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EFFECT OF APPLING A DEVELOPED SAFE DISCHARGE SCALE FROM THE RECOVERY ROOM ON THE INCIDENCE OF IMMEDIATE COMPLICATIONS FOLLOWING MAJOR ABDOMINAL SURGERY

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ABSTRACT

Focus on specialized nursing care during the immediate postoperative recovery period is the recognition that mortality can be prevented and complications managed. Many systems and scales have been used to assess the patient's health status and vital readiness for discharge from the recovery room to other surgical departments. However, most of those scales did not include sufficient vital signs and were not well defined, leaving them open to broad interpretation and increased variability between observers. **Objective:** Determine the effect of implementing a developed scale for safe discharge from the recovery room on immediate complications following major abdominal surgery. **Tools and methods**: The research was conducted on a sample of 100 patients in the recovery room and the departments of general surgery, urology, vascular and gynecology at Tishreen University Hospital, divided equally into two groups, so that a developed scale was applied to 50 patients in the experimental group, and 50 patients in the control group were left to the hospital routine. Direct complications occurring in patients in the control and experimental sample were evaluated 24 hours after the surgery, and three developed tools were used: the demographic and biometric data form, the direct complications form after surgery, and the scale developed by the researcher based on previous references and literature and the consensus of experts in this field. **Results**: The results showed the effectiveness of applying the developed scale, as the incidence of all complications, including nausea, vomiting, pain, hypothermia, cardiac and renal disorders, bleeding and gas retention, decreased significantly in the experimental group compared to patients in the control group who were left to the hospital routine. **Conclusions:** The study data suggest that the application of the improved scale in the recovery room contributes to reducing the incidence of direct complications following major abdominal surgery.

KEYWORDS: Safe discharge scale, complications, major abdominal surgery.

INTRODUCTION

Abdominal surgery is defined as a type of surgery that covers a wide range of operations involving the opening of the abdomen. Each organ is treated individually in abdominal surgery, depending on its specificity.[1][2][3]

Abdominal surgery constitutes a heterogeneous group of procedures that form the core of general surgical practice, this includes a long list of surgical procedures performed on an elective or emergency basis. Classic examples include, but are not limited to, resection of gastric organs, operations for complex inflammatory bowel diseases, repair of intestinal obstruction, liver resection, bariatric surgery, tumor resection, and others.[4]

In the immediate postoperative period, the patient requires special care called post-anesthesia care, which begins from the moment the surgical procedure is completed and continues in the recovery room until the patient is discharged.[5] Nursing plays an important role in providing nursing care to surgical patients throughout this entire period. However, special care for the patient in the first stage, immediately following surgery, called the recovery stage, occupies the greatest importance on the healthcare provider's agenda, especially in major surgeries. The complications and anesthetic complications that occur during this stage pose a major challenge, as it is a delicate and influential stage in subsequent stages, and because of its impact on the patient's length of stay in the hospital, and the resulting

increased financial cost of hospitalization. Therefore, nurses working to care for the patient during this stage must be highly qualified and possess the knowledge and skills necessary to treat patients undergoing various surgeries of varying complexity who require special and individualized care. The nurse must plan the care provided to restore the patient's physiological balance with the least possible complications, and to facilitate the provision of assistance and quality service.[6] Previous literature has shown that immediate postoperative complications affect long-term survival regardless of preoperative risk assessment,[7] Therefore the historical motivation behind focusing on specialized nursing care during the immediate postoperative phase, called the recovery phase, was the realization that mortality can be prevented and complications that occur after surgery and anesthesia can be managed in a timely manner.[8]

Under the guidelines established by the American Society of Anesthesiologists, discharge care from the recovery room should be supervised by a physician capable of managing surgical and anesthetic complications. However, it is more common for the decision to discharge a patient to be made by a group of nurses experienced in patient care, based on guidelines and protocols using specific criteria developed by anesthesiology supervisors. Numerous systems and scales have been used to assess a patient's health status for the purpose of continuing medical care from the 1950s to the present day. Most of the scales used did not include objective criteria for assessing hypoxemia, and the indicators assessed were not well-defined, leaving them open to broad interpretation and increased inter-observer variability. Since then, many scales have been proposed, modified, or abandoned.[9]

Therefore, this study was conducted to determine the impact of implementing a developed scale on immediate complications following major abdominal surgery.

