

## Enhanced Recovery Pathway Application for Perioperative Outcomes among Women Undergoing Gynecological Oncology Operations

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### Abstract

**Background:** perioperative morbidity and mortality are significant public health concerns due to their influence on patients' short- and long-term survival as well as the use of healthcare resources. **The aim of this study research** was to evaluate the effect of Enhanced Recovery Pathway application on perioperative outcomes among women undergoing gynecological oncology operations. **Methods:** A comparative quasi-experimental research design was used on a convenient sample of 112 women diagnosed with gynecological malignancy. The study group (56) got perioperative routine hospital care along with the implementation of an enhanced recovery pathway, and the control group (56) received perioperative routine hospital care only at the gynecology/ obstetrics and operating room of gynecological departments in Suez Canal University and Oncology Institute hospitals in Ismailia city. **Tools:** (T1) a structured interview questionnaire, (T2) assessment record for women undergoing gynecological oncology operations, (T3) Visual Analogue Scale. **Results:** There was a statistically significant difference between the studied groups; women who underwent gynecological oncology operation in the study group were significantly likely to experience less pain score, decrease in length of hospital stay, early postoperative bowel mobility with p-value (0.001,0.004,0.010 respectively) and decrease incidence of postoperative complications. **Conclusion:** As a result of the study's findings, women undergoing gynecological oncology surgery experienced fewer postoperative complications and better postoperative outcomes. **Recommendation:** Apply enhanced recovery pathway applications, which were successful for women following gynecological oncology surgery, to speed up recovery at the study sites and other healthcare facilities.

**Keywords:** *Enhanced recovery pathway, Gynecological oncology operations, Outcomes & Perioperative, Women.*

### Introduction

Surgery is typically used to treat gynecologic malignancies in women diagnosed with them. Because it affects patients' short- and long-term survival and the use of healthcare resources, perioperative morbidity and mortality are serious public health issues (Altman et al., 2019). In Egypt, 3.7-24% of women experience post-major gynecologic surgery perioperative problems (Abdelrazik et al., 2020). An Enhanced Recovery Pathway (ERP) is a planned perioperative healthcare program that uses evidence-based interventions, such as procedures and recommendations, to provide standard care (Street et al., 2020).

Gynecologic oncology perioperative practice involves preoperative, intraoperative, and postoperative strategies, including; preadmission counseling, avoidance of preoperative bowel preparation, use of opioid-sparing multimodal perioperative analgesia (including loco-regional analgesia), intraoperative

goal-directed fluid therapy (GDT), and use of minimally invasive surgical techniques with avoidance of routine use of the nasogastric tube, drains and/or catheters (Silva et al., 2018).

Postoperatively, it is essential to encourage early feeding, early movement, removal of tubes or drains, and multi-modal analgesia regimens that are function-focused. A multidisciplinary team effort is required to implement an ERP program successfully, and patients must actively participate in a functional, goal-oriented recovery program (Smith et al., 2020).

Implementing an ERP makes the entire management process more predictable, enhancing nursing care. Additionally, it decreases the excessive use of hospital resources (Renaud et al., 2019). All advanced gynecologic cancers that are initially being treated to cure them ought to be sent to palliative care right away in order to manage their symptoms. The nursing staff plays a crucial role as coordinators in enhancing hospital resource efficiency. Maternity

nurses can be an essential part of the process of developing and implementing ERP (Bajwah et al., 2020).

### Significant of the study:

Gynecological cancer is the second leading cause of death among women worldwide and in the Americas, Europe, and Western Pacific regions. It is the third leading cause of death in the Eastern Mediterranean, fourth in South-East Asia, and sixth in Africa. There were an estimated 6.7 million new cancer cases and 3.5 million deaths among women worldwide in 2012. Of these, 56% of cases and 64% of deaths were in less developed countries. Worldwide numbers are expected to increase to 9.9 million cases and 5.5 million deaths annually by 2030 as a result of the growth and aging of the population alone (Seweryn et al., 2022).

In Egypt, 3.7-24% of women experience post-major gynecologic surgery perioperative problems (Abdelrazik et al., 2020). Since radical surgery is still the mainstay of treatment for gynecologic oncology, accepting and implementing an ERP for postoperative care can significantly improve patient recovery and have an impact on patient care and patient safety, which in turn leads to clinical advancements and financial savings for the healthcare (Bisch et al., 2022). Maternity nurses can be an essential part of developing and implementing ERP (Bajwah et al., 2020). So, this study was conducted to evaluate the effect of enhanced recovery pathway application on perioperative outcomes among women undergoing Gynecological Oncology operations.

### Aim of the Study

**The current study aimed to:** The study aimed to evaluate the effect of enhanced recovery pathway application on perioperative outcomes among women undergoing Gynecological oncology operations.

**Research hypothesis:** Applying a perioperative enhanced recovery pathway will positively affect women undergoing gynecological oncology operations and reduce complications following surgery.

### Subjects and Methods

#### Study design:

The current study used a comparative quasi-experimental research design.

#### Setting:

The study was conducted in the gynecology/obstetrics and operating room of gynecological departments at Suez Canal University and Oncology Institute hospitals in Ismailia. The location of this study was chosen due to the significant frequency of gynecological oncology women who originate from several nearby cities and villages.

### Study Sample:

#### Target population:

The women diagnosed with gynecological cancer come to the setting for gynecological oncology operations.

