

# Effect of Enhanced Recovery After Surgery Protocol on Postoperative Outcomes of Women Undergoing Abdominal Hysterectomy

SAGE Open Nursing  
Volume 9: 1–11  
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DOI: 10.1177/23779608231165948  
journals.sagepub.com/home/son



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## Abstract

**Background:** Enhanced recovery after surgery protocol is a standardized, multidisciplinary approach for shorter hospital stay without negatively affecting patient outcomes. The aim of this research was to evaluate the effect of enhanced recovery after surgery protocol on postoperative outcomes of women undergoing abdominal hysterectomy.

**Design:** A quasi-experimental design was adopted to fulfil the aim of this research.

**Setting:** The research was conducted at Obstetric and Gynecological Department in Benha University Hospital.

**Sample:** A purposive sample of 148 women undergoing abdominal hysterectomy divided into two groups.

**Data collection:** Three tools were used: Tool (I) structured questionnaire sheet. Tool (II) post-operative pain assessment scale (numerical rating scale). Tool (III) post-operative outcomes assessment sheet.

**Results:** There was a highly statistically significant difference between the studied groups regarding all postoperative outcomes ( $p = .000$ ). The women in the study group experienced less mean score of pain compared to those in control group on both 2nd and 3rd day after surgery. Also, there was a statistically significant difference between the studied groups regarding postoperative complication and readmission ( $p = .000$ ).

**Conclusion:** Women undergoing abdominal hysterectomy who received enhanced recovery after surgery protocol had better postoperative outcomes than women who received routine perioperative care.

## Keywords

abdominal hysterectomy, enhanced recovery after surgery protocol, postoperative outcomes

Received 1 July 2022; revised 17 February 2023; accepted 7 March 2023

## Introduction

Hysterectomy is one of the most common major gynecological surgeries. It is considered the second most common operative procedure performed worldwide following cesarean section (Schneider et al., 2020). It has a broad spectrum of indications ranging from malignant gynecological diseases to obstetrical indications. Even though, less invasive approaches such as laparoscopic or vaginal procedures are suggested primarily, the standard procedure for most cases is abdominal hysterectomy (Sharma & Gupta, 2020).

Enhanced recovery after surgery (ERAS) care is an evidence-based multidisciplinary and collaborative protocol to perioperative care based on scientific principles designed

to achieve early recovery after surgical procedures by maintaining preoperative organ function and reducing the profound stress response following surgery (Noh et al., 2021). The main objectives of ERAS protocol are to accelerate functional recovery, improve postoperative outcomes including

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postoperative pain, more rapid return of bowel function, early discharge from the hospital, and, reduction in overall health care costs without increasing complications and/or hospital readmission rates (Garg et al., 2021).

ERAS protocol is designed to adjust psychological and physiological responses to major operations and has shown that complications and length of hospital stays are reduced, cardiopulmonary function improved, bowel functions returned early, and normal activities resumed earlier (Abdel-Aleem & El-Nemer, 2019). One of the most frequent problems and significant complaints experienced by women undergoing hysterectomy is pain in the postoperative period. Pain is a complex multifaceted phenomena, it is a subjective unique experience with sensory, affective, and evaluative qualities that may be difficult to describe or explain and often difficult for others to recognize, understand, and assess (Magon et al., 2017).

The implementation of the ERAS protocol requires collaboration from all members of the surgical team consisting of surgeons, anesthesiologists, nutritionists, nurses, and other staff from services who are involved in patient care (Nelson et al., 2019). The nurse's role within the ERAS protocol is clearly vital as part of the multidisciplinary team, as the individual responsible for inter-professional communication, individualized education, and self-care techniques training to empower the client, clarify doubts, and avoid inaccurate beliefs (Ardò et al., 2018).

Numerous studies illustrate that nurses attain an important role in better development and implementation of the ERAS protocol in everyday clinical practice. Also, they can help ensure compliance with ERAS protocol pathway, participate in patient-centered care, and help coordinate care among the different members of the team (Boshier et al., 2020). The nurse role extended to preparing the patient for discharge is an on-going process that takes place throughout the hospitalization. Prior to discharge, verbal and written instructions are provided to the patient and family, including when to call the surgeon, activity restrictions, guidelines for medication administration, signs and symptoms of infection to report, and follow-up appointments (Wall, 2020).

### *Operational Definitions:*

**ERAS:** It refers to an interdisciplinary evidence-based strategy of perioperative care (pre-operative, intra-operative, and post-operative care) to help patients recover faster (Caughey et al., 2018).

