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Implementation of Enhanced Recovery After Surgery as a Protocol Versus Routine Care on Women Undergoing Hysterectomy.

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Abstract

Enhanced recovery after surgery (ERAS) protocols are combination of multimodal evidence-based strategies applied to the conventional perioperative techniques to reduce postoperative complications and achieve early recovery. **Aim**: This study aimed to implement the ERAS protocol versus routine hospital care on women undergoing hysterectomy & assess the effect of this protocol on women recovery. **Subjects and Methods**: Randomized controlled study design was used to achieve the objectives of this study. **Setting**: The study was conducted at the gynecological unit at Women's Health Hospital, Assiut University **Sample:** A simple random sample was used to collect data of this study .The study sample included 140 women undergoing hysterectomy divided into two groups (70 women in each group) the ERAS group received ERAS protocol and control group received routine hospital care .**Results**: The results show a highly statistically significant difference between ERAS group and routine care in terms of length of hospital stay, return to general activity, return to sexual activity, time of changed dressing at home, whereas complications, patient re-admission and patient re-exploration showed no statistical significant difference between the groups. **Conclusion:** The implementation of ERAS protocol for abdominal hysterectomy reduced length of stay without increasing complications or readmissions. **Recommendation:** The study recommended that the ERAS protocol should become the standard practice for all women undergoing elective gynecologic surgeries.

Keywords: Hysterectomy & ERAS & Postoperative Complications.

Introduction

ERAS care is 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 **(Rebecca & Blumenthal, 2019, Budic & Velickovic, 2019).** 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. Enhanced Recovery after Surgery is a comprehensive protocol, and data demonstrate success when multiple components of the ERAS protocol are implemented together. Successful ERAS protocol implementation across the spectrum of gynecologic care has the potential to improve patient care and health care delivery systems. **(Ljungqvist et al., 2017, Taurchini et al., 2018 & Nelson et al., 2019)**.

Gynecologic surgery is very common. Hysterectomy is the surgical removal of the uterus and it is the most common major gynecological surgical procedure worldwide. It has a broad spectrum of indications ranging from malignant gynecological disease to obstetrical indication. Regardless of mode, hysterectomy is most often performed for benign conditions such as irregular uterine bleeding with or without uterine fibroids, and the operation is done in order to improve the patient's Quality of life (QoL) **(Ali et al., 2018).**

The main objectives of the ERAS protocol are to accelerate functional recovery, improve postoperative outcomes includes postoperative pain and the need to analgesia, more rapid return of bowel function, shorten the length of stay (LOS) in the hospital, and reduce the overall health care costs, and improve the satisfaction of the patients without increasing complications and/or hospital readmission rates **(Miralpeix et al., 2016& American College of Obstetricians & Gynecologists, 2018).**

The basic principles to ERAS include attention to the following preoperative counseling and nutritional strategies including avoidance of prolonged perioperative fasting, perioperative consideration including a focus on regional anesthetic and non-opioid analgesics approaches, fluid balance,

maintenance of normothermia and promotion of postoperative recovery strategies including early mobilization and appropriate thromboprophylaxis **(American College of Obstetricians & Gynecologists, 2018)**

The implementation ERAS in gynecologic surgery involves nursing care in four essential stages: the preadmission, preoperative, intraoperative, and postoperative stages **(Carey & Moulder, 2018)** The strategies include verbal counseling fortified by written information, preoperative bowel preparation should be avoided to prevent dehydration and electrolyte disturbances, use of loco regional analgesia, intraoperative goal-directed fluid therapy, and avoidance of routine use of nasogastric tubes, drains and/or catheters **(Miralpeix**, **2016)**. Postoperatively, it is important for gynecological nurses to encourage early feeding, early ambulation, timely removal of tubes and drains, if present. **(Waller et al., 2015, Wang et al., 2014, De Aguilar-Nascimento et al., 2014 & Cavallaro et al., 2018).**

Designated nurses specializing in ERAS protocol are beneficial. A key strategy for successful implementation of an ERAS protocol is the active engagement of nurses in all parties. In addition to partnering with the patient, a central component of a successful protocol is the cooperation of an interdisciplinary team, including the surgeon, preoperative nurse, anesthesiologist, office nurses, and other important staff (**Department of Health and Social Care, 2018).**

Significant of the study

After implementing an ERAS protocol, researches showed an association with significant improvements in length of stay, patient satisfaction, decreased costs, & complications for women undergoing major gynecologic surgery **(Nelson et al., 2014 & Modesitt et al., 2016)** as well as an association with improved survival **(Gustafsson et al., 2019).** The ERAS protocols resulted in a 30% to 50% reduction in the LOS and similar reductions in complications, as well as lower costs and readmission rates **(Ljungqvist et al., 2017)**. An enhanced recovery pathway in patients undergoing gynecologic oncology minimally invasive surgery is associated with significant improvements in recovery time, decreased pain and overall lower hospital costs (**Chapman et al., 2016)** so the researchers were interested to implement such study in their field of work to assess its effect on the women's recovery after hysterectomy.

Aims of study

1. Implement the ERAS as a protocol versus routine hospital care on women undergoing hysterectomy.
2. Assess the effect of this protocol on women's recovery.

