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Impact of a Nurse-Led Enhanced Recovery Pathway on Perioperative Patient Satisfaction in Hepato-Pancreato-Biliary Surgery

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Abstract
Background: The most desired result is patient satisfaction, which every hospital should aim for. Improved postoperative recovery maximizes care prior to, during, and following surgery by lowering perioperative stress, determining patient needs, and advancing clinical practice. **Aim:** Evaluate the impact of a nurse-led enhanced recovery pathway on perioperative patient satisfaction in hepato-pancreato-biliary surgery. **Design**: Quasi-experimental study. **Setting**: The study was conducted at surgical department, operation unit and intensive care Unit at Alrajhy Liver Hospital. **Sample:** Sixty patient undergoing hepatobiliary pancreatic surgeries. The sample was divided into two groups; control and study group (30 patients each). **Tools:** Patient satisfactions assessment questionnaire tool. It included three parts: Patient assessment, postoperative outcomes evaluation, and patient satisfactions questionnaire. **Results**: About 56.7% of the studied patients in the study and the control groups were more than 50 years old. 43.3% in the control group and 93.3% of the study group were satisfied, with highly statistically significant difference between the both groups at p-value <0.01. **Conclusions**: In hepato-pancreato-biliary surgery, implementing a nurse-led enhanced recovery pathway helps reduce postoperative complications and improves perioperative patient satisfaction. **Recommendations**: A nurse-led enhanced recovery pathway should be integrated as a standard practice in hepato-pancreato-biliary surgery. Further research with a larger sample size is recommended to confirm these findings.

Keywords: Enhanced recovery pathway, Hepatico-Pancreatic-Biliary surgery, Nurse & Patient satisfaction

Introduction
Hepato-pancreato-biliary (HPB) surgeries are among the most common procedures carried out globally in the broad field of gastrointestinal surgery **(Kovoor et al., 2022).** Hepato-pancreato-biliary surgery involves operating on the pancreas, gall bladder, bile ducts, and liver. It is essential to treat HPB because some procedures, like pancreaticoduodenectomy or hepatectomy, are thought to be complex and carry a high inherent risk, and not all hospitals perform them **(Woodhouse et al., 2021).**

Because it depends on a patient's subjective assessment, patient satisfaction is a complicated concept. The patient's emotional, social, cultural, past, and future expectations are some of the variables that affect it. Patients frequently contrast their expectations with both their actual results and their experiences. The patient may become unhappy if the real situation does not live up to those expectations **(Teshome et al., 2022).** Patient satisfaction with elective surgery is influenced by waiting time, age, the type of surgery, the patient's residence, and the duration of their hospital stay **(Derso et al., 2024).**

An essential component of healthcare is perioperative anesthesia services. It includes a perioperative evaluation to determine anesthesia-related risk factors and surgical planning for the type of anesthesia that may be used. As a result, the degree of patient satisfaction with perioperative anesthesia services is a crucial part of the health care system and a quality indicator **(Huang et al., 2022).**

Prior to, during, and following surgery, perioperative nurses play crucial roles. For example, prior to surgery, they inform patients about their medication, food restrictions, and surgery. Perioperative nurses also assist during surgery, nurse patients following surgery, and help patients feel less anxious and afraid before surgery. Both medication adherence and patient recovery are aided by these performances. In this sense, raising patient satisfaction with perioperative nursing care is critical to raising the standard of healthcare**(Anaba et al., 2020).**

According to **Van der Storm et al. (2024),** enhanced recovery after surgery (ERAS) begins with a precise diagnosis and aims to evaluate each patient's unique needs in order to optimize treatment before, during, and after surgery by reducing perioperative stress, improving clinical practice, and using evidence-based medicine to manage the patient.

When incorporated into the EARS protocol, pre-operative education effectively reduces pain, nausea, and overall well-being. The purpose of pre-operative

education and counseling includes setting expectations for surgical and anesthetic procedures as well as providing adequate information about postoperative care plans **(Smith et al., 2021).**

Significance of the study

Patient satisfaction has become a top priority for clinicians, hospitals, and healthcare organizations. Beyond addressing patients' needs as consumers, healthcare institutions aim to provide high-quality care that leads to positive health outcomes **(Berkowitz et al., 2021).** To assess the quality of care and advancements in perioperative services, measuring patient satisfaction is essential. Reports on patient satisfaction following anesthesia services vary globally, ranging from 56% to 99% (**Fetene et al., 2022).**

The study aimed to evaluate the perioperative quality of care following the implementation of a nurse-led enhanced recovery pathway at Alrajhy Liver Hospital. According to hospital records from 2022, approximately 105 hepato-pancreato-biliary surgeries were performed at Alrajhy Liver Hospital within a year.