#### Sampling technique:

A convenient sample of women was used in this study according to eligibility criteria. The study sample was divided into two groups: one study group (Interventional group) and a control group that received usual care in hospitals.

#### Inclusion criteria

The target population consisted of women aged 20-55 diagnosed with gynecological cancer such as ovary, uterine, cervix, and breast and undergoing gynecological oncology operations such as oophorectomy, hysterectomy, cervicotomy, and mastectomy. Women who agreed to participate in the research can read, write and have access to the Whats App application.

#### Exclusion criteria:

The researchers excluded women diagnosed with chronic diseases such as diabetes mellitus and hypertension and women undergoing planned minimally invasive surgery (laparoscopy to laparotomy).

#### The sample was divided into two groups:

The sample was divided into two groups (control and study). Choosing the women as control and study women have done randomly, every first woman was study group, and the last woman was control group, then written name of women, type of group, and phone number on the sheet.

**Control group:** Included 56 women who received routine perioperative (pre, intra, and postoperative) care at the hospital. Routine preoperative care includes antibiotics and crystalloid fluids, monitoring vital signs, and night starvation. Intra-operative care includes monitoring vital signs continuously, observing blood oxygenation levels, fluid therapy, and medication administration. Postoperative care includes monitoring vital signs every hour for the first six hours, monitoring urine output, taking a blood sample for complete blood count after six hours from the operation, and auscultating bowel sound postoperative.

**Study group:** Included 56 who received enhanced recovery pathway application and routine perioperative care at the hospital.

#### Sample size:

#### Sample size estimation:

The minimal sample size is determined using data from a prior study that examined the impact of clinical postoperative nursing care pathways for patients having gynecologic surgeries on postoperative outcomes. (Heeba et al., 2019a)

Concluded that the clinical pathway effectively improved postoperative outcomes related to early ambulation, early oral intake, bowel mobility, hours to remove catheters and drains, a short length of stay, and patient satisfaction. Based on (Heeba et al., 2019a) results, adopting a power of 80% ( $c_2=0.20$ ) to detect a standardized difference in improvement in postoperative outcome (primary outcome) of 25% and level of significance 5% ( $\alpha$  error accepted =0.05), the minimum required sample size was found to 49 women per group (number of groups=2) (Total sample size=98 women) (Charan & Biswas, 2013).

#### **Tools of data collection:**

#### **Three tools were used in this study for data collection:**

A structured interviewing schedule was designed, tested for validity and reliability, and utilized by researchers to collect necessary data; it included three parts:

#### **Tool (1): A structured interviewing questionnaire:**

This tool is used to get data from the women about (socio-demographic data, menstrual obstetrical and gynecological history. It includes four parts:

**Part I** included personal and socio-demographic data such as age, education level, occupation, and job status.

**Part II** included data related to menstrual history as the age of menarche, regularity, cycle length, amount of flow, associated symptoms, and inter-menstrual pain.

**Part III** included gynecological history as the chief complaint and gynecological medical diagnosis.

**Part IV** included data about obstetrical history as the number of pregnancies, delivery, and abortion.

#### **Tool (2): Assessment sheet**

This tool is used to assess the application of perioperative pathway, postoperative outcomes, and complications for women undergoing gynecological oncology operations, including three parts:

**Part (1):** perioperative components include (Preoperative, Intraoperative, and postoperative pathway application sheets).

**Part (2):** Postoperative outcomes assessment record include length of stay, hours of defecation, and pain score on the day of discharge.

**Part (3):** Post-discharge record complications include postoperative hypotension, ureteral injury, wound infection, vaginal bleeding, thrombosis, urinary incontinence, and vaginal prolapse. The physician reported complications based on women's complaints within one week after discharge through their visit to the gynecological outpatient department of Suez Canal University and oncology Institute hospitals in Ismailia city for the studied groups.

#### **Tool (3): visual Analogue Scale (RAS):**

The rating analogue scale (RAS) was developed by rheumatologists in France. A straight forward

assessment technique includes a category scale with none, mild, moderate, and severe pain on one end of a 10 cm line with 0 on the other end, denoting no pain (Abo-Bakr et al, 2020).

#### **Methods of data collection**

##### **Preparatory phase:**

The researchers read articles on the research subject's different aspects from national (Heeba 2019) and international sources. This enables the researcher to understand the scope and depth of the issues and directs them in preparing the necessary data-gathering methods. The study tools were created, and their validity was evaluated.

##### **Ethical consideration:**

This study was approved by the research ethics committee approved by the faculty of nursing at Suez Canal University on date 29/3/2021, code 71/12(2019). Then, before the conduction of the study, official letters were obtained from the dean of the faculty of nursing and directed to the directors of Suez Canal University and oncology institute hospitals in Ismailia city to carry out the study. Written consent was obtained from the women after a brief explanation of the study, and women were reassured that the information obtained was confidential and used only for the study, with her right to withdraw at any time.

##### **Tool validity:**

A tool was examined for validity by a jury of six subject-matter specialists of each specialty, four specialists from obstetrics and gynecological nursing and two specialists from medicine.

##### **Pilot study:**

To assess the tool's applicability and validity, 12 women (10%) of the research sample were used in a pilot study. The tool was then modified based on the study's findings. Those women were excluded from the study sample.