Research Hypothesis

Implementation of ERAS as a protocol of care improves recovery of women undergoing hysterectomy.

Subjects & Methods

Research design

Randomized controlled study design was used to achieve the aims of this study.

Settings of the study

The study was conducted at Women's Health Hospital. This hospital included a lot of units which provided the clients with the services needed; these units are labor, post-partum, high risk maternity unit, and gynecologic units. The sample were recruited from gynecologic units that includes 3 departments ; each of them divided into 2 words which contains all women's who complained from gynecological problems such as pre and post-menopausal bleeding , uterine cancer or fibroids, uterine prolapse and post hysterectomy.

Sample

A simple random sample was used to collect data of this study; the study included 140 post hysterectomy women at Women's Health Hospital. The sample divided into two groups 70 women at each group, group A (study group) who received ERAS protocol and group B (control group) who received daily routine care according to the policy of the hospital; women were assigned to each group at a random basis. Data collected through a period of 24 months from beginning of December 2017 to the end of November 2019. The researcher was collected data 3 days/week for each group, started by control group. **n** =

$$\frac{[DEFF^{*}Np(1-p)]}{[(d^2/z^2_{1-\alpha/2^{*}}(N-1)+p^{*}(1-p)]}$$

N = population size 200

P = hypothesized % frequency of outcome factor in the population: 3%+/-5

d = confidence limits as% of 100 (absolute +/- 5%)

Design effect (for cluster surveys –DEFF)

z = value 1.96

Randomization

The researcher was divided women randomly into two groups. Group (A) who received ERAS protocol and group (B) who received routine pre-and post-operative hospital care of hysterectomy. Randomization was done through computerized generated tables then closed envelopes containing the number of women had been assigned into two groups whether it was control or study groups .The researchers work with study group for one week and followed by control group in the next week.

Tools of data collection

1- **An interview questionnaire** was designed by researchers based on various international and local literatures which contained 4 parts:

Part one: which included data related to: socio-demographic characteristics as: Age, level of education, occupation and marital status.

Part two: included data related to: women medical history which includes history of cardiac diseases, risk factors for cardiovascular problems, Chronic Obstructive Pulmonary Disease (COPD), chronic renal or hepatic disease, immune deficiency diseases, history for chemotherapy, preoperative laboratory values (hemoglobin, Hematocrit, albumin, white blood cell count, platelet count and C - reactive protein).

Part three: included data related to obstetrical characteristics of the participant women as parity, abortion and number of living children.

Part four: which included data related to gynecological diseases such as Fibroid, cervical cancer, endometrial carcinoma, prolapse, endometriosis, Endometrial hyperplasia, irregular uterine bleeding, ovarian cyst and malignant ovarian mass.

2- **Pain assessment scale** which determined by using Visual analog scale (VAS) which was developed by national comprehensive cancer network 2007, as women were given a score to the level of pain, she felt from 0 to 10.This divided into three levels mild from 0-3, moderate from 4-7, and severe was more than 7. Pain was assessed after hysterectomy.

3- ERAS protocol which developed by Nanavati A.J & Subramaniam P.A. in 2015.

Period	Enhanced Recovery (group A)	Routine hospital care (group B)
Pre-operative phase	• Provide complete information about the protocol and take an oral formed consent • Advice given regarding stop of smoking 2 weeks before and 6 weeks after (passive smoker) • Minimal starvation (6 hrs for solids and 2 hrs for liquids) • Preoperative fluid (drink at 7pm-11pm 800ml fluid and 400 ml In the morning of surgery patient will have 400mls of fluid as water, tea, coffee and juice • Carbohydrate fluid intake such as orange juice Lemonade and apple juice. • Pre-operative antibiotic **Less use of** • Mechanical bowel preparation	• Night fasting(12am) from food and drink • Mechanical bowel preparation such as enema and Laxative Medications
Inter-operative phase	• Passive range of motion of extremities during surgery • Avoid hypothermia • Less use of drains • Asses I.V line • Minimal tissue handling	• Routine use of tubes as abdominal drain and urinary catheter. .
Post-operative phase	• Early progressive ambulation Start two hour after surgery (passive leg exercise ,change patient position, then sitting in bed, site in wheelchair ,walk with assist and walk without assist (4-6) time per day) • Early gradual oral nutrition start 2 hours by liquid such as worm fluid ,then semisolid such as yogurt , overcooked carrots and broccoli are good vegetables and then solid food. • Early removal of all tubes, drains and catheter when women able to go to path room (6 hour after surgery). • Use post-operative analgesic according pain scale if pain more than(5)	• No emphasis on PONV prophylaxis (postoperative nausea and vomiting) • No enforced mobilization • Removal of abdominal drain when presence of bowel motility. • Oral or eternal nutrition given once women passing (presents of bowel motility)
Post-discharge Phase	• Patient discharge after (1-2) Days after surgery. • Ensure 30-day follow-up including: Phone call at 48 hours • 7th day Clinic visit • Any Emergency visit	• Patient discharge after(3-5)days from surgery • Patient follows up on day 7 in the clinic or else as and when required

- Procedures

Administrative phase

Before implementation of the study, an official permission was obtained from the Dean of the Faculty of Nursing directed to the director of Women's Health Hospital, Assiut University, Egypt, after full explanation of the aim of the study. A verbal consent from women to participate in the study was obtained after explanation of the study purposes.