Aim of study:

Evaluate the impact of a nurse-led enhanced recovery pathway on perioperative patient satisfaction in hepato-pancreato-biliary surgery.

Research hypotheses

1. Patients who follow the clinical pathway report higher levels of satisfaction compared to those who do not.
2. Patients receiving the clinical pathway experience fewer complications than those without its implementation.

Patients and Method

Research design: A quasi-experimental research design was used in current study. As an enhanced recovery guidelines were carried out on the study group. Similar to randomized trials, quasi-experiments aim to demonstrate causality between an intervention and an outcome.

Setting: The study was conducted in surgical department, operation unit and intensive care unit at Alrajhy liver hospital**.**

Sample: A purposeful sample of Sixty patient undergoing hepatobiliary pancreatic surgeries. The sample was divided into two groups; control and study group with 30 patient in each. The control started the first then the study group.

The sample size was calculated according to Epi Info 2000. A sample size was selected using a special formula based on prevalence of disease at a confidence interval of 95% and precision of (2%). The sample was increased by 10% to overcome problems related to non-responses and missing data. The power of study was 80%. Considering the following matching criteria age group, sex, diagnosis, comorbidity diseases.

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

Inclusion criteria: Participants aged 18–65 years were included, as this range represents the adult population. Eligible patients were required to have the ability to communicate effectively and no evidence of vital organ failure (renal, hepatic, or cardiac).

Exclusion criteria: Patients were excluded if they had a history of cancer in other organs or if they declined to participate.

Tool of data collection:

Patients' satisfactions assessment questionnaire:

Data were collected using a single tool designed to measure patient satisfaction with the care they received. The tool consisted of three components. The first section of the patient assessment gathered socio-demographic details, such as age, sex, marital status, and educational level, as well as clinical information, including height, weight, BMI, and medical and surgical history, such as prior medical conditions, previous surgeries, and the specific surgical procedure performed.

The second part was developed by researchers based on reviewing the recent related literature **(Joshi & Kehlet 2019),** which included postoperative complications as pneumonia, wound Infection, nausea &vomiting, hypo or hypertension, mortality, admission ICU, fever and length of stay.

The third section utilized the Leiden Perioperative Care Patient Satisfaction Questionnaire (LPPSq) (Caljouw et al., 2008) to assess patient satisfaction with perioperative anesthesia care. This section comprised 23 questions, divided into five categories: nine questions addressing the patient-staff relationship, three questions about organizational services, four questions related to outcomes and concerns, three questions about information provided regarding the surgical and anesthesia procedures, and four questions about time management.

Patients' satisfactions scoring system:

Participants rated their satisfaction on a 5-point Likert scale, where 1 indicated "very dissatisfied," 2 "dissatisfied," 3 "neutral," 4 "satisfied," and 5 "very satisfied" (Bizuneh et al., 2020). The total score ranged from 23 to 115, with higher scores reflecting greater levels of satisfaction.

Validity and reliability of the tool:

The tool's content validity was assessed by a panel of five experts specializing in critical care nursing, anesthesia, and intensive care unit medicine at Assiut University. Based on their feedback, necessary modifications were made to ensure the tool's

relevance and accuracy. To evaluate the tool's reliability, Cronbach's alpha test was conducted, yielding a result of 0.920, which indicates a high level of reliability.

Pilot study:

A pilot study was conducted with six patients (three from each group) to assess the feasibility and appropriateness of the tools. After making the necessary modifications, the pilot data was excluded from the main study. To prevent sample contamination, data collection was completed for the control group before proceeding with the study group. While the study group followed the clinical pathway protocol, the control group received routine hospital care.

Administrative design:

Permissions were obtained from the director of at Alrajhy Liver Hospital at Assiut University. These permissions were aided the researcher to collect data from the studied patients in a legal and formed method.