Significance and Objectives of the Research

Significance of the Research:

Theoretically: There is an urgent need to develop clinical practice guidelines that serve as a tool to improve the care provided to patients undergoing major abdominal surgery in the recovery room. Furthermore, there is a need to standardize many of the indicators related to care during this phase and reduce unjustified variability among these indicators. It has also been proven that increasing the number of indicators included and measured is better for controlling postoperative developments, and that each individual indicator has an additive effect and must be applied together to maximize the benefit.

Practically: The results of the current study constitute a clinical practice guide by providing a safe measure for patient discharge from the recovery room. This measure serves as a tool to improve the care provided to patients undergoing major abdominal surgery, thereby enhancing recovery.

Research Objective: The research aims to determine the effect of implementing a developed safe discharge from the recovery room measure on the incidence of immediate complications following major abdominal surgery.

METHODS AND MATERIALS

Research Design: The experimental approach was used.

Place and Time: The study was conducted in the Surgical Operations Department (Recovery Room) and the General Surgery Department (Urology, Gynecology, Vascular Surgery) at Tishreen University Hospital in Lattakia Governorate, during the period from December 20, 2022, to October 20, 2023.

Research Sample: The study was conducted using a simple random sampling method on a sample of 100 male and female patients. The patients aged between 18 and 60 undergo major abdominal surgery under general anesthesia. Patients requiring direct transfer from the operating room to intensive care, patients whose stay in the recovery room exceeded three hours, and patients undergoing spinal anesthesia were excluded from the sample. The sample was divided into two groups: The first group, that experimental group, which consisted of 50 patients, was subjected to the developed scale while in the recovery room. Immedate complications were assessed in the hospital's specialized surgical department.

The second group: That control group, which consisted of 50 patients who were transferred to routine care in the recovery room. Patients were followed up and assessed for immediate complications during their stay in the hospital's specialized surgical department.

Research Tools

Three research tools were developed and used, drawing on relevant references and research, to collect data from the study sample. The **first tool** included a biodemographic data form, developed by the researcher and divided into two sections: demographic data, which included age and gender only, and Health data included medical diagnosis, type of surgery, vital signs, medication history, surgical history, medical history, comorbidities, duration of surgery, patient habits, body mass index (BMI), and the patient's physical condition classification according to the American Society of Anesthesiologists (ASA) scale,[10] which is a scale used to determine a patient's ability to tolerate surgery and anesthesia based on their medical history. It was approved by the American Board of Anesthesiologists in 2014 and subsequently updated in 2020 to include assessment of additional potential conditions. Its scores are as follows: ASA I: A healthy, normal patient as follows: healthy, body mass index (BMI) ≤30, non-smoker, non-alcoholic, or consumes only small amounts of alcohol. ASA II: The patient suffers from mild systemic disease without significant functional limitations, such as: active smoker, alcoholic, pregnancy, obesity (BMI <40), controlled diabetes, and

hypertension. ASA III: The patient has a severe systemic disease with significant functional limitations, such as: alcohol abuse and addiction, severe obesity (BMI >40), uncontrolled diabetes and hypertension, active hepatitis, pacemaker implantation, decreased heart rate, a history of stable angina, a patient with end-stage renal disease undergoing regular hemodialysis, chronic obstructive pulmonary disease, a cerebrovascular accident or transient ischemic attack, coronary artery disease, or a history of sleep apnea. ASA IV: The patient has a severe systemic disease with a high risk of death, such as: a heart attack less than three months ago, a cerebrovascular accident, a transient ischemic attack, coronary artery disease, persistent myocardial ischemia or valvular dysfunction, a severely decreased heart rate, infections, disseminated intravascular coagulation, or end-stage renal disease not undergoing regular hemodialysis. ASA V: A patient in critical condition who is not expected to survive without surgery, as follows: thoracic or abdominal aneurysm, shock, intracranial hemorrhage, or intestinal ischemia. ASA VI: A patient declared dead with plans for organ donation.