Validity and Reliability

The tools were reviewed to ascertain their content validity by three experts in nursing science in obstetrics and gynecological nursing, who reviewed the tool for clarity, relevance and comprehensiveness, understanding and applicability; according to the opinion of the experts the modification was done. The reliability of tool was measured by BSES-SF Cronbach's alpha value to be 0.98.

Pilot study

A pilot study was carried on 10% (14) of women before implementation of the study to test the clarity and feasibility of the tools. The necessary modifications were done based on the results from the pilot study. Women who participated in the pilot study were not included in the main study.

Field of work

The researchers introduce themselves to women and explain the aim, nature, and benefits of the study. Women were interviewed individually to collect the study data. Questionnaire completed between 20-30 minutes. Data collected through a period of 24 months from beginning of December 2017 to the end of November 2019.The researcher work with the studied women three days per week and completed around (13-15) participants. Researchers interviewed each woman at gynecological word and collected the data recorded in the questionnaire for both groups. This occurred after full explanation the nature of the study and took oral consent to be included in the study.

For control group

Researchers took data as personal data, obstetric profile. Women in control group were received routine hospital care as night fasting (12am) from food and drink, mechanical bowel preparation such as enema and Laxative Medication, routine use of tubes as abdominal drain and urinary catheter , no early ambulation, removal of abdominal drain and oral or eternal nutrition when presence of bowel motility .

For study group

- Before surgery women in the study group were provided information about the ERAS protocol and what to expect during the hospital stay. All women were admitted on the morning of the operation. They were asked to eat normally until midnight, and allowed to drink clear fluids until 2 hours before surgery, when they received 400 mL of a clear carbohydrate drink containing 200 kcal such as carbohydrate fluid intake such as orange juice, lemonade and apple juice. Women in ERAS group were given with 1 g of paracetamol, and oral midazolam also a single dose of oral antibiotics (metronidazole 1.2 g) and a combination tablet of trimethoprim sulfamethoxaz-ole 160/800 mg were given 2 hours before surgery as prescribed by physician.
- During surgery women in the study group were given warm intravenous fluids prescribed by physician to maintain as normal a body temperature as possible also passive range of motion of extremities during surgery. General anesthesia was maintained with volatile anesthetics.
- After surgery, women in study group were given oral paracetamol 1330 mg and diclofenac 50 mg three times daily to control pain as prescribed from physician. Pain score was assessed by a visual analogue scale after hysterectomy. Study group was started early gradual oral nutrition, 2 hours by liquid such as hot drinks, and then semisolid diet such as yogurt, overcooked carrots and broccoli are good vegetables and then solid food. In the study group was encouraged for early removal of all tubes, drains and catheter when women able to go to bath room (6 hour after surgery). Women in this group were encouraged for early progressive ambulation throughout 2 hours in the bed postoperatively on the first day of surgery (passive leg exercise, change patient position, then sitting in bed, site in wheelchair, walk with assist and walk without assist (4-6) time per day). The ERAS group were discharged when they were mobilized, eating and drinking normally, managing pain by oral analgesics, voiding normally and showing no sign of bowel obstruction. The target LOS was set to 2 days after surgery.

Follow up

All women from both groups (study &control) groups were asked for coming into gynecological outpatient clinics within three to five days in the study group & seven to ten days after surgery in control group . In this phase, researchers assessed wound healing and observe for any complications occurred to them after discharge, which were diagnosed by the help of the attendant physicians at gynecological outpatient clinic.

Ethical consideration

The research proposal was approved from Ethical Committee in the Faculty of Nursing at Assiut University. There was no risk for women during application of the research .The study followed the common ethical principles in research. Oral informed consent was obtained from every woman before

inclusion in the study. Confidentiality and anonymity will be assured. Women have the right to refuse to participate or withdraw from the study without any rational any time.

Statistical Analysis

The obtained data were reviewed, set for computer entry, coded, analyzed and tabulated. Descriptive statistics presented as (frequencies and percentage). The test of significance (chi-square test) has done using computer program SPSS version 20. The probability of less than 0.05 was considered significant for all statistical tests.

Results

Table (1): Distribution of the Study and Control Groups in Relation to their personal data.

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Age: (years)					
Mean ± SD	48.96 ± 8.55		47.79 ± 7.61		0.393
Range	23.0 – 66.0		25.0 – 60.0		
Level of education					
Illiterate	27	38.6	34	48.6	0.449
Read & write	24	34.3	17	24.3	
Basic education	8	11.4	12	17.1	
Secondary	8	11.4	5	7.1	
University	3	4.3	2	2.9	
Marital status					
Single	12	17.1	13	18.6	0.016*
Married	33	47.1	46	65.7	
Divorced	6	8.6	0	0.0	
Widowed	19	27.1	11	15.7	

Table (2): Distribution of the Study and Control Groups in Relation to their Obstetrical history.