Ethical consideration:

- The faculty of nursing's ethical committee approved the research proposal, which was assigned the number 1120230610.
- The study subjects were not at risk while the research was being applied.
- Common ethical guidelines for clinical research were adhered to in this study.
- Following an explanation of the nature and goal of the study, written consent was obtained from patients or guidance who were willing to participate.
- Anonymity and confidentiality were guaranteed.
- The study participant was free to decline participation or to leave the study at any time without providing a valid reason.
- Privacy of study participants was taken into account when gathering data.

Data collection and field work:

This study's recruitment phase began in May 2023 and ended in April 2024. During the first three months, the clinical pathway was developed and approved by committees, the hospital's administration as a whole, and the doctors and nurses who were part of the clinical pathway. For the following four months (August, September, October, and November 2023), the control group was collected. In the five months that followed (December, January, February, March, and April 2024), the study group collected data. As a result, the entire study was completed in roughly a year.

For study group:

Following the completion of the control group data collection, care providers received educational training sessions that covered the goal and procedure of putting the pathway into practice. After the training, the researchers began recruiting and screening participants for the study group, and they were given permission by the administration to begin collecting study group data. The patient gave both written and verbal consent so that the researchers could monitor, evaluate, and treat the patients in accordance with the clinical pathway that was planned.

The study was conducted in three phases:

The phase I:

The recruitment phase for this study commenced in May 2023 and concluded in April 2024. The clinical pathway was developed and received approval from relevant committees, the hospital administration, and the doctors and nurses involved in its implementation. The entire study was completed in approximately one year.

This phase consisted of two stages:

Stage I: Hospital routines were examined as an initial step in developing the clinical pathway. An enhanced recovery pathway, led by a nurse, was designed based on a critical analysis of relevant literature. A Google search was conducted between May 2023 and July 2023 to identify evidence-based articles related to patient safety, anesthesia safety, postoperative complications, improved postoperative recovery, and the role of nurses in preventing postoperative complications.

To ensure the relevance and accuracy of the evidence, the study focused on research articles published within the last five years (2019–2023). Additionally, the search was limited to full-text publications in English, without considering geographic location.

The clinical pathway was developed in collaboration with a critical care professor from the Assiut Faculty of Nursing, along with members of the surgical, anesthesiology, and nursing teams from the intensive care unit, operating unit, and surgical department.

To initiate the development of the clinical pathway, the researcher examined multiple theoretical frameworks that outlined its structure and design. Additionally, various clinical pathways from different specialties were reviewed, including guidelines for managing upper respiratory tract infections and the 2019 Enhanced Recovery After Surgery (ERAS) recommendations for perioperative care in pancreatoduodenectomy.

The following section outlines the types of interventions and actions incorporated into the clinical pathway.

Stage II: The clinical pathway was integrated into a training program designed to help the staff implement it across three work shifts. The researcher conducted the training sessions during break periods, and the program was delivered over a span of more than two weeks.

Phase II: implementation of the clinical pathway:
The clinical pathway was implemented as a three-stage enhanced recovery program led by a nurse.

Pre-operative phase: During this phase, patients received counseling and education on chest physical therapy, bowel preparation, early mobilization, spirometry, and how to anticipate common complications. They were also guided on collaborating effectively with nurses.

Intraoperative phase: This phase included optimal fluid management, the use of short-acting anesthetics, regional analgesia, opioid-sparing anesthesia, minimal incisions, avoidance of drains, maintenance of normothermia, prophylactic antibiotics, and prophylactic measures for venous thromboembolism (VTE).

Post-operative phase: Key components of this phase included early oral nutrition, optimal fluid management, multimodal non-opioid analgesia, prevention of post-operative nausea and vomiting, stimulation of gut motility, early mobilization, removal of catheters and drains, chest physical therapy, and the use of spirometry.

Phase III: Evaluation of the Clinical Pathway:
The effectiveness of the clinical pathway was assessed by measuring patient outcomes during the three days following surgery and evaluating their satisfaction with the care process. Key outcomes, including the incidence of respiratory infections, mortality rates, length of hospital stay, occurrence of fever, ICU admissions, readmission rates, and patient satisfaction, were compared between the control group and the study group.