##### **Field of work:**

Data was collected over a period of nine months, from the first of December 2021 to the end of August 2022. Data was collected four days/a week. A total of 112 women were selected from the study setting. Data was obtained with complete privacy using the pre-built tools after receiving written consent. In the selected settings of the study, the researchers introduced them-self and assessed socio-demographic characteristics and menstrual, gynecological, and obstetrical history. The researchers provided general information about gynecological oncology operations ERP.

Following baseline measurements, choosing the women as control and study women have done randomly, every first woman was study group, and the last woman was in the control group. The researcher performed ERP for the study group. Then,

the researcher assessed women's postoperative outcomes as hours of defecating within 4-48 hours after surgery, length of stay, and pain score on the day of discharge for the studied groups. Then, the researcher assessed postoperative complications, which included hypotension, ureteral injury, wound infection, vaginal bleeding, thrombosis, urinary incontinence, and vaginal prolapse within one week after discharge. The researchers followed up with the women through Whats App and phone. The researcher started to collect data through three phases: 1) interviewing phase, 2) assessment, 3) planning, 4) interventional, and 5) evaluation and follow-up phases.

**Interviewing phase:**

The researcher recruited the selected women to assess socio-demographic, menstrual, gynecological, and obstetrical history by interview at the gynecology/obstetrics inpatient department at Suez Canal University and Oncology Institute hospitals in Ismailia city. Personal data assessment was done for both studied groups. It takes 12 minutes for each woman; it was done before surgery one day.

**Assessment phase:**

The researcher recruited the selected women to assess postoperative outcomes within the day of discharge at the gynecology/obstetrics inpatient department at Suez Canal University and Oncology Institute hospitals in Ismailia. The researcher met the same women after one week to assess complications at the gynecological clinic of Suez Canal University and oncology Institute hospitals in Ismailia for the studied groups.

**Planning phase:**

Enhanced Recovery pathway activities were performed by the researchers immediately within four hours of admission, preoperative care within four hours, intraoperative care during surgery in operation, and postoperative care in the recovery room on the day of surgery

**Interventional phase:**

The researcher worked with the gynecological surgeon, nurse, and anesthesiologist regarding anticipated expectations of the woman. Concerning the control group, the role of the researcher was to observe and record the usual perioperative care of women by nurses. However, for the study group, the researcher implemented all the ERP components during hospitalization until discharge. An informational brochure was provided to the study group through education regarding discharge guidelines, including the definition, importance, and technique of kegel, abdominal and breathing exercises which should be provided to each woman on the day of discharge.

**Preoperative components:**

Preoperative ERP included pre-admission information education and counseling, included anesthetic procedures, and provided information regarding a nursing care plan and rehabilitation which included physical and psychological assessments and identified impairments. Preoperative bowel preparation allowed women a regular, so instruct women to maintain an unrestricted diet the day before surgery and take a clear-fluid diet the night before surgery. Preoperative fasting and carbohydrate treatment were managed through encouraged eating a light meal up until 6 hours, drinking carbohydrates before surgery, and NPO for 6 hrs before surgery. Venous thromboembolism prophylaxis was managed by performing leg compression and administering heparin or unfractionated heparin. Surgical site infection reduction bundles were maintained by administering prophylactic antimicrobials. Nutrition management is managed by treating anemia before surgery. Fluid management included the administration of prescribed IV solutions.

Hyperglycemia was controlled by blood glucose maintained at <200 mg/dL. The researchers instructed the woman about skin preparation by the woman taking a shower before surgery with a chlorhexidine-based antimicrobial soap and undergoing a chlorhexidine-alcohol in the operating room before surgery.

**Intra-operative components:**

Intra-operative ERP included venous thromboembolism prophylaxis through performed leg compression and taking heparin or unfractionated heparin medication. Surgical site infection reduction bundles through administered prophylactic antimicrobial. The researcher minimized the use of surgical drains. Hypothermia was avoided by using forced air blanket devices, underbody warming mattresses which researchers bought because it was not available in hospitals, and warmed intravenous fluid administration. Fluid management is managed by administering prescribed IV solutions that maintain tissue perfusion. Opioid-sparing multimodal post-operative analgesia was used, but the researcher avoided using opioids and NSAID after consulting the gynecological surgeon and anesthesiologist.

**Post-operative components:**

Post-operative ERP included venous thromboembolism prophylaxis and early detection of thrombosis by early ambulation; perform leg compression and administration of heparin or unfractionated heparin medication. Surgical site infection reduction bundles were managed by administering antimicrobial and surgical drains, and surgical wound care was minimized. Hypothermia is avoided by using forced air blanket devices,



underbody warming mattresses, and warmed intravenous fluid administration. Average blood glucose was maintained at <200 mg/dL. Fluid management was maintained by administering prescribed IV solutions that maintain tissue perfusion. Opioid-sparing multimodal post-operative analgesia was used, but the researcher avoided opioid and NSAID use. Nutrition management is managed through early feeding, slow reintroduction of oral diet, and coffee consumption. Post-operative ileus complications were prevented through early feeding and fluid balance.

#### Evaluation and follow up phase:

The researcher assessed postoperative outcomes on the day of discharge and complications within one week after discharge for two studied groups. Following discharge, the researchers contacted the women via phone and WhatsApp to remind them to perform kegel exercises, practice abdominal and breathing exercises, and take their prescribed medications.