**The postoperative outcomes:** In the current study, postoperative outcomes refer to reduction in postoperative pain, return to normal defecation, tolerance of food and drink without nausea, faster mobilization, rapid hospital discharge, and reduction in postoperative complication, and re-admission among women who underwent abdominal hysterectomy.

### *Significance of the Study*

Hysterectomy is one of the most common gynecological procedures performed all over the world, the incidence rate of hysterectomy varies significantly across the globe, more than 600,000 hysterectomies in the United States and around 140,000 in Germany are performed each year (Ala-Nissilä et al., 2017). The National Center for Health Statistics reports that the annual incidence rate for hysterectomies in Egypt was 165 per 100,000 (EidFarrag et al., 2018). The incidence of hysterectomy increased among gynecological operations to reach 240 cases, according to the annual statistics of Benha University hospital. There was no previous study conducted on the ERAS protocol for abdominal hysterectomy in Benha.

ERAS protocol is an interdisciplinary, evidence-based strategy to enhance clinical services throughout the perioperative. The goal of using this protocol is to reduce the physiologic response throughout the operation to improve patient outcomes while decreasing postoperative problems (Caughey et al., 2018). A well-planned perioperative care regimen by using ERAS protocol strategies leads to a reduction in morbidity, earlier hospital discharge, and better postoperative outcomes (Noh et al., 2021).

### *Aim of the Research*

This research aimed to assess the effect of the ERAS protocol on postoperative outcomes of women undergoing abdominal hysterectomy. This aim was achieved through:

1. Assessing the women undergoing abdominal hysterectomy to collect the data and ensure that women fulfill the inclusion and exclusion criteria.
2. Applying the protocol before, during, and after the operation.
3. Evaluating the effect of the protocol on postoperative outcomes including (postoperative pain, return defecation, tolerance of food and drink, mobilization, hospital discharge, complication, and readmission) of women undergoing abdominal hysterectomy.

### *Research Hypothesis*

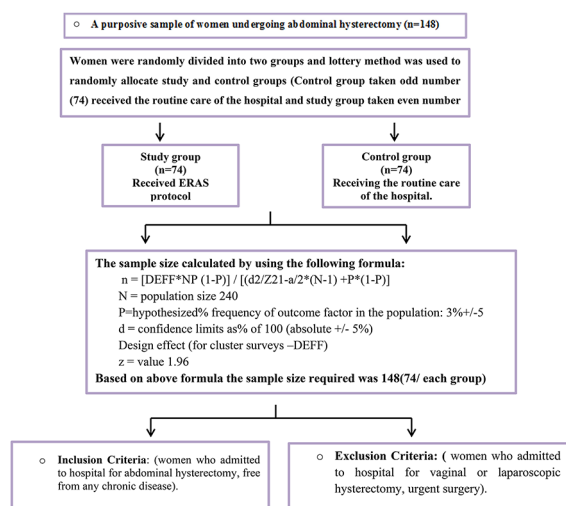
Women undergoing abdominal hysterectomy who receive ERAS protocol show better postoperative outcomes than women who received routine perioperative care.

### **Methods**

**Research design:** A quasi-experimental study design (two groups) was adopted for this research. This study was conducted from April 2020 to the end of April 2021.

**Setting:** This research was conducted at Obstetrics and Gynecological Department of Benha University Hospital.

### Sample:



### Data collection tools:

Three tools were used for data collection:

**Tool (I): A structured interviewing questionnaire:** It encompassed personal characteristics of woman (age, educational level, residence, occupation).

**Tool (II): Post-operative pain assessment scale (numerical rating scale):**

This tool was adopted from Jensen et al. (1986). This scale was used to measure pain intensity after surgery on 1st, 2nd, and 3rd day by instructing the woman to choose a single number from the straight line ranging from 0 to 10 that best indicates the level of pain.

**Scoring system:** 0 (no pain), 1–3 (mild level of pain), 4–6 (moderate level of pain), and 7–10 (sever level of pain)

### Tool (III): Postoperative Outcomes Assessment Sheet

This tool was adapted from Heeba et al. (2019) and modified by the researchers. It included postoperative mobilization (sitting in bed after surgery, ambulation out of bed after surgery), postoperative nutrition (initiation of oral fluids after surgery, initiation of regular diet after surgery), bowel motility (first passage of flatus, first passage of stool), postoperative follow-up (postoperative complications and readmission to hospital) and time of hospital discharge.