Statistical analysis:

IBM SPSS (version 26.0) software was used for all data cleaning and analysis. Ordinal numbers and percentages (N, %) were used to describe categorical variables, and chi-square (X2) tests were employed to compare them. In order to compare continuous variables, either t-tests were used if the data met the requirements for a non-parametric test or Mann Whitney U tests were used if the data did not meet the requirements for a parametric test. Continuous variables were described using means and standard deviations (means, SD). Using Q-Q plots, which show the observed values against normally distributed data, and the Kolmogorov Smirnov test, continuous variables were also examined for normal distribution. A two-tailed p-value of less than 0.05 was deemed statistically significant.

Results:

Table (1): Distribution of socio-demographic characteristics in the study and control groups (N=60):

Socio-demographic data	Control (n=30)		Study (n=30)		X2	P-value
	No	%	No	%		
Age / years						
Less than 30 years	5	16.7	4	13.3	0.20	0.977
From 30-40 years	5	16.7	6	20.0		
From 40-50 years	3	10.0	3	10.0		
More than 50 years	17	56.7	17	56.7		
Mean±SD(range)	46.5±14.18		49±14.03		-0.69	0.495
Gender						
Female	13	43.3	17	56.7	1.07	0.302
Male	17	56.7	13	43.3		
Level of education						
Illiterate	5	16.7	12	40.0	4.45	0.217
read and write	10	33.3	9	30.0		
Secondary	12	40.0	7	23.3		
high education	3	10.0	2	6.7		
Marital status						
Single	2	6.7	1	3.3	1.50	0.472
Married	25	83.3	28	93.4		
Widow	3	10.0	1	3.3		

Chi square test for qualitative data between the two groups
Independent T-test quantitative data between the two groups

Table (2): Distribution of clinical data among studied patients (N=60):

	Control		Study		T	P-value
	Mean±SD		Mean±SD			
Duration of anesthesia	5.1±1.95		6.15±2.1		-2.00	0.050*
Duration of surgery	4.45±1.77		5.26±1.97		-1.67	0.101
Duration of recovery	29.5±2.74		29±3.81		0.58	0.561
Weight	72.37±13.3		69.13±14.13		0.91	0.365
Height	165.1±7.77		164.87±7.57		0.12	0.907
Body Mass index	26.59±4.94		25.44±5.13		0.89	0.377
Body Mass index	**No**	**%**	**No**	**%**	**X^2**	**P-value**
Underweight	0	0.0	3	10.0	3.21	0.225
Normal Weight	12	40.0	10	33.3		
Overweight	18	60.0	17	56.7		

**Significant level at P value < 0.05.*

Table (3): Percent distribution of medical and surgical data in the study and control groups (N=60):

	Control		Study		X2/T	P-value
	No	%	No	%		
Surgical procedure						
Abdominal exploration	0	0.0	1	3.3	13.48	0.263
Bile duct repair	1	3.3	0	0.0		
CBD exploration	10	33.3	2	6.7		
Laparoscopic distal pancreatectomy	1	3.3	0	0.0		
Heller myotomy	0	0.0	1	3.3		
Hepaticojejunostomy	2	6.7	3	10.0		
Hepaticoduodenostomy	1	3.3	3	10.0		
Klatskin tumor resection	0	0.0	1	3.3		
Liver resection	2	6.7	2	6.7		
Laparoscopic liver resection	1	3.3	0	0.0		
Removal cyst (hydatid cyst)	1	3.3	2	6.7		
Wipple	11	36.7	15	50.0		
Past medical history						
None	25	83.3	27	90.0	1.41	0.842
DM	2	6.7	1	3.3		
DM&HTN	1	3.3	1	3.3		
COPD	1	3.3	1	3.3		
Intracranial hemorrhage with V.P shunt	1	3.3	0	0.0		
Past surgical history						
No	26	86.7	23	76.7	1.00	0.317
Yes	4	13.3	7	23.3		
If Yes						
CBD stent	1	3.3	0	0.0	5.52	0.479
Cholecystectomy	1	3.3	4	13.2		
ERCP	2	6.7	1	3.3		
ERCP& wipple	0	0.0	1	3.3		
Surgical removal renal stones	0	0.0	1	3.3		

Chi square test for qualitative data between the two groups
Independent T-test quantitative data between the two groups