#### Results:

**Table (1): The studied groups' distribution regarding their socio-demographic characteristics**

Socio-demographic characteristics.	Groups				Test of significance (X <sup>2</sup> )	p value
	Control (n=56)		Study (n=56)			
	No.	%	%	No.		
<b>Age (years)</b>						
- Min-Max	25.00-55.00		24.00-54.00		1.595*	0.11 NS
- Mean ± Std. Deviation	38.82±11.73		35.32±11.49			
- 95% CI for mean	38.68-51.96		38.24-55.40			
- SEM	1.57		1.54			
<b>Educational Level</b>					1.986	0.73 NS
- Illiterate	10	17.86	15	26.79		
- Read and write	8	14.29	5	8.93		
- Primary	10	17.86	8	14.29		
- Secondary	14	25.00	13	23.21		
- University	14	25.00	15	26.79		
<b>Marital status</b>					2.410	0.514 NS
- Not married	6	10.71	12	21.43		
- Married	38	67.86	34	60.71		
- Widow	7	12.50	6	10.71		
- Divorce	5	8.93	4	7.14		
<b>Job status</b>					0.349	0.55 NS
- House wife	34	60.71	37	66.07		
- Employed	22	39.29	19	33.93		

**n:** Number of patients

**CI:** Confidence interval

**MC:** Monte Carlo test

**SD:** Standard deviation

**t:** Independent Samples t test

**Min-Max:** Minimum – Maximum

**SEM:** Standard error of the mean

**NS:** Statistically not significant ( $p \geq 0.05$ )

**x<sup>2</sup>:** Pearson's chi-squared test

**df:** Degree of freedom\*

Table (2): The studied groups' distribution according to menstrual, Gynecological, and obstetrical history

Menstrual, gynecological and obstetrical history.	Groups				Test of significance ( $\chi^2$ )	p value		
	Control (n=56)		Study (n=56)					
	No.	%	No.	%				
<b>Menstrual history</b>								
<b>Age of menarche (years)</b>	11.00-16.00		11.00-15.00		0.07*	0.942 NS		
- Min-Max	13.16±1.25		13.18±1.32					
- Mean ± Std. Deviation	12.83-13.49		12.82-13.53					
- 95% CI for mean	0.17		0.18					
<b>Regularity</b>	30		33		0.327	0.568 NS		
- Regular (n=62) (55.86%)	53.57		58.93					
- Irregular (n=49) (44.14%)	26		23		41.07			
<b>length of cycle (days)</b>	15.00-90.00		20.00-35.00		1.20*	0.232 NS		
- Min-Max	27.16±13.61		24.88±4.18					
- Mean ± Std. Deviation	23.51-30.81		23.76-25.99					
- 95% CI for mean	1.82		0.56					
<b>Amount of Flow</b>	17		27		3.951	0.136 NS		
- Mild (n=44) (39.29%)	30.36		48.21					
- Moderate (n=57) (50.89%)	32		25				44.64	
- Severe (n=11) (9.82%)	7		4				7.14	
<b>Associated symptoms</b>	25		35		3.590	0.058 NS		
- No (n=60) (54.10%)	44.64		62.50					
- Yes (n=51) (45.95%)	31		21		37.50			
<b>Inter menstrual pain</b>	29		30		0.036	0.850 NS		
- No (n=59) (52.68%)	50.79		53.57					
- Yes (n=53) (47.32%)	27		26		46.43			
<b>Gynecological history</b>								
<b>Previous Gynecological surgery</b>	50		49		0.087	0.768 NS		
- None (n=99) (88.39%)	89.29		87.50					
- IUD (n=13) (11.61%)	6		7		12.50			
<b>Chief Complain</b>	25		16		7.742	0.159 NS		
- Bleeding (n=41) (36.61%)	45.64		28.57					
- Pain (n=40) (35.71%)	16		24				42.86	
- Breast discharge (n=8) (7.14%)	5		3				5.36	
- Heaviness (n=2) (1.79%)	2		0				0.00	
- Urinary incontinence (n=15) (13.39%)	5		10				17.86	
- Abdominal tenderness (n=6) (5.36)	3		3		5.36			
<b>Medical Diagnosis</b>	27		30		11.120	0.24 NS		
- Uterine cancer (n=20) (17.86%)	48.21		53.57					
- An ovarian tumor (n=41) (36.61%)	22		19				33.93	
- Breast cancer (n=2) (1.79%)	2		0				0.00	
- Cervical cancer (n=12) (10.71)	5		7		12.50			
<b>Obstetrical history</b>								
<b>Parity</b>	6		7		8.085	0.55 NS		
- Nullipara	10.71		12.5					
- 1 to 3	23		25				44.64	
- 4 or more	27		24		42.86			
<b>Gravidity</b>	6		7		2.667	0.055 NS		
- Nulligravida	10.71		12.5					
- 1 to 3	20		20				35.71	
- 4 or more	30		29		51.78			
<b>Abortion</b>	41		36		1.039	0.308 NS		
- No	73.21		64.29					
- Yes	15		20		35.71			

n: Number of patients

CI: Confidence interval

MC: Monte Carlo test

SD: Standard deviation

\*t: Independent Samples t test

Min-Max: Minimum – Maximum

SEM: standard error of the mean

NS: Statistically not significant ( $p \geq 0.05$ ) $\chi^2$ : Pearson's chi-squared test