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
number of parity					
Nullipara	8	11.4	6	8.6	**0.018***
Multipara	34	48.6	39	55.7	
Grand multipara	28	40	25	35.7	
Previous abortions					
No	59	84.3	56	80	**0.467**
Yes	11	15.7	14	20	
Number of living children					
0	6	10.3	3	5.3	**0.018***
1 – 3	14	24.1	3	5.3	
4 – 6	20	34.5	26	45.6	
> 6	18	31.0	25	43.9	

Table (3): Distribution of the Study and Control Groups in Relation to gynecological history

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Currant gynecological problems					
Fibroid	**19**	**27.1**	13	18.6	0.227
Cervical cancer	4	5.7	1	1.4	0.366
Endometrial carcinoma	4	5.7	1	1.4	0.366
Prolapse	8	11.4	12	17.1	0.334
Endometriosis	5	7.1	4	5.7	1.000
Endometrial hyperplasia	0	0.0	2	2.9	0.496
Irregular uterine bleeding	19	27.1	32	45.7	0.022*
Ovarian mass	3	4.3	2	2.9	1.000
Adnexal mass	2	2.9	2	2.9	1.000
Molar pregnancy	3	4.3	1	1.4	0.620
Malignant ovarian mass	3	4.3	0	0.0	0.245
Route of hysterectomy:					
Abdominal hysterectomy	62	88.6	57	81.4	0.237
Vaginal hysterectomy	8	11.4	13	18.6	
Type of hysterectomy:					
Total	35	50.0	41	58.6	0.010*
Subtotal	24	34.3	28	40.0	
Radical	11	15.7%	1	1.4%	
Duration of surgery					
Mean ± SD/hour	2.20 ± 1.61		2.10 ± 1.01		0.661
Range/hour	1.0 – 8.0		1.0 – 7.0		

Table (4): Distribution of the Study and Control Groups in Relation to Pre-operative data

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
preoperative antibiotic:					
Yes	70	100.0	00	00.0	**0.000***
No	00	00.0	70	100	
Carbohydrate and preoperative fluid intake:					
Yes	70	100.0	00	00.0	
No	00	00.0	70	00.0	**0.000***
Bowel preparation:					**0.000***
Yes	29	41.4	70	100.0	
No	41	58.6	0	0.0	
Fasting time:					
Fasting 6 hour	70	100.0	00	00.0	**0.000***
Fasting 12 hour	0	00.0	70	100.0	

Table (5): Distribution of the Study and Control Groups in relation to intra-operative data.

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Intra-operative antibiotics after 3-4 hour:					**0.000***
Yes	20	28.5	70	100.0	
No	50	71.4	0	0.0	
Type of anesthesia:					**0.002***
General	7	10.0	14	20.0	
Spinal	49	70.0	55	78.6	
Epidural	5	7.1	1	1.4	
Spinal followed by General	9	12.9	0	0.0	
Assessment IV line:					**0.683**
Peripheral line	52	74.3	56	80.0	
Central line	15	21.4	11	15.7	
Both	3	4.3	3	4.3	

Table (6): Distribution of the Study and Control Groups in Relation to post-operative care

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Pain management according pain analog scale:					
Pain level:					**0.000***
Mild	46	65.7	10	14.3	
Moderate	21	30.0	50	71.4	
Severe	3	4.3	10	14.3	
Total post-operative inter venous fluids intake /24 hour					**0.000***
Mean ± SD/ml	1085.71 ± 433.82		1714.29 ± 430.47		
Range/ml	500.0 – 2000.0		1500.0 – 3000.0		
Abdominal drain:					**0.000***
Yes	24	34.3	52	74.3	
No	46	65.7	18	25.7	
Amount of drain for first day/ml					**0.385**
Mean ± SD/ml	152.08 ± 63.38		168.27 ± 79.85		
Range / ml	100.0 – 300.0		100.0 – 400.0		
Darin removal/ hour					**0.000***
Mean ± SD/hour	10.25 ± 2.79		43.85 ± 21.63		
Range/hour	6.0 – 12.0		24.0 – 72.0		
Vaginal pack removed /hour					**0.001***
Mean ± SD/ hour	19.50 ± 6.21		38.00 ± 12.36		
Range/ hour	12.0 – 24.0		24.0 – 48.0		
Urinary catheter removed /hour:					**0.000***
Mean ± SD hour	6.09 ± 0.72		27.17 ± 8.83		
Range /hour	6.0 – 12.0		24.0 – 48.0		
Oral Fluid Intake					**0.000***
Mean ± SD ml	1164.29 ± 667.25		815.71 ± 452.57		
Range /ml	100.0 – 3000.0		100.0 – 2000.0		
Urinary Output:					**0.039***
Mean ± SD/ml	151.43 ± 158.11		111.43 ± 29.70		
Range/ ml	100.0 – 1000.0		100.0 – 200.0		

Table (7): Distribution of the Study and Control Groups according to early recovery symptoms