Table (4): Percent distribution of postoperative outcome among studied patients (N=60):

	Control		Study		X2	P-value
	No	%	No	%		
No Complication	6	20.0	14	46.7	4.80	0.028*
Pneumonia	12	40.0	5	16.7	4.02	0.045*
Wound Infection	6	20.0	8	26.7	0.37	0.542
Nausea &Vomiting	7	23.3	1	3.3	5.19	0.023*
Hypo, hypertension	3	10.0	1	3.3	1.07	0.301
Mortality	0	0 0	0	0 0	-	-
Admission ICU	3	10.0	2	6.7	0.22	0.640
Readmission To ICU	0	0 0	0	0 0	-	-
Fever	7	23.3	3	10.0	1.92	0.166
Length of stay						
Less than 10 days	16	53.3	15	50.0	0.49	0.785
From 10-15 days	10	33.3	9	30.0		
More than 15 days	4	13.3	6	20.0		

Chi square test for qualitative data between the two groups
**Significant level at P value < 0.05*

Table (5): Mean±SD distribution of patient's satisfaction regarding implementation of clinical pathway in the study and control groups (N=60):

	Max Score	Control		Study		T	P-value
		Mean±SD	Mean%	Mean±SD	Mean%		
Information	15	11.33±2.43	75.56	12.43±1.38	82.89	-2.16	0.035*
Time	20	13.87±3.54	69.33	16.37±1.73	81.83	-3.47	0.001**
Relationship	45	31.83±8.08	70.74	38.5±2.67	85.56	-4.29	0.000**
organization service	15	10.2±2.57	68.00	12.5±1.38	83.33	-4.32	0.000**
Outcomes	20	14.73±4.03	73.67	17.03±1.38	85.17	-2.96	0.005**
patients' satisfactions scale about caring process	**115**	**81.97±17.67**	**71.28**	**96.83±6.68**	**84.20**	**-4.31**	**0.000****

Chi square test for qualitative data between the two groups
**Significant level at P value < 0.05, ** highly significant level at P value < 0.01*

Table (6): Comparison of Patient Satisfaction Scores Between Study and Control Groups (N=60)

Patient satisfactions	Max Score	Control (n=30)		Study (n=30)		X2	P-value
		No	%	No	%		
Dissatisfaction(<75%)	115	17	56.7	2	6.7	17.3	<0.001**
Satisfaction(≥75%)	115	13	43.3	28	93.3		
Mean ± SD (Range)	**115**	**82.0 ± 17.7 (59–111)**		**96.8 ± 6.7 (82–115)**		**4.1**	**<0.001****

Chi square test for qualitative data between the two groups
*** Highly significant level at P value < 0.01.*

Table (1): Shows the socio-demographic data in the control and study groups, and revealed that 56.7% of the studied patients in the study and the control groups were more than 50 years old. Regarding gender, it was found that 56.7% of them in the control group and 43.3% in the study group were male. Regarding level of education, it was revealed that 40% of them in the control group were secondary education and 40% of them in the study group were illiterate. Regarding marital status, it was found that 83.3% of the studied patients in the control group and 93.4% of them in the study group were married, with no statistical significant difference between the control and study groups regarding all previous variables at p-value >0.05 .

Table (2): Represents the clinical data related to groups, and reported that 60% of the studied patients in the control group and 56.7% if them in the study

group were overweight, the mean of duration of anesthesia was 5.1±1.95in the control group and 6.15±2.1 in the study group. The mean duration of surgery was 4.45±1.77 in the control group and 5.26±1.97 in the study group. The mean duration of recovery was 29.5±2.74 in the control group and 29±3.81 in the study group, with no statistical significant difference between the control and study groups regarding all previous variables at p-value >0.05.

Table (3): Illustrates the medical and surgical data, and clarified that percentage of Wipple procedures was 36.7% in the control group and 50% in the study group, and 86.7% and 76.7% in the control and study groups respectively didn't have any past medical and surgical history, with no statistical significant difference between the control and study groups regarding all previous variables at p-value >0.05.

Table (4): Shows that there were statistically significant difference between the study and control groups regarding postoperative outcomes (no complication, pneumonia, and nausea and vomiting) at p-value <0.05.