df: Degree of freedom

**Table (3): The studied groups' distribution regarding post-operative complications**

Postoperative complications	Groups				Test of significance $\chi^2$	p value
	Control (n=56)		Study (n=56)			
	N	(%)	N	(%)		
<b>Postoperative complications</b>						
<b>Postoperative Hypotension</b>						
- No (n=96) (85.71%)	43	76.79	53	94.64	7.292	0.007*
- Yes (n=16) (14.29%)	13	23.21	3	5.36		
<b>Ureteral Injury</b>						
- No (n=70) (62.50%)	27	48.21	43	76.79	9.752	0.002*
- Yes (n=42) (37.50%)	29	51.79	13	23.21		
<b>Wound Infection</b>						
- No (n=102) (91.07%)	48	85.71	54	96.43	3.953	0.047*
- Yes (n=10) (8.93%)	8	14.29	2	3.57		
<b>Vaginal Bleeding</b>						
- No (n=64) (57.14%)	27	48.21	37	66.07	3.646	0.056 NS
- Yes (n=48) (42.86%)	29	51.79	19	33.93		
<b>Thrombosis</b>						
- No (n=101) (90.18%)	48	(85.71%)	53	94.64	2.520	0.112 NS
- Yes (n=11) (9.82%)	8	(14.29%)	3	5.36		
<b>Urinary Incontinence</b>						
- No (n=69) (61.61%)	27	48.21	42	75.00	8.493	0.004*
- Yes (n=43) (38.39%)	29	51.79	14	25.00		
<b>Vaginal prolapse</b>						
- No (n=95) (84.82%)	43	76.79	52	92.86	5.617	0.018*
- Yes (n=17) (15.18%)	13	23.21	4	7.14		

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$\chi^2$ : Pearson's chi-squared test

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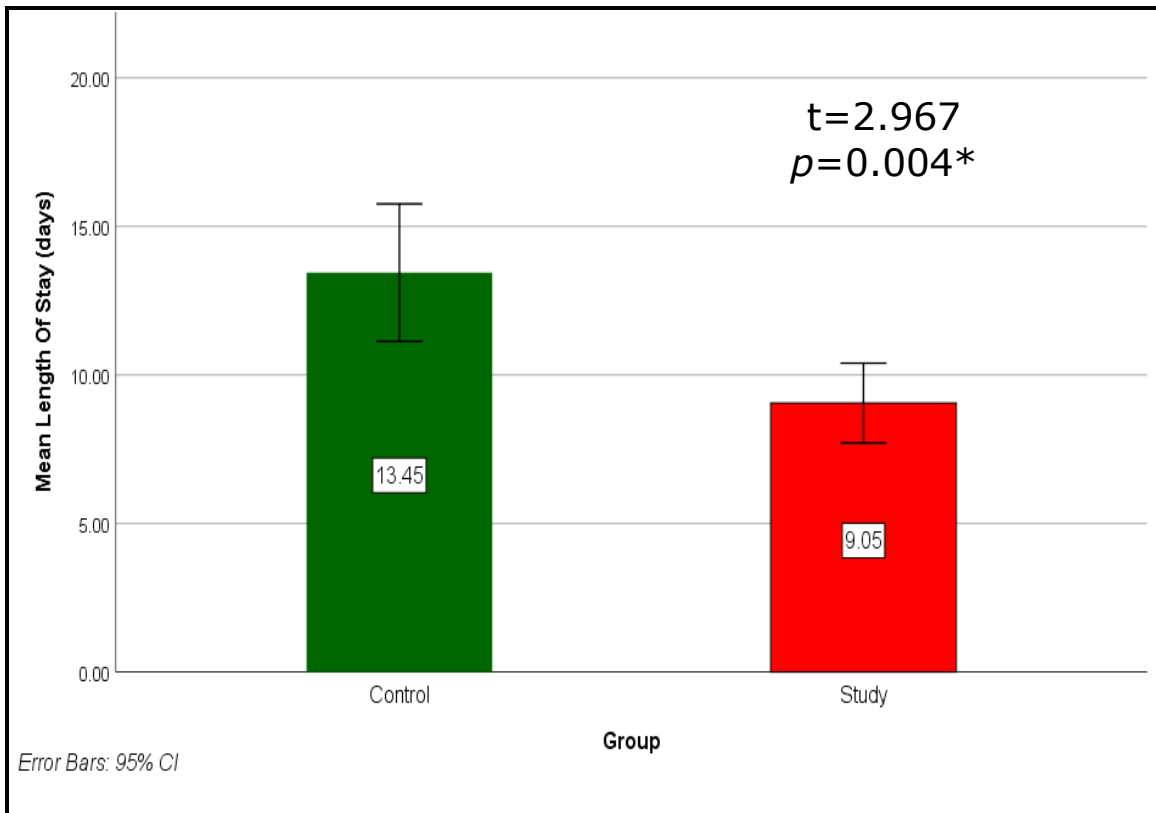
**Table (4): Postoperative complications in relation to the type of cancer in the studied groups**