**Validity.** The data collection tools were submitted to a board of three obstetrics and gynecology professional nurses to test the content validity. According to the board's comments on sentence clarity and the content's appropriateness, modifications were carried out.

**Reliability.** The internal consistency of the tools was tested for their reliability by using Cronbach Alpha coefficient test by a statistician.

Tool	Cronbach's alpha value
Post-operative pain assessment scale (numerical rating scale)	91.8%
Post-operative outcomes criteria assessment tool (Tool II, part one)	93.3%

### Ethical Considerations

Ethical approval was obtained from the Research Ethics Committee at the Faculty of Nursing, Benha University. An official approval for conducting the study was obtained from the directors of Benha University Hospital and Head of Obstetrics and Gynecological Department. Informed written consent was obtained from all women before enrollment in the study. The women were assured that confidentiality of the collected data would be maintained and the results would be used for research purposes as well as for future publication and education only. Women were assured that they would have the right to withdraw from the study at any time. The study didn't have any physical, social, or psychological risks on the women.

### Pilot Study

The pilot study was performed on 10% of the total sample (15 women). It was aimed at determining the tools' usability and clarity. It also helped to predict the time required for the forms to be filled in. No modified changes occurred for the tool.

### Field Work

The following phases were adopted to fulfil this research aim: the assessment phase, planning phase, implementation, and evaluation phase. These phases were carried out from first of April 2020 to the end of April 2021, covering 1 year. On Sunday, Tuesday, Thursday (3 days a week), from 9.00 am to 2.00 pm, the researchers visited the previously mentioned setting.

The researchers attended the study setting 3 days every week from 9 am to 3 pm, until the predetermine size of sample was completed. Data collection was implemented for 1 year, from first of April 2020 to the end of April 2021. Data collection related to the control group were first obtained, and then followed by collecting data of the study group. The study was conducted through the following phases.

### Assessment Phase

- During this phase, the researchers attended to the previously mentioned setting after obtaining permission. Then all participating women in both studied groups were interviewed to exclude the women who did not fulfill the inclusion criteria.

- The researchers interviewed all women in both groups at the admitted ward before surgery to collect data regarding personal characteristics. This sheet filled through an interview which ranged from 10 to 20 min.

### *Implementation Phase*

*For Control Group (Receiving Routine Hospital Care).* Concerning the control group, the role of the researchers was just observing and recording the tasks performed concerning perioperative care of patients.

### *Routine Hospital Care Includes the Following*

**Preoperative:** Night fasting (12 am) from food and drink, routine mechanical bowel preparation such as enema and laxative medication and wearing well-fitting compression stockings before admission to the operating room.

**Intraoperative:** All women in the control group received general anesthesia, where induction of anesthesia was performed using 2–3 mcg/kg of IV fentanyl, 1.5–2.0 mg/kg of propofol, and 0.5 mg/kg of atracurium and intravenous antibiotics were given during surgery as prescribed by surgeon.

**Postoperative:** Fluids were continued until the intestinal motility was regained, single type of NSAIDs analgesics were given as prescribed by the physician, and removal of abdominal drain with the presence of bowel motility. Oral or enteral nutrition was given once women passing flatus (presents of bowel motility).

*For Study Group (Applying Enhanced Recovery After Surgery Protocol).* Applying ERAS protocol required a multidisciplinary team. This team consisted of a gynecologist, anesthetist, nurse specialist, and ward nurse managers. The researchers explained the component of ERAS protocol to all members of the team including preoperative, intraoperative, and postoperative preparation before applying care to study groups. Also, the researchers were present with all team members and followed the application of the protocol preoperatively, intraoperatively, and postoperatively.

### **Preoperative Preparation**

#### *Women Counseling and Education*

Researchers provided women with information about ERAS protocol using pictures illustrated in the booklet, what to expect during the hospital stay and instruction about early discharge planning.

#### *Perioperative Diet*

All women were admitted on the day before the operation. The researchers advised women to eat normally until midnight (fasting of no more than 6 h preoperatively) for solid

foods, and they were allowed to drink clear fluids until 2 h before surgery. They received 400 mL of a clear carbohydrate drink containing 200 kcal, carbohydrate fluid intake such as (orange juice, lemonade, and apple juice) to minimize effect of fasting.

### *Mechanical Bowel Preparation*

Rectal enemas and mechanical bowel preparations were avoided for women in ERAS protocol group.

### *Prophylaxis Against Thromboembolism*

Women wore well-fitting compression stockings before admission to the operating room.