Table (5): Shows highly statistically significant differences between the study and control groups in patient satisfaction items, including time, relationship, organization service, and outcomes (p-value < 0.01). Additionally, a statistically significant difference was observed between the two groups regarding information (p-value < 0.05).

Table (6): Illustrates the relationship between study and control related to patients' satisfaction, and revealed that 43.3% in the control group and 93.3% of the study group were satisfied, highly statistically significant difference between the study and control groups at p-value <0.01.

Discussion:

In order to achieve early postoperative recovery and improve patient satisfaction, a number of evidence-based, multidisciplinary interventions are carried out during the perioperative phase as part of enhanced recovery after surgery programs, also known as enhanced recovery (ERAS) programs. According to **(Wei et al. 2020),** ERAS programs improve quality of life, lower hospital expenses, decrease nosocomial infections and exposures, and decrease complications and hospital length of stay (LOS). Successful implementation of ERAS programs during the perioperative period necessitates appropriate coordination between the anesthesiologist, the surgeon, and the nursing staff **(Moningi et al., 2019).** Preoperative education, postoperative mobilization, nutrition, and pain management are just a few of the many aspects of nursing roles in ERAS(**Huang et al., 2022).** This study aimed to investigate a nurse-led enhanced recovery pathway on perioperative patient satisfaction in hepatico-pancreatic-biliary surgery.

The results of the current study revealed no significant differences between the control and study groups in sociodemographic data (age, gender, education level, marital status), medical and surgical data (past medical history, past surgical history, and type of surgical procedure), or clinical data (weight, height, BMI, duration of surgery, and duration of recovery). However, a statistically significant difference was observed in the duration of anesthesia, which was longer in the study group. This difference can be attributed to the higher proportion of major surgeries (e.g., pancreatoduodenectomy) performed in the study group compared to the control group.

The findings were consistent with those of **Koek & Ballal (2023),** who used their research to evaluate the use of ERAS in patients who had undergone PD in a tertiary facility. They also found no discernible differences in age, gender, or BMI between the groups. Similarities between the study and control groups verify that there is no bias.

Comparing the study group to the control group, the current study found that the former experienced higher levels of satisfaction and fewer complications. According to **Alshehri et al. (2015),** who conducted their study to assess postoperative patient satisfaction during the patient stay at King Khalid University Hospital in Riyadh, Saudi Arabia, the vast majority of the patients were satisfied with the following: perioperative care items, the information item, the time item, the patient-staff relationship item, the organization service item, and the outcomes score. The patient-staff relationship item received a high satisfaction rating, while the time item received a lower score. Also near to previous findings, **Alsaif, et al., (2018),** who implemented their study using a multicenter pre-specified survey tool, assess patient satisfaction before and after surgery as well as overall impression. The results demonstrated that over half of the patients in the study were satisfied following.This result supported with **Andemeskel et al., (2019)**, who demonstrated improved staff-patient relationships and successfully completed their study to evaluate the degree of patient satisfaction with perioperative anesthesia care and identify the factors that affect satisfaction. This resemblance highlights how crucial nurse-led improved recovery pathways are to patient satisfaction.

On the other side **Abuosi & Braimah, (2019),** who conducted a study using a disaggregated approach to investigate patient satisfaction with the quality of care in Ghanaian healthcare facilities and discovered that lengthy wait times are a significant cause of patient dissatisfaction with care and an unsolvable issue at

different service delivery units of healthcare facilities. Additionally, **Teshome et al. (2022)** conducted a study to evaluate surgical patients' satisfaction with perioperative anesthesia services and related factors. The study found that the provision of information was the least satisfactory and fear and concern were the most satisfied. Preoperative education, early mobilization, and fewer complications in the study group may all be linked to high satisfaction.

The cornerstones of ERAS pathways to involve patients and caregivers in every facet of their perioperative care are preoperative education and counseling. It enables the establishment and management of expectations concerning follow-up, expected length of stay (LOS), postoperative pain management, and early mobility **(McGinigle et al., 2023).** In order to improve fatigue and enable early discharge, pre-operative education and psychological preparation can reduce anxiety and boost patient satisfaction **Nelson et al., (2019).**

According to the actual study, there was a statistically significant difference in postoperative outcomes (no complications, pneumonia, and nausea and vomiting) between the study and control groups. This outcome was consistent with that of **Li & Zhang (2020),** who used their research to investigate the effectiveness and dependability of enhanced recovery after surgery (ERAS) during the perioperative phase of precise hepatectomy for hepatocellular carcinoma (HCC). They found that the ERAS group had significantly better patient outcomes and satisfaction than the control group.