Type of cancer and postoperative complications	Control (n=56)		Study (n=56)		Test of significance (Z)	P value
	N	(%)	N	(%)		
<b>Ovarian cancer (n=41)</b>						
n	22		19			
Postoperative hypotension-	6	27.27	1	5.26	1.8677	0.041*
Ureteral Injury-	11	50.00	5	26.32	1.550	0.042*
-Wound Infection	2	9.09	1	5.26	0.4693	0.043*
Vaginal Bleeding-	11	50.00	6	31.58	1.1939	0.043*
-leg thrombosis	2	9.09	2	10.53	0.1545	0.88 NS
-Urinary incontinence	11	50.00	5	26.32	1.5503	0.04*
-Vaginal prolapse	6	27.27	1	5.26	1.8677	0.041*
<b>Cervical cancer (n=12)</b>						
n	5		7			
Postoperative hypotension-	2	40.00	1	14.29	1.0142	0.31 NS
Ureteral Injury-	3	60.00	1	14.29	1.6562	0.09NS
-Wound Infection	1	20.00	0	0.00	1.2358	0.21 NS
Vaginal Bleeding-	3	60.00	2	28.57	1.0887	0.27NS
-Leg thrombosis	1	20.00	0	0.00	1.2358	0.214NS
-Urinary incontinence	3	60.00	1	14.29	1.6562	0.09NS
-Vaginal prolapse	2	40.00	1	14.29	1.0142	0.31NS

Type of cancer and postoperative complications	Control (n=56)		Study (n=56)		Test of significance (Z)	P value
	N	(%)	N	(%)		
<b>Uterine cancer (n=57)</b>						
n	27		30			
Postoperative hypotension-	4	14.81	1	3.33	1.53	0.12 NS
Ureteral Injury-	13	48.15	7	23.33	1.96	0.040*
-Wound Infection	5	18.52	1	3.33	1.86	0.040*
Vaginal Bleeding-	13	48.15	13	48.15	0.87	0.37 NS
-Leg thrombosis	5	18.52	3	10	1.86	0.061 NS
-Urinary incontinence	13	48.15	6	20.67	1.67	0.04*
-Vaginal prolapse	4	14.81	0	0	1.00	0.04*

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**MC:** Monte Carlo test  
**NS:** Statistically not significant ( $p \geq 0.05$ )  
**t:** Independent Samples t test  
**x<sup>2</sup>:** Pearson's chi-squared test  
**Z:** Z test for two proportions comparison

**Min-Max:** Minimum – Maximum  
**SEM:** standard error of the mean  
**\***: Statistically significant ( $p < 0.05$ )  
**SD:** Standard deviation  
**df:** Degree of freedom  
**NA:** not applicable



**Figure (1):** The studied groups' distribution regarding the mean length of stay (days) on the day of discharge.



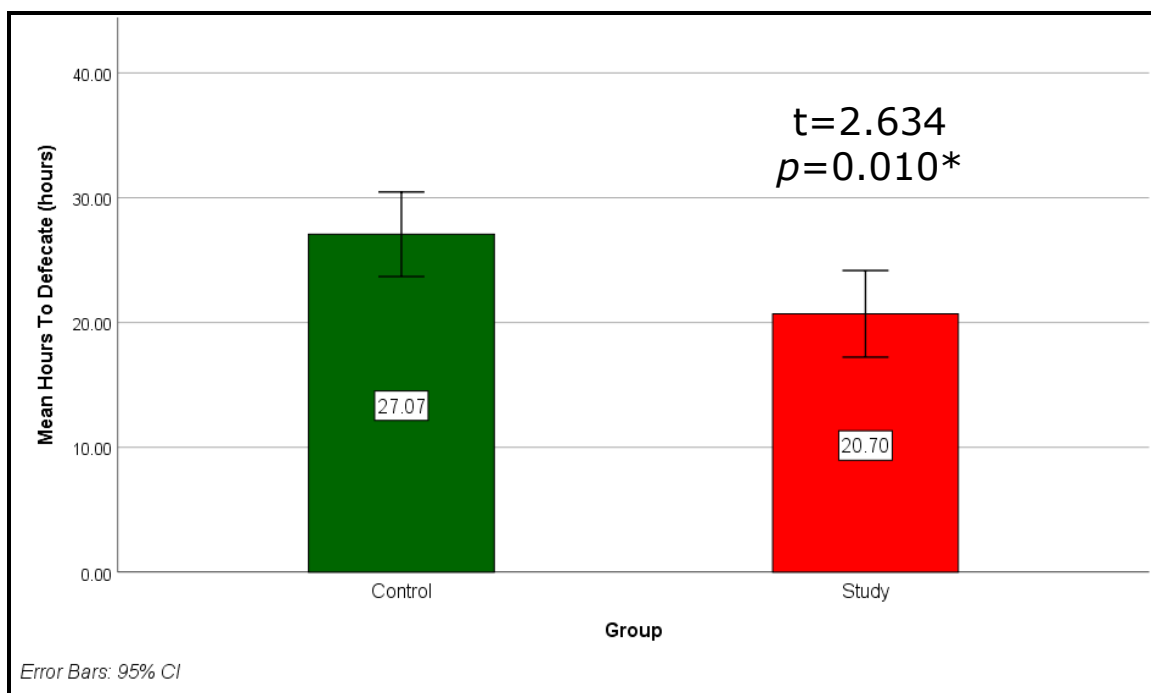


Figure (2): The studied groups' distribution regarding the mean hours of defecating (hours) within 4-48 hours postoperative.