### **Intraoperative Preparation**

- Regional anesthesia.
- Warm intravenous fluids prescribed by a physician were given to maintain a normal body temperature.
- Intravenous prophylaxis antibiotics were given 30–60 min before initiating surgery, as prescribed by surgeon.
- Prophylaxis for nausea and vomiting by giving dexamethasone 8 mg IV intraoperative.
- Urinary catheter insertion.
- Avoidance of abdominal drain as possible.

### **Postoperative Preparation**

#### *Postoperative Fluid Management*

- As for postoperative fluid management crystalloids fluid 500 mL was administered during the first 24 h, and then stop.

#### *Postoperative Nutrition*

- Laxatives were used to promote early restart of the intestinal function.  
- Early oral gradual nutrition were started by hot drinks and then semisolid diet such as yogurt, overcooked carrots, and broccoli then solid foods.

#### *Pain Control*

- Women in study group were given multimodal analgesics approach such as oral paracetamol 500 mg and diclofenac 50 mg three times daily as prescribed by physician, to effectively control postoperative pain and allow attainment of other ERAS protocol targets such as early mobilization and return to oral diet.

## Drains and Tubes

- The study group was encouraged for early removal of all tubes, drains, and catheters when the women were able to go to bath room (within 24 h after surgery).

## Postoperative Mobilization

- The researchers encouraged women for early progressive ambulation throughout 2 h in the bed postoperatively on the first day of surgery (passive leg exercise, change in position, and then sitting in bed, sitting in wheelchair, followed by walking with assistance and finally walking without assistance 4–6 time per day).

## Hospital Discharge Criteria

The ERAS protocol group was discharged when the researchers insured that the strict criteria before hospital discharge were achieved. This included:

- Adequate oral feeding
- Recovery of bowel function
- Pain and discomfort controlled by oral analgesia
- Adequately mobilizing without assistance
- No clinical or laboratory signal of postoperative complication
- Having adequate home supervision after discharge.

## Evaluation Phase

✓ This phase started immediately after completion of the operation where the researchers evaluated the effect of the ERAS protocol on the study group and effect of routine perioperative care on control group regarding postoperative outcomes (postoperative pain, return defecation, tolerance of food and drink, mobilization, hospital discharge, complication, and readmission) of women who underwent abdominal hysterectomy (**Tool II, Tool III**).

✓ Before the women were discharged from the hospital in the study group, the researchers gave oral instruction about home care after discharge and distributed the booklet provided with illustrated pictures to suit all levels of education to help them to know about the important aspects of discharge education after surgery.

✓ After hospital discharge, the researchers telephoned women for follow-up to assess postoperative outcomes and recorded all occurrences of long-term postoperative complications, readmissions to hospitals, and/or need to reoperation.

## Statistical Analysis

Data analysis was performed using IBM SPSS statistical software version 22. The data were explored. Descriptive

statistics with mean and standard deviation (SD) for continuous variables and frequency for categorical variables were analyzed. Qualitative variables were compared using chi-square test ( $X^2$ ) as the test of significance, independent ( $t$ ) test was used to compare mean score between two groups.

## Results

Table 1 shows that, there was no statistically significant difference among the study and control groups regarding personal characteristics.

Table 2 reveals that, there was no statistically significant difference between the study and control groups concerning the level of pain in the first day while the women in the study group experienced less mean score of pain compared to those in control group on both 2nd and 3rd day after surgery with highly statistically significant difference ( $p \leq .001$ ).

Table 3 shows that, there was highly statistically significant difference between the studied groups regarding all postoperative outcomes and the mean time of sitting in bed and ambulation out of bed after surgery was less in the study group than those in the control group ( $3.2 \pm 0.7$  &  $4.4 \pm 1.9$  and  $5.1 \pm 1.0$  &  $8.4 \pm 2.6$ , respectively). Also, the mean time of initiation of oral fluids and initiation of regular diet after surgery was less in the study group than those in the control group ( $2.5 \pm 0.5$  &  $10.5 \pm 3.1$  and  $3.0 \pm 0.2$  &  $25.2 \pm 4.0$ , respectively). Additionally, the mean time of first passage of flatus and first passage of stool was less in the study group than those in the control group ( $4.7 \pm 1.5$  &  $9.6 \pm 2.3$  and  $17.3 \pm 3.1$  &  $26.4 \pm 4.8$ , respectively). There was statistically significant difference between the studied groups regarding postoperative complication and readmission ( $p \leq .001$ ).

Figure 1 represents that, the majority of the women (81.1%) in the study group discharged from hospital 2 days after surgery compared to only 12.2% for control group.

