2022). *Hysterectomy: Past, present and future*. IntechOpen.

American Association of Nurse Anesthesiology (AANA). (2022). *Enhanced recovery after surgery*. AANA.

American Congress of Obstetricians and Gynecologists (ACOG). (2021). *Hysterectomy*. ACOG.

Carugno, J., & Fatehi, M. (2025). *Abdominal hysterectomy*. StatPearls Publishing.

Centers for Disease Control and Prevention (CDC). (2022). *Women's reproductive health*. CDC.

Delgado, D. A., Lambert, B. S., Boutris, N., McCulloch, P. C., Robbins, A. B., Moreno, M. R., & Harris, J. D. (2018). Validation of digital visual analog scale pain scoring with a traditional paper-based visual analog scale in adults. *Journal of the American Academy of Orthopaedic Surgeons Global research & reviews, 2*(3), e088. https://doi. org/ 10. 5435/ JAAOSGlobal- D-17-00088.

Emile Gohar, I., Saied Ibrahim Ali, H., & Saad Mahmoud Shoukhba, N. (2023). Effect of implementing enhanced recovery after surgery pathway for women undergoing cesarean section on maternal outcomes and satisfaction. *Egyptian Journal of Health Care, 14*(4), 1561-1580. https://doi. org/ 10. 21608/ ejhc. 2023. 374873.

Enhanced Recovery Canada (ERC). (2021). *Clinical pathway for gynecologic surgery*. ERC.

Ferghali, A. M., Zarh, Z. E. L. A., Youness, E. M., Al-Sayed, H. A., & Ahmed, A. A. E. A. (2020). Implementation of enhanced recovery after surgery as a protocol versus routine care on women undergoing hysterectomy. *Assiut Scientific Nursing Journal, 8*(20.00), 103-115. https://doi.org/10.21608/asnj.2020.90526.

Garg, B., Mehta, N., Bansal, T., Shekhar, S., Khanna, P., & Baidya, D. K. (2021). Design and implementation of an enhanced recovery after surgery protocol in elective lumbar spine fusion by posterior approach: A retrospective, comparative study. *Spine (Phila Pa 1976), 46*(12), E679-e687. https://doi. org/ 10. 1097/ brs. 0000000000003869.

Hayes, M. (1921). Experimental development of the graphic rating method. *Psychological Bulletin, 18*, 98-99.

Heeba, M. F., Nasr, E. H., & Ali Abou Elsadat, H. m. (2019). Clinical pathways of postoperative nursing care for women undergoing gynecological operations at port said hospitals. *Port Said Scientific Journal of Nursing, 6*(3), 221-248. https:// doi. org/ 10. 21608/ pssjn. 2019.68002.

Hill, C. (2021). *Pain after hysterectomy*. Pelvic Rehabilitation Medicine.

Huque, S., Roberts, I., Fawole, B., Chaudhri, R., Arulkumaran, S., & Shakur-Still, H. (2018). Risk factors for peripartum hysterectomy among women with postpartum haemorrhage: Analysis of data from the woman trial. *BMC Pregnancy and Childbirth, 18*(1), 186. https:// doi. org/10.1186/s12884-018-1829-7.

Ibrahim, S. M. M., El-Sheikh, M. A. M., & Abdelfattah, A. M. S. (2023). Effect of enhanced recovery after surgery protocol on postoperative outcomes of women undergoing abdominal hysterectomy. *SAGE Open Nursing, 9*, 23779608231165948. https://doi. org/ 10. 1177/23779608231165948.

Karcioglu, O., Topacoglu, H., Dikme, O., & Dikme, O. (2018). A systematic review of the pain scales in adults: Which to use? *The American Journal of Emergency Medicine, 36*(4), 707-714. https:// doi. org/ 10. 1016/ j. ajem. 2018. 01.008.

Karki, D., & Saha, R. (2021). Assessment of patient satisfaction after implementing an enhanced recovery after surgery (eras) protocol for elective caesarean sections. *Journal of Kathmandu Medical College, 10*(4), 188-193.

Kate, V. (2023). *Enhanced recovery after surgery (eras) in emergency abdominal surgery*. Medscape.

Liang, X., Ying, H., Wang, H., Xu, H., Yu, H., Cai, L., Wang, Y., Tong, Y., Ji, L., Luo, R., & Cai, X. J. (2016). Enhanced recovery program versus traditional care in laparoscopic hepatectomy. *Medicine (Baltimore), 95*(8), e2835. https:// doi. org/ 10. 1097/ md. 0 0 0 0 0 00000002835.