Additionally, **Corbin et al. (2021)** conducted a study to evaluate the effects of improved patient perioperative education on patient satisfaction and outcomes in gynecologic oncology practice. They found that, following the implementation of the ERAS protocol, patient satisfaction and overall status improved. They also concurred with **Berkowitz et al. (2021),** who conducted a study to measure the relationship between clinical outcomes and patient-reported satisfaction and regret. They found that the predicted probability of being highly satisfied was slightly less than four fifths for patients with no complications and the vast majority for those with no pain. According to the researcher, similarity in this case validated that patient satisfaction was crucial in enhancing their results.

This finding was consistent with that of **Koivisto et al. (2020),** who conducted a study to investigate the informational expectations and level of received knowledge of surgical patients at the time of hospital discharge and investigate whether there is a correlation between the patients' level of received knowledge and postoperative complications. They found that patients who received less information than anticipated experienced more postoperative complications than those who received adequate information.

The lower incidence of nausea and vomiting in the study group may have contributed to their higher satisfaction levels. Effectively preventing these complications not only enhances patient satisfaction but also facilitates a quicker return to daily activities. Nausea and vomiting are frequently cited as among the most distressing postoperative experiences, which patients strongly prefer to avoid. This finding aligns with the work of **Elsaid et al. (2021)** and is further supported by **Alshehri et al. (2015),** who emphasized that effective management of postoperative symptoms-such as pain, nausea, and vomiting-plays a critical role in improving patient satisfaction.

Conclusion

The implementation of a nurse-led enhanced recovery pathway in hepatico-pancreatic-biliary surgery demonstrates significant benefits, including reduced postoperative complications and increased patient satisfaction during the perioperative period. These findings highlight the value of structured, nurse-led care in improving clinical outcomes and patient experiences.

Recommendation

Based on the study's results, it is recommended that nurse-led enhanced recovery pathways be adopted as standard practice in hepatico-pancreatic-biliary surgery. To further validate these findings and enhance generalizability, future research should involve larger sample sizes and multi-center studies.

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References:

Abuosi, A. & Braimah, M (2019):‹‹Patient satisfaction with the quality of care in Ghana's health-care institutions : A disaggregated approach, International Journal of Pharmaceutical and Healthcare Marketing, Vol.(13), No.(2),Pp.160-170.

Alsaif, A. Alqahtani, S. Alanazi, F. Alrashed, F. & Almutairi, A (2018): Patient satisfaction and experience with anesthesia: A multicenter survey in Saudi **population**, Saudi journal of anaesthesia, vol. (12), No.(2), Pp. 304-310.

Alshehri, A. Alomar, Y. Mohammed, G. Al-Fozan, M. Al-Harbi, M. &Alrobai, K. (2015): A survey on **postanesthetic** patient satisfaction in a

university hospital, Saudi journal of anaesthesia, *Vol,*(9),No.(3), Pp.303–305.

Anaba, P. Anaba, E. & Abuosi, A(2020): Patient satisfaction with perioperative nursing care in a tertiary **hospital** in Ghana, International Journal of Health Care Quality Assurance, ahead-of-print(ahead-of-print),10.1108/IJHCQA-01-2020-0021.

Andemeskel, Y. Elsholz, T. Gebreyohannes, G. & Tesfamariam, E (2019): Patient satisfaction with perioperative **anesthesia** care and associated factors at two National Referral Hospitals: a cross sectional study in Eritrea,BMC Health Services Research, Vo1.(19), No. (669), Pp.2-8.

Berkowitz, R. Vu, J. Brummett, C.Waljee, J. Englesbe, M. & Howard, R (2021): A Population-Based, Patient-Level Study of the Impact of Complications and Pain on Patient Satisfaction, Annals of Surgery, Vol. (273), No. (6), Pp.1127-1134.