Table 4 reveals that, there was highly statistically significant relation between post-operative pain and hospital discharge in both studied groups ( $p \leq .001$ ).

## Discussion

Hysterectomy is one of the utmost frequent major gynecological surgeries. Even though, less invasive approaches such as laparoscopic or vaginal procedures are suggested primarily, the standard procedure for most cases is abdominal hysterectomy (Torné et al., 2021). ERAS protocol is a perioperative protocol of evidence-based interventions that have been grouped together with the goals of speeding functional recovery and improving postoperative outcomes which represents a fundamental shift in perioperative care (Kleppe & Greenberg, 2018).

The aim of the current study was to assess the effect of ERAS protocol on postoperative recovery criteria of women undergoing abdominal hysterectomy. The present study results concluded that women undergoing abdominal

**Table 1.** Distribution of Studied Groups According to Personal Characteristics ( $n = 148$ ).

Personal characteristics	Study group ( $n=74$ )		Control group ( $n=74$ )		$X^2$	$p$ -value
	No.	%	No.	%		
Age (years)						
20–	10	13.5	6	8.1	<b>2.67</b>	<b>.263</b>
30–	12	16.2	19	25.7		
≥40	52	70.3	49	66.2		
Mean $\pm$ SD	45.7 $\pm$ 9.7		46.1 $\pm$ 12.3		<b>0.219</b>	<b>.826</b>
Educational level						
Illiterate	38	51.3	37	50.0	<b>2.271</b>	<b>.518</b>
Basic education	21	28.4	27	36.5		
Secondary education	10	13.5	8	10.8		
High education	5	6.8	2	2.7		
Residence						
Urban	32	43.2	36	48.6	<b>0.435</b>	<b>.509</b>
Rural	42	56.8	38	51.4		
Occupation						
Working	29	39.2	25	33.8	<b>0.467</b>	<b>.495</b>
Not working	45	60.8	49	66.2		

**Table 2.** Distribution of Studied Groups Regarding Post-Operative Pain (Numerical Analog Scale) ( $n = 148$ ).

Post-operative pain (numerical analog scale)	Study group ( $n=74$ )		Control group ( $n=74$ )		$X^2$	$p$ -value
	No.	%	No.	%		
1st postoperative day						
Moderate (4–6)	35	47.3	24	32.4	<b>3.410</b>	<b>.065</b>
Severe (7–10)	39	52.7	50	67.6		
Mean $\pm$ SD	6.8 $\pm$ 2.0	7.2 $\pm$ 1.9	<b>1.489</b>	<b>.139</b>		
2nd postoperative day						
Mild (1–3)	11	14.9	0	0.0	<b>27.142</b>	<b>&lt;.001**</b>
Moderate (4–6)	55	74.3	42	56.8		
Severe (7–10)	8	10.8	32	43.2		
Mean $\pm$ SD	4.9 $\pm$ 1.8	6.5 $\pm$ 1.9	<b>5.239</b>	<b>&lt;.001**</b>		
3rd postoperative day						
Mild (1–3)	52	70.3	12	16.2	<b>45.506</b>	<b>&lt;.001**</b>
Moderate (4–6)	22	29.7	57	77.0		
Severe (7–10)	0	0.0	5	6.8		
Mean $\pm$ SD	2.9 $\pm$ 1.7	4.8 $\pm$ 1.7	<b>6.573</b>	<b>&lt;.001**</b>		

hysterectomy who received ERAS protocol had better post-operative recovery criteria than women who received routine perioperative care. So, the research hypothesis was accepted and indicates that ERAS protocol for women undergoing abdominal hysterectomy was effective.

Regarding personal characteristics as a baseline for comparison, it was noticed that no significant difference was found between the studied groups as regarding age, level of education, residence, and occupation. These findings are consistent with Egyptian study by Shalaby (2021) who found that there was

no significant difference in patient demographics between the two groups. This ensured homogeneity of the two groups.

The findings of the current study showed that the mean  $\pm$  SD of age was 45.7  $\pm$  9.7 and 46.1  $\pm$  12.3 for the study and control groups, respectively. These findings are consistent with Ferghali et al. (2020) who showed that, mean  $\pm$  SD of age was 48.96  $\pm$  8.55 years old in the study group and 47.79  $\pm$  7.61 years old in the control group.