Malviya, A. K., & Khanna, P. (2024). Enhanced recovery after surgery (eras) protocols: Advancements and implementation challenges. *National Board of Examinations Journal of Medical Sciences, 2*, S6-12.

Myriokefalitaki, E., Smith, M., & Ahmed, A. S. (2016). Implementation of enhanced recovery after surgery (eras) in gynaecological oncology. *Archives of Gynecology and Obstetrics, 294*(1), 137-143. https:// doi. org/ 10. 1007/ s00404- 015-3934-4.

Noh, J. J., Kim, M.-S., & Lee, Y.-Y. (2020). The implementation of enhanced recovery after surgery protocols in ovarian malignancy surgery. *Gland Surgery, 10*(3), 1182-1194.

Nwadike, V. R., & Eske, J. (2020). *What to know about a hysterectomy*. from https://www.medicalnewstoday.com/articles/hysterectomy. [Accessed in Feb, 2025]

Office on Women's Health (OASH). (2022). *Hysterectomy*. OASH.

Patel, S. Y., Garcia Getting, R. E., Alford, B., Hussein, K., Schaible, B. J., Boulware, D., Lee, J. K., Gilbert, S. M., Powsang, J. M., Sexton, W. J., Spiess, P. E., & Poch, M. A. (2018). Improved outcomes of enhanced recovery after surgery (eras) protocol for radical cystectomy with addition of a multidisciplinary care process in a us comprehensive cancer care center. *World Journal of Surgery, 42*(9), 2701-2707. https://doi.org/10.1007/s00268-018-4665-z.

Rania, E., Reda, M. N. A., & Helalia Shalabi, M. (2018). Effect of an educational supportive program on self-esteem and marital relation among women undergoing hysterectomy. *The Malaysian Journal of Nursing (MJN), 10*(2), 11-23. https://doi. org/ 10. 31674/ mjn. 2018. v10i02. 002.

Sarhan, A. M. M., Dayem, H. M. A., Abdelrahman, H. M. F., & Elnaem, R. A. A. (2021). Improvement of outcome by implementation of enhanced recovery pathway in gynecologic/ oncology surgery. *The Egyptian Journal of Hospital Medicine, 83*(1), 856-861. https:// doi. org/ 10. 21608/ ejhm. 2021. 156458.

Schneider, S., Armbrust, R., Spies, C., du Bois, A., & Sehouli, J. (2020). Prehabilitation programs and eras protocols in gynecological oncology: A comprehensive review. *Archives of Gynecology and Obstetrics, 301*(2), 315-326. https:// doi. org/ 10. 1007/ s00404-019-05321-7.

Shalaby, N. S., Elsayed Shahin, H., & Khalifa Khalil, A. (2021). Effect of clinical pathway of postoperative nursing careon improving postoperative outcomes for women undergoing hysterectomy. *Port Said Scientific Journal of Nursing, 8*(1), 184-205. https:// doi. org/ 10. 21608/pssjn.2021.64269.1086.

Sharma, P., & Gupta, S. (2020). Histopathological analysis of cervical and uterine pathologies in hysterectomy specimens in tertiary care centre. *Journal of Medical Science and Clinical Research, 8*(2), 761-765. https:// doi. org/ https:// doi. org/ https:// dx. https:// doi. org/ 10. 18535/ jmscr/ v8i2. 131.

Siedhoff, M., Samimi, P., & Marfori, C. (2020). Hysterectomy for the transgender man. In C. A. Ferrando (Ed.), *Comprehensive care of the transgender patient* (p.p. 152-156). Elsevier.

Statistisches Bundesamt (Destatis): Fallpauschalenbezogene Krankenhausstatistik (DRG-Statistik). (2020). *Operationen und Prozeduren der vollstationären Patientinnen In.*

Stovall, T. (2022). *Abdominal hysterectomy*. from https:// www.uptodate.com/contents/search. [Accessed in Feb, 2025]

Wall, A. S. (2020). *Post-operative nursing education of enhanced recovery after surgery recommendations for patients undergoing total joint arthroplasty* [Doctorate Thesis]. The University of Tulsa, Tulsa, Oklahoma.

Yilmaz, G., Akça, A., & Aydin, N. (2018). Enhanced recovery after surgery (ERAS) versus conventional postoperative care in patients undergoing abdominal hysterectomies. *Ginekologia Polska, 89*(7), 351-356. https:// doi. org/ 10. 5603/ GP. a2018.0060.