The **second tool** included a scale developed by the researcher for the discharge of a surgical patient from the recovery room. A maximum score was set for the scale, and scores were assigned for each of the indicators included within the scale. New indicators were added based on previous literature and expert consensus, such as (urinary output, temperature, bleeding, and pulse). In its final form, the scale included 10 indicators, each indicator has a maximum value bearing the number (3), which indicates the normal condition, and a minimum value (0) zero, which indicates the worst value for the indicator. As for the numbers (1) or (2), they indicate the presence of a disorder in the indicator, which are:

1. Level of consciousness and orientation: If the patient is fully aware of time and place, a value of (3) is assigned.
2. Systolic blood pressure: If its value is between 100-140 mmHg, it is given a value of(3).
3. Axillary temperature: If it is between 36-37°C, it is given a value of (3).
4. Respiration: If the number of breaths exceeds ten times, it is given a value of (3).
5. Pulse: If the heart rate is between 50-100 beats/minute, it is given a value of (3).
6. Blood oxygen saturation: If the percentage is greater than or equal to 94%, it is given a value of (3).
7. Patient's Pain Level: If the patient does not experience pain, the score is (3).
8. Nausea and Vomiting Symptoms: If the patient does not experience symptoms of nausea and vomiting, the score is (3).
9. Urine Output: If the urine output is greater than 50 ml/hour, the score is (3).
10. Bleeding: If the patient does not experience bleeding, the score is (3).

Therefore, the total score for the indicators is (30). The patient is discharged from the recovery room if the score is (24) or higher and is not discharged if the numerical score for any indicator is (0).

The **Third Tool**: A list of immediate complications following abdominal surgery, designed by the researcher, includes: the type of complication, method of diagnosis, time of occurrence, and severity. Complications included: hypothermia, nausea and vomiting, hypoxia, cardiac disturbances, bleeding, pain, and gas retention.

Research Method

1. Approvals: The necessary approvals were obtained.
2. Development of Study Tools: The first tool was developed by the researcher after translating the ASA scale to determine the patient's ability to withstand surgery and anesthesia. The second tool, these following steps were adopted in developing the scale: Relevant references were reviewed, and indicators of previous scales were evaluated based on previous studies. The strengths and weaknesses of several scales were examined, and suggestions were made for their inclusion or removal from the developed scale. New indicators were added based on previous research, and a final grade was established for discharge. The developed version of the scale was then presented to a group of experts in the fields of medicine and nursing to examine its validity, comprehensiveness, and clarity of its items. Necessary additions or modifications were made in light of their comments.
3. The third tool was designed by the researcher based on potential complications immediately after surgery, adding complications that occurred in the study patients, and recording their symptoms, time of occurrence, and frequency.
4. Patient consent was obtained.
5. Data collection: Data was collected between December 20, 2022, and October 20, 2023.
6. A sample of 100 patients was selected using a simple random sampling method from patients undergoing major abdominal surgery at the hospital. The sample was divided into two equal groups as follows:

- The first group (experimental): Consisting of 50 patients, the developed scale was applied in the recovery room as follows:

✓ The developed scale's values were recorded immediately after surgery, and the time the patient spent from the moment the surgery was completed until the minimum value for discharge to the surgery department was achieved according to this scale as follows: less than (15) minutes, (15-30) minutes, (30-60) minutes, (1-2 hours), and (2-3) hours maximum.

✓ The patient was discharged from the recovery room after achieving the minimum value required for discharge according to this scale, and approval was obtained from specialists such as the

anesthesiologist and the surgeon.

- ✓ Patients were followed in the surgical department for 24 hours to detect immediate complications. Complications, including their symptoms, time of occurrence, and recurrence, were recorded using the third instrument.
- The second group (control): Consisting of 50 patients, the patient was left to the hospital's care in the recovery room by specialists. They were then followed by the researcher in the surgical department for 24 hours to detect immediate complications. Symptoms, time of occurrence, and recurrence were recorded using the third instrument.

7. Data was collected, classified, and presented in tables and graphs using appropriate statistical methods to compare the developed scale with the hospital's routine for patient discharge from the recovery room and its impact on immediate complications after major abdominal surgery.
8. The following statistical tests were used:

-Frequency (N), Mean (M), Standard Deviation (SD), and Percentage.(%)

-The Chi-square test (Ch,2) was used to compare demographic characteristics, medical history, and complications between the two study groups.