On other hand, the results are contrary to Sarhan et al. (2021) who stated that, mean  $\pm$ SD of age was higher in

**Table 3.** Comparison Between Studied Groups Related to Postoperative Outcomes (n = 148).

Postoperative recovery criteria	Study group (n=74)		Control group (n=74)		$\chi^2$	p-value
	No.	%	No.	%		
<b>1. Postoperative mobilization</b>						
-Sitting in bed after surgery (hours)						
< 3 h	14	18.9	0	0.0	<b>92.61</b>	<b>&lt;.001**</b>
3–4 h	60	81.1	18	24.3		
> 4 h	0	0.0	56	75.7		
Mean $\pm$ SD	3.2 $\pm$ 0.7	5.1 $\pm$ 1.0				<b>12.902 &lt;.001**</b>
<b>Ambulation out of bed after surgery (hours)</b>						
< 6 h	64	86.5	6	8.1	<b>91.39</b>	<b>&lt;.001**</b>
6–12 h	10	13.5	65	87.8		
> 12 h	0	0.0	3	4.1		
Mean $\pm$ SD	4.4 $\pm$ 1.9	8.4 $\pm$ 2.6				<b>10.729 &lt;.001**</b>
<b>2. Postoperative nutrition</b>						
<b>Initiation of oral fluids after surgery (hours)</b>						
< 3 h	71	95.9	34	45.9	<b>44.87</b>	<b>&lt;.001**</b>
$\geq$ 3 h	3	4.1	40	54.1		
Mean $\pm$ SD	2.5 $\pm$ 0.5	3.0 $\pm$ 0.2				<b>7.971 &lt;.001**</b>
<b>Initiation of regular diet after surgery</b>						
< 12 h	62	83.8	3	4.1	<b>120.55</b>	<b>&lt;.001**</b>
12–24 h	12	16.2	6	8.1		
>24 h	0	0.0	65	87.8		
Mean $\pm$ SD	10.5 $\pm$ 3.1	25.2 $\pm$ 4.0				<b>24.776 &lt;.001**</b>
<b>3. Bowel motility (hours)</b>						
First passage of flatus (hours)	4.7 $\pm$ 1.5				9.6 $\pm$ 2.3	<b>15.289 &lt;.001**</b>
First passage of stool (hours)	17.3 $\pm$ 3.1				26.4 $\pm$ 4.8	<b>13.593 &lt;.001**</b>
<b>4. Postoperative follow-up</b>						
<b>Postoperative complications</b>						
Yes	3	4.1	20	27.0	<b>14.877</b>	<b>&lt;.001**</b>
No	71	95.9	54	73.0		
<b>Readmission to hospital</b>						
No	72	97.3	65	90.5	<b>4.812</b>	<b>.028*</b>
Yes	2	2.7	9	12.2		

both studied groups which distributed as  $51.25 \pm 16.1$  and  $56.55 \pm 11.94$  years in the study and control groups, respectively. In the researchers' point of view, the little observed difference in the current study findings and the other studies could be attributed to the variations in sample size and its selection criteria.

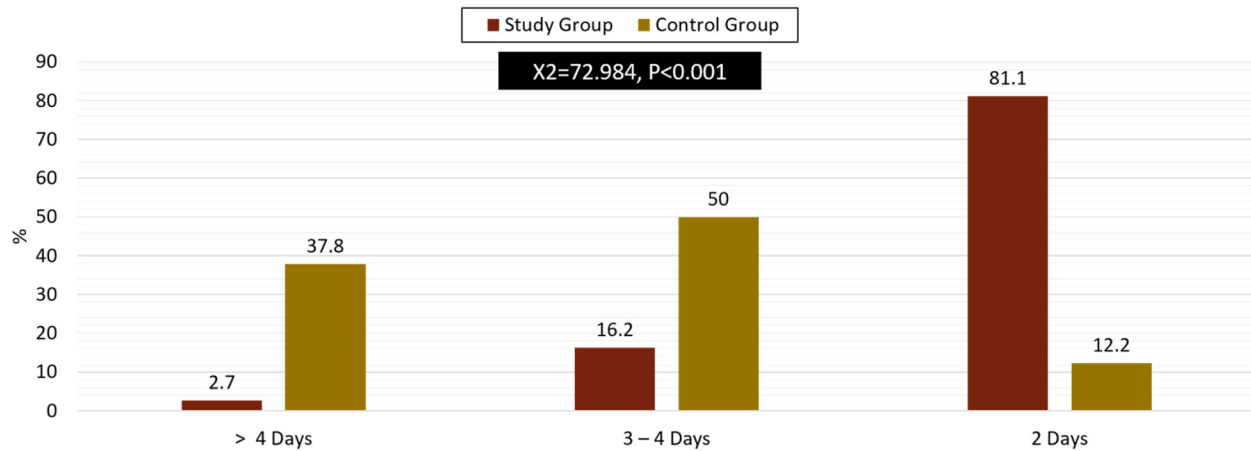
In relation to educational level, it was clear that about half of the women in both studied groups were illiterate. This finding is in congruent with Ferghali et al. (2020) who founded that, more than one third of women in both groups were illiterate. Meanwhile, this result is in disagreement with Heeba et al. (2019) who found that, more than half from studied women had secondary level of education in both groups. In the researchers' point of view, the reasons for this difference may be due to variations in study subjects, setting, and the majority of subjects in current study were elderly for which there is increase in the rate of illiteracy in Egypt.