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Time of oral fluid intake post-operative period/ hour					
Mean ± SD/hour	2.20 ± 0.60		6.03 ± 0.87		**0.000***
Range/hour	2.0 – 4.0		6.0 – 12.0		
Time of bowel motility(passing) / hour					
Mean ± SD/hour	5.27 ± 1.38		12.23 ± 2.37		**0.000***
Range/hour	4.0 – 12.0		6.0 – 24.0		
Time of Start solid food / hour					
Mean ± SD/hour	10.86 ± 3.48		26.77 ± 9.89		**0.000***
Range/hour	12.0 – 24.0		24.0 – 72.0		
Mobilization in the bed / hour					
Mean ± SD/hour	2.11 ± 0.58		5.93 ± 1.28		**0.000***
Range/hour	2.0 – 8.0		4.0 – 12.0		
Passive range of motion					
Yes	70	100.0	0	0.0	**0.000***
No	0	0.0	70	100.0	
Ambulate in the abed					
Yes	70	100.0	58	82.9	**0.000***
No	0	0.0	12	17.1	
Change position:					
Yes	70	100.0	0	0.0	**0.000***
No	0	0.0	70	100.0	
Mobilization outside the bed / hour					
Mean ± SD	8.46 ± 2.89		13.83 ± 4.29		**0.000***
Range	2.0 – 6.0		12.0 – 24 .0		
Sit in wheelchair					
Yes	63	90.0	2	2.9	**0.000***
No	7	10.0	68	97.1	
Wake with or without assist					
Yes	70	100.0	0	0.0	**0.000***
No	0	0.0	70	100.0	

Table (8): Distribution of the Study and Control Groups according to their follow-up visit

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Length of stay: (days)					
Mean ± SD/**(days)**	1.30 ± 0.46		6.33 ± 2.24		**0.000***
Range/**(days)**	1.0 – 2.0		3.0 – 20.0		
Telephone call by the researcher:					
Yes	70	100.0	27	38.6	**0.000***
No	0	0.0	43	61.4	
General activity return / weak					
Mean ± SD/ **weak**	2.76 ± 0.67		6.10 ± 0.76		**0.000***
Range/ **weak**	2.0 – 4.0		5.0 – 12.0		
Sexual activity return /weak					
Mean ± SD/ **weak**	3.39 ± 0.79		6.09 ± 0.41		**0.000***
Range/ **weak**	3.0 – 6.0		6.0 – 8.0		

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Vaginal discharge color					
Pinkish/ brown	69	98.6	70	100.0	**1.000**
Bloody	0	0.0	0	0.0	**--**
No vaginal discharge	1	1.4	0	0.0	**1.000**
Wound discharge odor					
Offensive	00	00	0	0.0	**0.001***
No odor	70	100	68	97.1	
Pus	0	0.0	2	2.9	
Wound color					
Normal	70	100	68	97.1	**0.496**
Redness	0	00	2	2.9	

Table (9): Distribution of the Study and Control Groups according to their Emergency visit

	Study group (n= 70)		Control group (n= 70)		P-value
	No.	%	No.	%	
Patient re-admission:					
Yes	0	0.0	3	4.3	**0.245**
No	70	100.0	67	95.7	
Type of complication:					
No complication	70	100.0	67	95.7	**0.245**
Septic wound	0	0.0	2	2.8	**2.000**
Stamp carcinoma	0	0.0	0	0.0	**0.000**
Fistula	0	0.0	1	1.4	**1.000**
Patient re-exploration					
Yes	0	0.0	1	1.4	**1.000**
No	70	100	69	98.6	

Regarding Personal data **Table (1):** Showed that the mean age was 48.96 ± 8.55 years old with (range 23.0 – 66.0) in the study group & 47.79 ± 7.61 years old with (range 25.0 – 60.0) in the control group. About 38.6 % of women in study and 48.6% in control group were illiterate. More than two quarter in both groups (47.1% in the study and 65.7 % in control groups) were married.

The analytic data in **Table (2**): Which illustrates previous obstetrical data the present study showed about half 48.6% in the study group and 55.7% in the control group were multipara. The majority of them hadn't previous abortion.

Data in **Table (3):** Represents gynecological history. About 27.1% in the study group & 45.7 % in the control group had complained from irregular uterine bleeding with significant difference between both groups p-value is 0.022. As regards route and type of hysterectomy majority of them were done total abdominal hysterectomy.

Based on pre-operative care which is described in **Table (4**): The present study reports that there was statistical significant difference between both groups regarding preoperative antibiotics, Carbohydrate and fluid intake, bowel preparation and fasting time within 6 hours P-value was 0.000 in all items.

The analyzed data in **Table (5):** Presents that intra-operative care in both groups .It clears that there was significant difference between two groups regarding received intra-operative antibiotics; type of anesthesia p-value was 0.000.

Data in **Table (6**): Clears that post-operative care in both groups. There were statistical significant difference between two groups regarding total inter venous fluids intake /24 hour , abdominal drain, removal of drain, vaginal pack , urinary catheter /hour, oral fluid intake, p-value was 0.0001 in all items. On the other hand, there was significant difference between both groups regarding score of pain after hysterectomy p- value 0.000.

Table (7): Demonstrates early recovery symptoms in both groups. It indicates that there were statistical significant differences between two groups regarding time of starting of post-operative oral fluid intake,

started solid food, time of bowel motility, early mobilization inside and outside of bed. , passive range of motion with high statistical significant difference between two groups P=0.0001.