-The Shavero test was used to test for normal distribution of variables.

- Differences at the significance threshold (p value ≤0.05) were considered statistically significant and are indicated by the symbol (*), and differences at the significance threshold (p value ≤0.01) were considered highly statistically significant and are indicated by the symbol (**).

RESULTS AND DISCUSSION

RESULTS

The study was conducted on 100 patients in the recovery room at Tishreen University Hospital in Lattakia. They were selected using a simple random sampling method and randomly divided by the researcher into two equal groups.

Demographic Data

Table (1): Distribution of patients in the study according to their demographic data in the study groups and the relationship between them.

X^2p	Control		Experimental Developed		Variable Categories	Variables
	%	F	%	F		
4.641 0.200	4.0	2	2.0	1	20-30	Age in years
	18.0	9	20.0	10	31-40	
	54.0	27	36.0	18	41-50	
	24.0	12	42.0	21	51-60	
0.042 0.838	38.0	19	40.0	20	Male	Gender
	62.0	31	60.0	30	Female	

X2: Indicates the Chi-square test (Ch,2 Chi square). P: Significance level.

Table 1 shows the distribution of patients in the study according to their demographic data in the two study groups and the relationship between them. It shows that the highest percentage of patients (42%) in the experimental developed group was in the age group (51-60 years), compared to 54% in the control group who were in the age group (41-50 years). The highest percentage of them were females (60% experimental developed, 62% control). It also shows that there was no statistically significant difference (significance level less than 0.05) between the two study groups according to the studied variables.

Table (2): Distribution of patients in the study according to their health data in the study groups and the relationship between them.

X^2p	control (50)		Experimental developed (50)		Variable Categories	Variables
	%	F	%	F		
6.569 0.087	12.0	6	14.0	7	18 <	BodyMass Index (BMI) kg/m2
	30.0	15	38.0	19	18.5-24.9	
	46.0	23	48.0	24	24.9-29.9	
	12.0	6	0	0	30 <	
2.837 0.092	2.0	1	10.0	5	Non	Medication History
	98.0	49	90.0	45	available	
0.043 0.836	36. 0	18	38.0	19	Non	Surgical History
	64.0	32	62.0	31	available	
0.877 0.349	28.0	14	20.0	10	Non	Medical History
	72.0	36	80.0	40	available	
0.167 0.683	62.0	31	58.0	29	Non	Comorbidities
	38.0	19	42.0	21	available	

0.210 0.900	10.0	5	8.0	4	2<	Surgical Duration / Hours
	58.0	29	62.0	31	2-3	
	32.0	16	30.0	15	3 >	
1.528 0.216	34.0	17	44.0	22	no	Smoker
	66.0	33	56.0	28	yes	
0.332 0.564	84.0	42	88.0	44	no	Alcoholic
	16.0	8	12.0	6	yes	
3.973 0.137	14.0	7	28.0	14	ASA I	Physical Status
	64.0	32	46.0	23	ASA II	
	22.0	11	26.0	13	ASA III	

X2: refers to the Chi-square test (Ch2 Chi square). P: significance level.

Table 2 shows the distribution of patients in the study according to their health data in the study groups and the relationship between them. It showed that the highest percentage of patients (48% Experimental developed, 46% control) had a body mass index indicating that they were overweight (BMI between 25.9 - 29.9), and most of them (90% Experimental developed, 98% control) had a medication history. The table also showed that the highest percentage of patients (80% developed scale, 72% control) had a surgical history, and (58% Experimental developed, 62% control) had comorbidities. In terms of the duration of the surgical operation, it was (2 - 3 hours) for the highest percentage (62% Experimental developed, 58% control), and the highest percentage of them were smokers (56% Experimental developed, 66% control), in contrast, the majority of them were non-alcoholics (88% Experimental developed, 84% control), and as for the physical status classification, it was (ASA II) at (46% Experimental developed, 64% control), and the differences in previous health characteristics between the two groups were not statistically significant because the significance level was greater than 0.05.

Table (3): Comparison of the Incidence of Direct Postoperative Complications in Patients Between the Two Study Groups.