Regarding postoperative pain, the present study revealed that, women in the study group experienced less mean

score compared to those in the control group ( $6.8 \pm 2.0$  vs.  $7.2 \pm 1.9$ , respectively) at the first postoperative day with no statistical significant difference, while mean score of pain at the postoperative second day was  $4.9 \pm 1.8$  versus  $6.5 \pm 1.9$ , respectively, and at the third postoperative day was  $2.9 \pm 1.7$  versus  $4.8 \pm 1.7$ , respectively with highly statistical significant difference.

These results are parallel with Echeverria-Villalobos et al. (2020) who concluded that the mean score of pain in the study group was less than those in control group. The researchers owing this to the preoperative counseling and different multimodal analgesia approaches according to ERAS protocol lead to reduced postoperative pain scores and opioid consumption.

Regarding postoperative mobilization, the present study founded 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 as the majority of women in the study group started sitting in bed within the first 3–4 h after surgery



**Figure 1.** Distribution of the studied groups regarding time of hospital discharge.

**Table 4.** Relation Between Post-Operative Pain and Hospital Discharge Among the Studied Groups (n=148).

	Hospital discharge											
	Study group (74)						Control group (74)					
	2 days (n=60)		3-4 days (n=12)		> 4 days (n=2)		2 days (n=9)		3-4 days (n=37)		> 4 days (n=28)	
Post-operative pain	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pain level 1st day after surgery												
Moderate pain	34	56.7	1	8.3	0	0.0	9	100.0	15	40.5	0	0.0
Severe pain	26	43.3	11	91.7	2	100.0	0	0.0	22	59.5	28	100.0
$\chi^2$	<b>11.217</b>						<b>33.300</b>					
<i>p</i>	<b>.003*</b>						<b>&lt;.001**</b>					
Pain score 2nd day after surgery												
Mild pain	11	22.4	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Moderate pain	49	77.6	6	50.0	0	0.0	9	100.0	14	37.8	19	67.9
Severe pain	2	100.0	6	50.0	2	100.0	0	0.0	23	62.2	9	32.1
$\chi^2$	<b>43.694</b>						<b>13.669</b>					
<i>p</i>	<b>&lt;.001**</b>						<b>&lt;.001**</b>					
Pain score 3rd day after surgery												
Mild pain	48	80.0	4	33.3	0	0.0	9	100.0	0	0.0	3	10.7
Moderate pain	12	20.0	8	66.7	2	100.0	0	0.0	37	100.0	20	71.4
Severe pain	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	5	17.9
$\chi^2$	<b>15.283</b>						<b>63.278</b>					
<i>p</i>	<b>&lt;.001**</b>						<b>&lt;.001**</b>					

compared to only one quarter of the control group. Meanwhile, the majority of women in the study group started ambulation out of bed within the first 6 h of the operation compared to less than one-tenth of the control group. This finding could be attributed to the fact that early mobilization of patients as early as possible is an important component of the ERAS protocol which contributed to shortened hospital stay with resultant early discharge, decreased postoperative complications, increased patient comfort, and early return to daily living activities leading to rapid recovery.

This finding is consistent with Miralpeix et al. (2016) who concluded that, early ambulation protects against deconditioning, reduces thromboembolic complications, insulin resistance, and overall results in shorter hospital stays. Also, Nelson et al. (2016) found that patients should ambulate eight times per day, have all meals sitting in a chair, and stay out of bed at least 8 h per day.

In relation to postoperative nutrition, the current study revealed that, the mean time of initiation of oral fluids and initiation of regular diet after surgery was less in the study group than those in the control group as the majority of the



women in the study group initiated oral fluid within first 4 h after surgery compared to less than half of the women in control group. Meanwhile, the majority of those in the study group began regular diet within first 11 h after surgery compared to only three women in control group. This may be due to that early oral nutrition is a component of ERAS protocol postoperatively which encouraged a quick resumption of gastrointestinal functions (intestinal sound, flatus, bowel motion) and hasten the recovery process.