Table(8): Reveals woman follow-up of both group. It clears significance difference regarding length of stay, returned to general and sexual activity P-0.0001.

Base line data on emergency visit **Table (9):** Shows that there was no statistically significant difference between both groups regarding re-admission, type of complication, re-exploration.

Discussion

The Enhanced Recovery after Surgery (ERAS) guidelines are now firmly established as a global surgical quality improvement initiative that results in both clinical improvements and cost benefits to the healthcare system

(Ljungqvist et al., 2017 & Gustafsson et al., 2019).

This study aimed to implement the ERAS protocol versus routine hospital care on women undergoing hysterectomy & assess the effect of this program on women's recovery.

The present study revealed a statistically significant difference concerning length of hospital stay between both groups (P. 0.000), where the length of hospital stay decreased ranged from one to two days after implementing ERAS protocol than women who applied routine hospital care ranged from three to twenty days. This finding was supported by **Relph et al**., **(2014**) who developed a study to evaluated length of hospital stay before and after implementation of an ERAS program for 45 women undergoing vaginal hysterectomy at a North London teaching hospital ,they found a reduction in median length of hospital stay from 42.9 hours before to 23.5 hours after program implementation ($p<0.05$), also **Yoong et al., (2014**) who worked on enhanced recovery pathways improve outcomes of vaginal hysterectomy in Canada focused on the same ERAS elements plus thromboprophylaxis and antimicrobial treatment ,they discovered a reduction in median length of hospital stay from 45.5 hours before to 22.0 hours after program implementation ($p < 0.01$). Similarity with **Myer et al., (2018**) who compared clinical outcomes among a cohort of 607 women undergoing open gynecologic surgery before or after implementation of ERAS ,they found that Median length of stay decreased by 25% for patients in the ERAS pathway, ($p<.001$).These results are similar in the different study settings because the researchers of these studies implement similar tools that applied to patients of similar gynecological complains.

The finding of present study showed a statistically significant difference regarding score of pain between two groups, the level of pain was mild in women after implementing ERAS protocol than women who applied routine hospital care was moderate. This finding was similar to a meta-analysis of randomized controlled trials by **Gobble et al., (2014)** who worked on Postoperative pain control for optimal patient outcomes; they found that ketorolac should be considered for postoperative pain control, especially to limit the use of opioid pain medications. On the same line **Steinberg et al., (2017)** who performed a study in women receiving a preemptive medication prior to total abdominal hysterectomy to investigate the effectiveness of preemptive analgesia for pain control, they concluded that Preemptive medication strategies (eg, medications given to the patient before surgery), including paracetamol and acetaminophen, gabapentin, non-steroidal anti-inflammatory drugs, and COX-2 inhibitors, have been shown to decrease total narcotic requirements and improve postoperative pain and satisfaction scores in women undergoing total abdominal hysterectomy and these results agreed with the present study.

The finding of the present study revealed that there was statistically significant difference concerning postoperative intravenous fluid between both groups (P=0.0001). The consumption of post-operative intravenous fluid intake/24/ml was less in women after implementing ERAS protocol than women who applied routine hospital care. This finding was supported by **Modesitt et al., (2016)** they examine implementing an enhanced recovery after surgery (ERAS) protocol for women undergoing major gynecologic surgery at an academic institution and compare surgical outcomes before and after implementation ,they found that Implementation of ERAS protocols in gynecologic surgery was associated with a substantial decrease in intravenous fluids. Similar finding of **Nelson et al., (2016)** who established a study in Enhanced Recovery After Surgery guidelines for pre- and intraoperative care in gynecologic/oncology surgery, they found that Intravenous fluids should be discontinued within 24 hours after surgery because they are rarely needed in patients able to sustain oral intake. High energy protein drinks may be added to the dietary regimen to ensure protein and calorie intakes while oral intake is building.

According to surgical drain removal after implementing ERAS**,** the finding of the current study revealed that there were statistically significant differences between both groups P-value were 0.001. The time of drain removal was earlier in women after implementing ERAS protocol ranged from six to twelve hours than in women who applied routine hospital care ranged from one to three days. These findings were agreed with **(Royal College of Obstetricians & Gynaecologists, 2018)** who

instructed surgical drains should be removed as early as possible after surgery. The routine use of nasogastric, abdominal, and vaginal drains hinders mobilization, increases morbidity, and prolongs hospital stay with limited evidence of benefit. On the same line **(Department of Health and Social Care**, **2018)** who cleared that removal of the urinary catheter, if used, within 24 hours also shortens hospital length of stay by decreasing risk of infection.

As regard to early ambulation, the present study concluded that there was significantly a difference between both groups p-value (0.000). The mobilization outside the bed was earlier ranged from two to six hours in women after implementing ERAS protocol than women who applied routine hospital care which ranged from twelve to twenty four hours. This finding was in the same line with **Kalogera & Dowdy**, **(2016)** who established Enhanced recovery pathway in gynecologic surgery as they cleared that early ambulation protects against deconditioning, reduces thromboembolic complications, insulin resistance and overall results in shorter hospital stays. **Miralpeix et al., (2016)** on their study about A call for new standard of care in perioperative gynecologic oncology practice: Impact of enhanced recovery after surgery (ERAS) programs, they observed early ambulation is an essential element in ERAS for early recovery**. Nelson et al., (2016)** discovered that patients should ambulate 8 times per day, have all meals sitting in a chair, and stay out of bed at least 8 hours per day.