X^2 *p*	**Control(50)**		**Experimental developed(50)**		hypothermia
	%	F	%	F	
47.868 **0.000****	68.0	34	2.0	1	available
	32.0	16	98.0	49	non
X^2 *p*	**Control(50)**		**Experimental developed(50)**		hypoxia
	%	F	%	F	
6.775 **0.009****	28.0	14	8.0	4	available
	72.0	36	92.0	46	non
X^2 *p*	**Control (50)**		**Experimental developed(50)**		Nausea and vomiting
	%	F	%	F	
9.091 **0.003****	60.0	30	30.0	15	available
	40.0	20	70.0	35	non
X^2 *p*	**Control (50)**		**Experimental developed(50)**		bleeding
	%	F	%	F	
18.778 **0.000****	36.0	18	2.0	1	available
	64.0	32	98.0	49	non
X^2 *p*	**Control (50)**		**Experimental developed(50)**		cardiac disorder (tachycardia-bradycardia)
	%	F	%	F	
22.374 **0.000****	48.0	24	6.0	3	available
	52.0	26	94.0	47	non
X^2 *p*	**Control (50)**		**Experimental developed (50)**		Renal disorder
	%	F	%	F	
4.167 **0.041***	8.0	4	0	0	available
	92.0	46	100	50	non
X^2 *p*	**Control(50)**		**Experimental developed (50)**		Pain
	%	F	%	F	
14.446 **0.000****	70.0	35	32.0	16	available
	30.0	15	68.0	34	non
X^2 *p*	**Control(50)**		**Experimental developed(50)**		Gas Retention
	%	F	%	F	

8.696	16.0	8	0	0	available
0.003**	84.0	42	100	50	non

X^2: Indicates Chi-square test. P: Significance level *: P value ≤ 0.05, **: P value ≤ 0.01

Table 3 shows that the incidence of all studied direct postoperative complications (hypothermia, hypoxia, nausea and vomiting, bleeding, cardiac disturbances (tachycardia-bradycardia), renal disturbances, pain, and gas retention) in patients in the Experimental developed group was significantly and statistically significantly lower (P < 0.05) than in the control group.

DISCUSSION

Recognizing and managing postoperative problems in a timely manner can be lifesaving.[11] Nursing care in the recovery room primarily aims to provide continuous monitoring, allowing healthcare professionals, particularly nurses, to detect and restore impaired vital functions, the absence of which or the lack of appropriate equipment can lead to complications that could lead to shock or death.[12] The current study, which included 100 patients undergoing major abdominal surgery, showed that most of the sample in both study groups were between 20 and 60 years old, and most were female. They were overweight, had a history of medication and surgery, and had comorbidities. Their surgical duration was between 2 and 3 hours. They were smokers but non-alcoholics. Their physical status classification, according to the American Society of Anesthesiology scale, indicated that the patient had mild systemic disease without significant functional limitation (ASA II). This indicates that the sample was largely homogeneous in terms of demographic and health data. This is important to ensure that differences in study results are attributable to the measures used in the groups and not to differences in the characteristics of the participants themselves.

The study results showed that hypothermia was the most common complication after surgery for most patients in the control sample. This may be primarily due to the lack of use of a heating device in the hospital or the failure to operate the heating systems due to long hours of rationing. However, the incidence rate after applying the developed scale was only 2% among patients in the experimental group. This is considered logical for a gradual return of temperature to the normal range (<36), given that hypothermia is caused by anesthetic agents. Therefore, the period for leaving the recovery room, which ranged between 30-60 minutes, was good for restoring thermal balance. In addition, this period may also be good for beginning to restore most other vital signs to their normal or near-normal state, such as consciousness, orientation, physical activity, and hemodynamic stability related to mean arterial pressure, which contribute to returning temperature to normal limits. These signs were not monitored in the control group.