This result is consistent with Shalaby (2021) who found that, the mean time until the first oral fluid intake was  $5.4 \pm 1.0$  h in the study group and  $15.8 \pm 8.3$  h in the control group. These results also are in agreement with Renaud et al. (2019) who reported that patients who resumed a diet before the second postoperative day were significantly higher in the study group.

In relation to bowel motility, the current study showed that women in the study group were more likely to have less mean time of first passage of flatus and stool after operation than the control group. This finding is consistent with Atia et al. (2020) who found that women in the study group were more likely to have less mean time of first defecation after operation than the control group ( $10.07 \pm 4.15$  vs.  $21.16 \pm 8.90$  h). In the researchers' point of view, no bowel preparation preoperatively and early initiation of oral fluids after surgery helps the patient to return quickly to defecate and bowel movement.

Concerning postoperative complications, the current study showed that there was a statistically significant difference between the studied groups. This finding is in harmony with Liang et al. (2016) who reported that the ERAS protocol group had a significantly lower rate of complications than control group. The researchers attribute the reason for this finding to the applications of the ERAS protocol elements. This finding isn't consistent with Myriokefalitaki et al. (2016) who showed that ERAS protocol in major abdominal gynecology surgery does not affect complications.

Regarding readmission, the current study found 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. This result is in agreement with the study conducted by Yilmaz et al. (2018), who reported that, there was significant differences in readmission rates in which one patient in the study group and 11 patients in the conventional group required hospital readmission after discharge.

Regarding postoperative hospital discharge, the present study revealed that, the majority of the study group discharged from hospital 2 days after surgery compared to nearly one-tenth of the control group. From the perspective of the researchers, applications of enhanced recovery protocol decreased length of hospital stay due to early mobilization and diet after surgery and decreased the incidence of postoperative complication.

The findings of the current research were supported by Sarhan et al. (2021) who reported that, the mean length of hospital stay was  $38.29 \pm 4.95$  h in the study group and  $68.44 \pm 6.5$  h in the control group with significant difference between the two groups. This finding is also similar to Sibbern et al. (2017) who studied "Patients' experiences of enhanced recovery after surgery" founded that more than half of the studied women stayed from 1 to 3 days in hospital compared to the control group with 4–5 days mean duration of hospitalization, the study group was significantly shorter than those in control group.

On the other hand, Liang et al. (2016) reported that, patients in the ERAS protocol group left the hospital at  $6.2 \pm 2.6$  days. Also, Patel et al. (2018) reported that there is no significant difference in length of hospital stay clinical outcomes in the study and control groups.

### **Strength Points of the Study**

Although the willingness to learn and apply new principles that are not traditional is not easy because many of these procedures work against current clinical practice, there has been cooperation between health care providers to implement ERAS protocol.

Application of ERAS protocol has been shown to improve the postoperative outcomes, reduce postoperative pain, and facilitate women's discharge from hospital after abdominal hysterectomy.

### **Limitation of the Study**

A blinded study protocol was not carried out due to the extensive multidisciplinary nature of the ERAS protocol; thus, physicians and the healthcare workers were not blinded to the study protocol.

### **Implications for Practice**

The findings of this study have several implications that can positively affect the practice of nurses. It may also help in providing better information about performance of all members of the team in the hospital who take care of women undergoing abdominal hysterectomy. This research evidence overwhelmingly suggests that a healthy post-hysterectomy period depends on collaborative work for all members of care providers to women after hysterectomy, to ensure complete recovery, less pain, and early discharge from the hospital.

### **Conclusion**

It has been concluded that, women undergoing abdominal hysterectomy who received the ERAS protocol had less pain level after surgery, faster hospital discharge, and better

postoperative outcomes than women who received routine perioperative care according to the hospital policy.

## Recommendations

Recommendations derived from this research are as follows:

1. ERAS protocol should become the standard practice for all women undergoing elective gynecologic surgeries.
2. Conduct workshops for health care providers about the importance of applying ERAS protocol in perioperative care.
3. Disseminate the present study findings to all Obstetrics and Gynecological departments at different health system setting would be helpful.

## Acknowledgments

The authors would like to thank all the participating women for their valuable participation. They also thank all jury expertise for guidance and thanks for setting that allow researchers to conduct this research.


## Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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