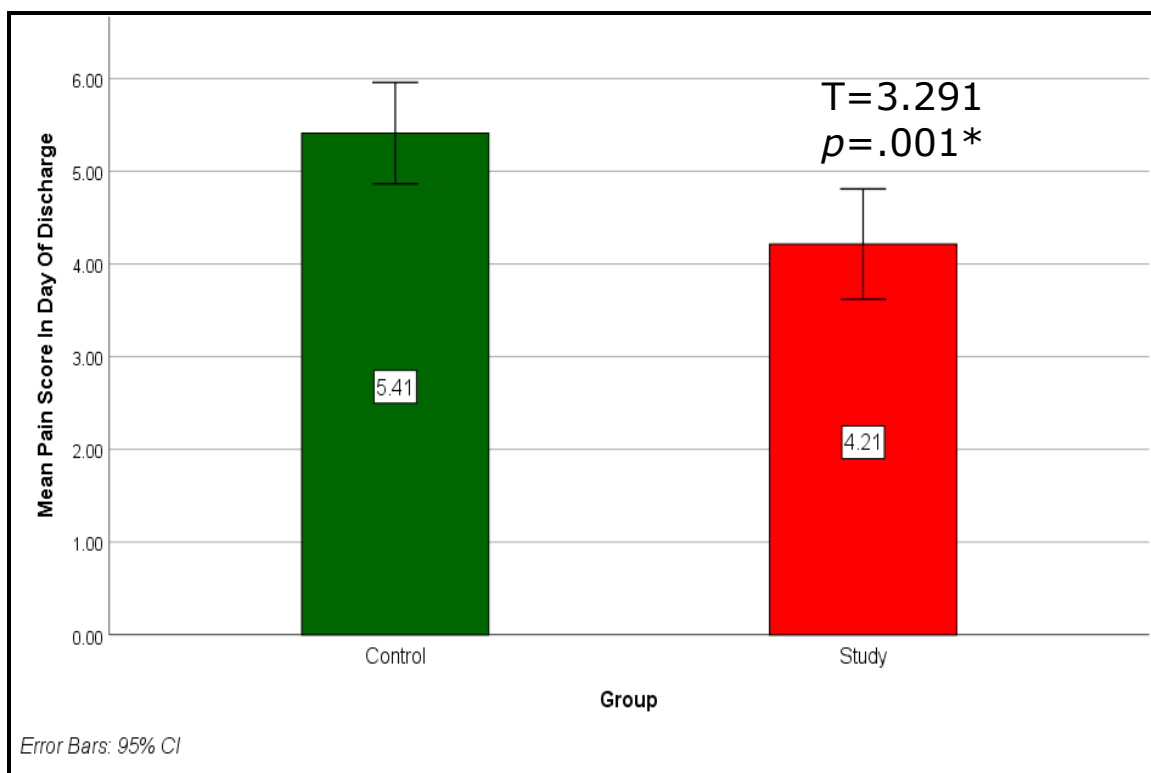


Figure (3): The studied groups' distribution regarding the mean pain score on the day of discharge.

**Table (1):** Shows the studied women's distribution regarding their characteristics of socio-demographics. According to age, the age varied from 25-55 years in the control group, while it ranged from 24-54 years in the study group. There was no statistically significant difference in age between the two studied groups ( $p=0.113$ ). Regarding educational level, marital status, and job status, there was no statistically significant difference between the two studied groups ( $p=0.738$  in education level and  $p=0.55$  in marital status and job status).

**Table (2):** Shows the studied women's distribution regarding their menstrual, gynecological, and obstetrical history; there was no statistically significant difference between the two groups.

**Table (3):** Shows the studied women's distribution according to postoperative complications, the postoperative hypotension was represented in 13/56 (23.21%) in the control group and 3/56 (5.36%) in the study group. The postoperative hypotension was statistically significantly higher in the control group compared to the study group ( $p=0.007$ ). Ureteral injury was represented in 29/56 (51.79%) in the control group and 13/56 (23.21%) in the study group. The ureteral injury was statistically significantly higher in the control group compared to the study group ( $p=0.002$ ). Wound infection was represented in 8/56 (14.29%) in the control group and 2/56 (3.57%) in the study group. The wound infection was statistically significantly higher in the control group compared to the study group ( $p=0.047$ ). Urinary incontinence was represented in 29/56 (51.79%) in the control group and 14/56 (25.00%) in the study group. Urinary incontinence was statistically significantly higher in the control group compared to the study group ( $p=0.004$ ) (Table). Vaginal prolapse was represented in 13/56 (23.21%) in the control group and 4/56 (7.14%) in the study group. The vaginal prolapse was statistically significantly higher in the control group compared to the study group ( $p=0.018$ ).

**Table (4):** Shows postoperative complications in relation to the type of cancer in the studied groups. Regarding ovarian cancer, there was a statistically significant in postoperative complications except for leg thrombosis ( $p=0.04^*$ ). Concerning uterine cancer, there were statistically significant in postoperative complications except vaginal bleeding and leg thrombosis ( $p=0.04^*$ ). There was no statistically significant in postoperative complications in relation to cervical and breast cancer.

**Figure (1):** Shows that the mean length of hospital stay (days) was shorter in the study group than those in the control group (9.05 and 13.45, respectively) with statistically significantly ( $p=0.001^*$ )

**Figure (2):** Shows that the hour's defecation means decreased in the study group than those in the control group (20.70 and 27.07 respectively) with statistically significant ( $p=0.010^*$ ).