The current result is consistent with the results of a study (Loftus et al, 2019) conducted in the United States of America with the aim of evaluating the effect of applying a unified protocol with standard procedures on the rate of complications following emergency abdominal surgeries and comparing it with other measures. The results of that study showed that most of the patients included in the study experienced hypothermia within the first hour after surgery, and that the lowest number of those were in the group to which the unified protocol was applied. In contrast, the "New Fast Track" measure gave a good result in reducing the percentage of patients who experienced hypothermia after surgery, but that percentage remained higher than in the members of the other experimental group, and that the difference between the groups was statistically significant.[13]

On the contrary, the current result was not consistent with the result of the study (Dahak and Verma, 2024) in India, which aimed to conduct an analytical comparison between the criteria followed by applying the "New Fast Track" scale with other developed scales used in the same context. The results of that study showed that the "New Fast Track" scale with its multiple criteria led to a reduction in the incidence of postoperative hypothermia in patients compared to other scales, but there was no significant statistical significance.[14]

The results of the current study also showed that nausea, vomiting and pain were also among the most common complications after surgery, but the number of patients who experienced these complications was statistically significantly lower. This is consistent with a study conducted by (Apfelbaum, J. 2002) that applying a scale that includes vital parameters reduces complications that occur after surgery, especially complications of nausea, vomiting and pain.[15] while a study conducted by (Burki et al.2013) showed that patients who underwent the application of a scale such as New Fast Track needed more nursing interventions related to nausea and vomiting compared to using other scales.[16]

The results of the current study showed that the incidence of hypoxia in the developed scale group was statistically significantly lower than in the control group. This can be explained by the improvements in care strategies included in the developed scale, such as oxygen administration procedures, respiratory care, and the use of effective heating techniques, which help reduce heat loss and thus maintain normal oxygen levels in the improved scale group for a longer period than in patients in the other groups. The current result is consistent with the results of the study (Loftus et al, 2019), which showed that most of the patients included in the study were exposed to hypoxia within a very short period after surgery, and that the highest percentage of those were in the group to which the routine protocol was applied. In contrast, the presence of the "New Fast Track" scale gave a better result than that protocol in

reducing the percentage of patients who were exposed to hypoxia after surgery, and this difference between the groups was statistically significant.[13]

The results of the current study showed that the incidence of bleeding in the improved scale group was statistically significantly lower than in the control group (P<0.05). The lower incidence of bleeding in the developed scale group suggests that this scale may incorporate effective strategies such as improved fluid intake and output regulation, blood pressure control, and the use of meticulous surgical techniques, which help reduce the incidence of postoperative bleeding. This reflects the importance of close monitoring and rapid intervention during this period, as included in the developed scale.

The current finding is like a study (Duan et al, 2022) conducted in China to compare three models of scales for assessing postoperative patients: the first was the New Fast-Track scale, the second was a scale with routine nursing standards, and the third was a combined model. The results of this study showed that the combined model was more effective in reducing the proportion of patients who experienced postoperative bleeding, and this proportion was lower than in the other groups, with statistically significant differences. The proportion of these patients in the New Fast-Track scale group was also lower than in the routine nursing standards group.[17] The current result also did not align with the results of a study conducted in Sweden by (Williamsson et al.2015) to evaluate the effect of the New Fast Track scale on the severity of immediate complications after partial splenectomy. The results showed that the proportion of patients who experienced postoperative bleeding in the New Fast Track scale group was equal to the proportion of patients who experienced the same problem in the control group, and there were no statistically significant differences in this regard.[18]

The results of the current study showed that the incidence of cardiac arrhythmias (tachycardia- bradycardia) in the developed scale group was lower than in the control group, and this was statistically significant (P<0.05). There are some immediate post-operative complications, the occurrence of which is often linked to the occurrence of other complications, both in terms of timing and severity. In the context of the current outcome, the effectiveness of the developed scale in reducing the incidence of post-operative cardiac events may be due to its effectiveness in reducing the incidence of other complications, such as bleeding and hypothermia. This should not be overlooked, however, as the effective strategies included in the developed scale compared to other scales and strategies in the current study, such as focusing on monitoring vital signs, using appropriate medications, and implementing modern nursing care techniques, and implementing modern nursing care techniques.