Concerning complications and readmission rates in both groups, the current study showed that there was no statistically significant difference between both groups. These results come in the same line with the results of **Myriokefalitak et al., (2016**) they evaluate the outcomes of enhanced recovery after surgery (ERAS) implementation in a gynecological oncology center. They showed ERAS care in major abdominal Gynecology surgery not affecting complication or readmission rates. These results are in agreement with by **Yoong et al., (2014)** who compared readmission rates in patients undergoing vaginal hysterectomy before and after implementation of an ERAS program, they reported a readmission rate of 4% before and 0% after implementation of an ERAS program. On the same line **Relph et al., (2014)** reported a readmission rate of 6.7% before and 0% after implementation of an ERAS program. The similarity of the complications between groups of the present study might be contributing to the study participants were elderly females which might have refused to provide a current data about their complications for fear from readmission to hospital.

Conclusion

The implementation of ERAS protocol for abdominal hysterectomy reduced length of stay without increasing complications or readmissions.

Recommendations

Based on the study finding -the ERAS protocol should become the standard practice for all women undergoing elective gynecologic surgeries.

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References

1. **Ajuzieogu, O., Amucheazi, A., & Nwagha, U., (2016):** Effect of routine Pre-operative fasting on residual gastric volume and acid in patients Undergoing myomectomy, Nigerian Journal of Clinical Practice, Vol.(19), No.(6), Pp.816–820.
2. **Ali, H., Mohamed, R., Riad, R., & ElFadeel N., (2018):** Effect of Designed Nursing Care Protocol On Minimizing Post Hysterectomy Complications At El Manial University Hospital, Egyptian Nursing Journal,Vol.(16),No.(24),Pp.1-13. elmagla.egy2010@yahoo.com
3. **American College of Obstetricians and Gynecologists, (2018):** Prevention of infection after gynecologic procedures, Obstet Gynecol, Vol.(131), No.(195), Pp.172–189.
4. **Budic, I., & Velickovic, I., (2019):** Editorial: Enhanced Recovery After Surgery , Frontiers in Medicine,Vol.(6),No.(62),Pp.1-6.
5. **Carey, E., & Moulder, J., (2018):** Peri-operative management and implementation of enhanced recovery programs in gynecologic surgery for benign indications, Obstet. Gynecology, Vol.(132), No.(01), Pp137–146.
6. **Cavallaro, P., Milch, H., & Savitt, L., (2018):** Addition of a scripted pre-operative patient education module to an existing ERAS pathway further reduces length of stay, Am J Surg, Vol.(216),No.(4),Pp.:652–657.
7. **Chapman, J., Roddy, E., Ueda, S., Brooks, R., Chen, L., & Chen, L., (2016):** Enhanced Recovery Pathways for Improving Outcomes After Minimally Invasive Gynecologic Oncology Surgery, Obstet. Gynecol., Vol.(128),No.(1),Pp.138-144.
8. **De Aguilar-Nascimento, J., Leal, F., Dantas, D., Anabuki, N., de Souza, A., Silva, E., Lima, V., Tanajura, G., & Canevari, M., (2014):** Preoperative education in cholecystectomy in

the context of a multimodal protocol of perioperative care: a randomized, controlled trial., World J. Surg., Vol.(38),No.(2),Pp.357–362.