**Figure (3):** Shows that the studied groups distribution according to their mean score of pain on the day of discharge, the mean score of pain in the study group was less than the control group (4.21 and 5.41 respectively) with statistically significant ( $p=0.004^*$ ).

### Discussion:

A paradigm change is taking place in the perioperative management of surgical patients. ERP programs are becoming the standard of care and best practice in many surgical specialties worldwide. ERP is a multimodal, multidisciplinary, and evidence-based approach to the care of the surgical patient that aims to optimize perioperative management and outcomes (Bernard et al., 2021).

The main aspects of the ERP protocol include preoperative education, perioperative nutrition, restriction of fasting, and avoiding of carbohydrate loading up to two hours prior to surgery and standing anesthesia protocol (Matlok et al., 2015).

Studies have shown a link between using ERP and beneficial outcomes, such as the provision of cost-effective care, high quality, the satisfaction of staff, and improved women (Marchand 2021). In order to find out how closely the national hospital complies with regulatory standards. The current study was started to evaluate the effect of ERP application on perioperative outcomes among women undergoing gynecology oncology operations at Suez Canal University and the oncology Institute hospitals in Ismailia city.

In the current study, women in the study group were more likely to have a shorter average length of stay than the control group. These results were supported by (Nelson et al., 2019), who studied perioperative care [guidelines for gynecologic/oncology](#) operations in Canada and found that the ERP decreased hospital costs and duration of stay and has become standard procedure at an increasing number of institutions. This result was reinforced by (Bernard et al., 2021), who studied ERP on gynecologic oncology surgery outcomes after three days of surgery in Virginia to find out improving the care of surgical women using ERP and noticed that the ERP also shortened hospital stays. In a similar direction, (Halawa et al., 2018) studied the implementation of an enhanced recovery program after renal transplant surgery in the United Kingdom and reported similar findings, highlighting that ERP may shorten primary and overall hospital stays compared to usual care. From the researcher's point of view, this could be associated with the

correct application for ERP and the teamwork collaboration of researchers, physicians, and nurses.

Women in the study group were more likely to have a shorter mean time for their first bowel movement following surgery than those in the control group. These results are supported by (Heeba et al., 2019), who studied the postoperative nursing care clinical pathway for women undergoing gynecological operations in Egypt and reported that the clinical pathway was effective in improving postoperative outcomes related to early bowel mobility. Also, this result was reinforced by (Atia et al., 2020), who studied the effect of an ERP nursing program on the recovery process of women after a hysterectomy operation in Egypt and determined that the improved recovery after surgery correlated to shorter defecation durations. From the researcher's point of view, this could be when an enema was avoided, the patients rapidly returned to defecate and have an early bowel movement.

The results also showed that the mean pain score in the women in the study group decreased compared to those in the control group. This finding was agreed with (Atia et al., 2020), who studied the effect of an enhanced recovery nursing program on women's recovery process after a hysterectomy operation in Egypt and found that the ERP application led to a decreased level of pain in the postoperative period. In addition, (Prabhakaran et al., 2020) studied the outcomes of enhanced recovery after surgery compared with standard recovery pathways in laparoscopic sleeve gastrectomy in India and found that women in the study group experienced less pain following surgery than women in the control group. From the researcher's point of view, this could be associated with reducing stress and clarifying common false ideas about gynecological oncology operations during preoperative counseling.

According to study findings, most of the study group's women were less likely to experience postoperative complications such as postoperative hypotension, ureteral injury, wound infection, urinary incontinence, and vaginal prolapse compared to those in the control group. This is supported by, (Wijk et al., 2019), who studied the association between compliance with ERP after surgery gynecologic/oncology guideline elements and postoperative outcomes in an international cohort and showed that fewer complications arise from (ERP) programs than from regular care.

This finding was in line with (Elsarrag et al., 2019a), who studied enhanced recovery after spine surgery in Virginia and found that it allowed patients to resume their normal lives without increasing complications. In similar side, the study of enhanced recovery after surgery in gastrointestinal surgery done

by (Gao et al., 2019) study in china to evaluate the effectiveness of ERP protocols in optimizing inpatient care and decreasing discomfort and reported that the ERP protocols were more likely to cause minor postoperative complications in the study group than in the control group.

From the researcher's perspective, applying the Enhanced Recovery Pathway reduced postoperative complications due to early mobilization, diet, and performing exercises such as ankle, breathing, and coughing exercises, which may lead to a decreased length of stay. Most of the research was conducted to study the effect of enhanced recovery pathway on women undergoing gynecological oncology operations, and most agree with our results. Many researchers in this discussion studied the implementation of ERP in gynecological oncology operations, and nearly all of them agree with our results. Finally, the results of this study showed that implementing ERP improves the recovery process and decreases the incidence of complications that may occur postoperatively. All results significantly differed when compared with traditional care.

### Conclusion:

Gynecological oncology surgeries that followed the Enhanced Recovery Pathway regimen had a higher likelihood of recovering quickly, with earlier bowel movements, less pain, shorter hospital stays, and fewer postoperative complications than women who did not.

### Recommendation:

The successful use of the Enhanced Recovery Pathway application for gynecological oncology surgery patients should be incorporated into the postoperative care at the study sites and in other healthcare facilities.

Maternity nurses should participate in ongoing in-service training programs to expand their knowledge and skills in the Enhanced Recovery Pathway.

It is advised that more studies employ diverse evidence-based strategies for gynecological oncology care with high sample sizes and in varied settings.

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