The current finding is consistent with a study by (Gharouni et al. 2023), which showed that the percentage of patients who experienced cardiovascular arrhythmias after surgery was lower in the group using the improved ERAS protocol compared to the control group, and this difference was statistically significant.[19] The current result is also consistent with the results of a study (Zhao et al., 2014), which showed that the combined model in all the studies included in the analysis contributed to a greater reduction in the proportion of patients who experienced cardiovascular events than in the control group, and this resulted in statistically significant differences across all of these studies.[20]

Conversely, the current result is not consistent with the results of a study (Jia et al., 2014), which showed that the standardized model contributed to a reduction in the proportion of patients who experienced cardiac events, but without any statistical significance.[21]

The results of the current study showed that oliguria did not occur in the developed scale group, while its incidence was low in the control group, and this difference was statistically significant.

The absence of oliguria in the developed scale group suggests that this scale may include effective strategies for fluid management and postoperative care, helping to maintain normal urine flow. This reflects the need for close monitoring and effective management and also confirms the effectiveness of the strategies implemented in the improved scale group. This result may also be attributed to the lower proportion of patients in the improved scale group who experienced bleeding and cardiac disturbances, which are among the most direct complications affecting the occurrence of urinary tract problems after surgery.

The current result is consistent with the results of a study (Aggarwal et al., 2024), which showed that implementing the so-called "New Fast Track" scale contributed to reducing the proportion of patients who experienced renal complications such as oliguria, but not to the extent that implementing the improved protocol based on national standards contributed, which resulted in a greater reduction in the incidence of these complications after surgery, and this difference was statistically significant. In contrast, the proportion of patients who experienced renal problems after surgery in the "New Fast Track" scale group was very close to that of their counterparts in the control group.[22] The current result is also consistent with the results of a study conducted in Russia by (Belobordov et al, 2023) comparing the effectiveness of the New Fast Track and Multi-Strategy Protocols on the incidence of complications after ureteral transplantation. The results of this study showed that patients in the Multi-Strategy Protocol group did not experience any postoperative urinary problems. In contrast, some patients in the New Fast Track group experienced some urinary problems, such as oliguria.

However, this difference was not statistically significant.[23]

The results of the current study showed that gas retention did not occur in the developed scale group, while its incidence was low in the control group. This difference was statistically significant.

The problem of gas retention after surgery is associated with several factors, such as anesthesia technique, patient positioning during surgery, the rate of postoperative hypothermia, and early postoperative mobilization. The developed scale focused on monitoring these factors and focusing on effective postoperative care strategies, such as improving bowel movements and providing appropriate support to patients after surgery, which is what accounts for the current result. The current result is consistent with the results of a study (Aggarwal et al., 2024), which showed that implementing a developed protocol based on national standards contributed to a significant reduction in the percentage of patients who experienced gas retention, compared to the percentage of patients who experienced the same event in the control group.[22] The current result is consistent with a study (Xu et al, 2015), which showed that the use of the "New Fast Track" model was effective in reducing the incidence of gas retention in postoperative patients compared to the traditional integrated model used in the management and care of these patients, and there were statistically significant differences in this aspect.[24] Another study (Jia et al, 2014) showed that the use of the "New Fast Track" model contributed to a reduction in the percentage of patients who experienced gastrointestinal complications such as intestinal obstruction and gas retention, but without any statistical significance.[21] The current results were also consistent with the results of a study (Gharouni et al, 2023), which showed that patients in the improved ERAS protocol group did not experience any gastrointestinal problems such as intestinal obstruction or intestinal gas retention.[19]

CONCLUSIONS AND RECOMMENDATIONS

CONCLUSIONS

1 Most of the patients in the sample were between 40 and 60 years old, and most of them were women.

2 The developed scale contributed to reducing the incidence of direct complications after abdominal surgery, and there were statistically significant differences between the two groups in terms of (hypothermia, hypoxia, nausea and vomiting, bleeding, cardiac disorders, renal disorders, pain, and gas retention) compared to the control group.

Recommendations

1 Generalize the use of the developed scale in the current study more widely in various healthcare units, given its effectiveness in reducing the incidence of complications after surgery.

2 Add other indicators, such as creatinine levels and other laboratory tests, to improve patient outcomes.

3 Provide ongoing training for medical and nursing staff on how to effectively apply the developed scale to ensure optimal outcomes.

4 Conduct additional research on a larger sample to strengthen the results of the current study.

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