9. **Department of Health and Social Care, (2018):** Enhanced recovery partnership programmer, Available at https://assets.publishing.service.gov.uk/government/: uploads/system/uploads/attachment_data/file/215511/dh_128707.pdf.
10. **Gobble, R. , Hoang, H., Kachniarz, B., & Orgill, D., (2014):** Ketorolac does not increase perioperative bleeding: a meta-analysis of randomized controlled trials, Plast Reconstr Surg., Vol. (133),No.(3),Pp.:741-755.
11. **Gustafsson, U., Scott, M., Hubner, M., Nygren, J., Demartines, N., Francis, N., Rockall, T., Young-Fadok, T., Hill, A., Soop, M., de Boer, H., Urman, R., Chang, G., Fichera, A., Kessler, H., Grass, F., Whang, E., Fawcett, W., Carli, F., Lobo, D., Rollins, K., Balfour, A., Baldini, G., Riedel, B., & Ljungqvist, O., (2019):** Guidelines for perioperative care in elective colorectal surgery: Enhanced Recovery After Surgery (ERAS®) society recommendations, World J. Surg. ,Vol.(43),No. (3), Pp.:659–695.
12. **Kalogera, E., & Dowdy, S., (2016):** Enhanced recovery pathway in gynecologic surgery: improving outcomes through evidence-based medicine, Obstet. Gynecol Clin. North Am, Vol.43, No.3, Pp.551–573.
13. **Ljungqvist, O., Scott, M., & Fearon, K., (2017):** Enhanced recovery after surgery:a review.JAMA Surg.,Vol.(152),No.(03),Pp.292-298.
14. **Meyer, L., Lasala, J., Iniesta, M., Nick, A., Munsell, M., Shi, Q., Wang, X., Cain, K., Lu, K., & Ramirez, P., (2018):** Effect of an Enhanced Recovery After Surgery Program on Opioid Use and Patient-Reported Outcomes, Obstet Gynecol. Vol.(132),No.(2),Pp. 281–290.
15. **Miralpeix, E., Nick, A., & Meyer, L., (2016):** A call for new standard of care in perioperative gynecologic oncology practice: Impact of enhanced recovery after surgery (ERAS) programs. Gynecol Oncol, Vol.(141), No.(02), Pp.371–378.
16. **Modesitt, S., Sarosiek, B., Trowbridge, E., Redick, D., Shah, P., Thiele, R., Tiouririne, M., & Hedrick, T., (2016):** Enhanced recovery implementation in major gynecologic surgeries: effect of care standardization, Obstet. Gynecol. Vol.(128),No.(03),Pp.457–466.
17. **Myriokefalitaki, E., Smith, M., & Ahmed, A., (2016):** Implementation of enhanced recovery after surgery (ERAS) in gynaecological oncology, Arch Gynecol. Obstet. Vol. (294), No.(1), Pp.137-143.
18. **Nanavati, A., & Subramaniam, P., (2015):** Fast Tracking Colostomy Closures,Indian J Surg.Epublication [Ahead of print]. doi10.1007/s12262-015-1224-9.50
19. **Nelson, G., Altman, A., & Nick, A., (2016):** Guidelines for postoperative care in gynecologic/oncology surgery: Enhanced Recovery After Surgery (ERAS®) Society recommendations–Part II, Gynecol. Oncol .,Vol.(140),No.(02),Pp.323–332.
20. **Nelson, G., Gamez, J., Kalogera, E., Glaser, G., Altman, A., Meyer, L., Taylor, J., Iniesta, M., Lasala, J., Mena, G., Scott, M., Gillis, C., Elias, K., Wijk, L., Huang, J., Nygren, J., Ljungqvist, O., Ramirez, P., & Dowdy, S., (2019):** Guidelines for perioperative care in Gynecologic /oncology: Enhanced Recovery After Surgery (ERAS) Society recommendations—2019 update, Int. J. Gynecol. Cancer, Vol.(29), Pp.651–668.
21. **Nelson, G., Kalogera, E., & Dowdy, S., (2014):** Enhanced recovery pathways in gynecologic oncology, Gynecol. Oncol.,Vol. (135), No.(3) ,Pp.586–594.
22. **Nygren, J., Thorell, A., & Ljungqvist, O., (2015**): Preoperative oral carbohydrate therapy, Curr Opin Anaesthesiol, Vol.(28),No.(3),Pp.364–369.
23. **Rebecca, N., & Blumenthal, M., (2019):** ERAS: Roadmap For A Safe Perioperative Journey, The Official Journal of the Anesthesia Patient Safety , Volume (34), No. (1),Pp 1–28
24. **Relph, S., Bell, A., Sivashanmugarajan, V., Munro, K., Chigwidden, K., Lloyd, S., Fakokunde, A., & Yoong, W., (2014):** Cost effectiveness of enhanced recovery after surgery programme for vaginal hysterectomy: a comparison of pre and post-implementation expenditures, Int. J. Health Plann. Manage., Vol. (29),No.(4),Pp.399–406.
25. **Royal College of Obstetricians and Gynaecologists, (2018):** Enhanced recovery in gynaecology. Available at: https://www.rcog.org.uk/ globalassets/documents/guidelines/ scientific-impact- papers/sip_36.pdf.
26. **Steinberg, A., Schimpf, M., White, A., Mathews, C., Ellington, D., Jeppson, P., Crisp, C., Aschkenazi, S., Mamik, M., Balk, E., & Murphy, M., (2017):** Preemptive analgesia for postoperative hysterectomy pain

control: systematic review and clinical practice guidelines, Am J Obstet Gynecol.,Vol. (217),No.(3),Pp.303-313.

27. **Taurchini, M., Del Naja, C., & Tancredi, A., (2018):** Enhanced Recovery After Surgery: a patient centered process, Journal Vis. Surg., Vol. (4), No.(40), Pp.1-11
28. **Waller, A., Forshaw, K., & Bryant, J., (2015):** Preparatory education for cancer patients undergoing surgery: a systematic review of volume and quality of research output over time Patient Education and Couns
29. **Wang, F., Li, C., Li, S., & Li, Q., (2014):** Integrated interventions for improving negative emotions and stress reactions of young women receiving total hysterectomy, Int. J. Clin. Exp. Med., Vol. (7), No. (1), Pp.331–336.
30. **Yoong, W., Sivashanmugarajan, V., Relph, S., Bell, A., Fajemirokun, E., Davies, T., Munro, K., Chigwidden, K., Evan, F., & Lodhi, W., (2014):** Can enhanced recovery pathways improve outcomes of vaginal hysterectomy? Cohort control study, Journal of Minimally Invasive Gynecology, Vol. (21), No. (1), Pp.83–89.