Bizuneh, Y., Lema,G.,Fantie, D., Berhe, Y., & Ashagrie, H, (2020): Assessment of Patient's Satisfactions and Associated Factors regarding Postoperative Pain Management at the University of Gondar **Compressive** Specialized Hospital, Norhwest Ethiopia, Pain Research and management, Vol.(2020), No.(1) Pp.1-7.

Caljouw, M. Beuzekom, M. & Boer, F (2008): Patient's satisfaction with perioperative care: development, **validation**, and application of a questionnaire, British Journal of Anaesthesia, Vol.(100), No.(5),Pp.637–644.

Corbin, B. Tsaih, S. & Uyar, D (2021): Enhanced Recovery After Surgery (ERAS) protocols: the impact of **enhanced** patient perioperative education on patient satisfactions and outcomes in gynecologic oncology practice, Gynecologic Oncology ,Vol.(162), No.(1),Pp.S149-S150.

Derso, Y.Getachew, D. Adisu, M. & Adu, A (2024): Elective Surgery Patients Satisfaction toward Perioperative Service and its Associated Factors at **Amhara** region comprehensive Specialized Hospitals of Ethiopia, BMC Journal of medical science, Vol. (5), No, (1), Pp.3-11.

Elsaid, R. Namrouti, A. Samara, A. Sadaqa, W. & Zyoud, S (2021): Assessment of pain and postoperative nausea and vomiting and their association in **early** postoperative period: an observational study from Palestine, BMC Surgery , Vol.(21),No.(177), Pp.1-9.

Fetene, M. Bayable, S. Wendimu, E. Belehu, K. Almaw, A. Dula, P. & Bejiga, B (2022): Perioperative patient satisfaction and its predictors following surgery **and** anesthesia services in North Shewa, Ethiopia. A multicenter prospective cross-sectional study, Annals of Medicine and Surgery,Vol. (76), No(1), Pp.1-7.

Huang, YT. Lin, YJ. &nHung, CH (2022): The fully engaged inspiratory muscle training reduces postoperative pulmonary complications rate and increased respiratory muscle function in patients with **upper** abdominal surgery: a randomized controlled trial, *Annals of medicine*, Vol. (54), No. (1), Pp.2222-2232.

Joshi, G. & Kehlet, H (2019): Enhanced Recovery Pathways: Looking Into the Future, Anesthesia and **analgesia**, Vol. (128), No. (1), Pp.5-7.

Koek, S. & Ballal, M (2023): Implementation of ERAS in pancreaticoduodenectomy in an Australian tertiary **centre**, Pancreatology: official journal of the International Association of Pancreatology, Vol. (23), No. (6), Pp.729-735.

Koivisto, J. M, Saarinen, I. Kaipia, A. Puukka, P. Kivinen, K. Laine K.M. & Haavisto, E(2020): Patient education in relation to informational needs and **postoperative** complications in surgical patients. International Journal for Quality in Health Care, Vol. (32.), No (1), Pp.35-40.

Kovoor, J. Ma, N. Tivey, D. Vandepeer, M. Jacobsen, J. & Scarfe A. (2022): In-hospital survival after pancreatoduodenectomy is greater in high -volume hospitals versus lower-volume hospitals: a meta-analysis, ANZ Journal of Surgery, Vol. (92), No.(1-2), Pp.77-85.

Li, L. & Zhang, J (2020): Application value of ERAS in perioperative period of precise hepatectomy for hepatocellular carcinoma patients, JBUON, Vol.(25), No.(2), Pp.965-971.

McGinigle, K. & Spangler, E. (2023): A framework for perioperative care for lower extremity vascular bypasses: A Consensus **Statement** by the Enhanced Recovery after Surgery (ERAS®) Society and Society for Vascular Surgery, Journal of Vascular Surgery, Vol. (77), No. (5), Pp.1295-1315.

Moningi, S. Patki, A. Padhy, N. & Ramachandran, G (2019): Enhanced recovery after surgery: An anesthesiologist's perspective, Journal of Anaesthesiology Clinical Pharmacology, Vol.(35), No.(1), Pp.S5-S13.

Nelson, G. Bakkum-Gamez, J. & Kalogera, E. (2019): Guidelines for perioperative care in gynecologic/oncology: Enhanced Recovery After Surgery (ERAS) Society recommendation-2019 update, International journal of gynecological cancer: official journal of the International Gynecological Cancer Society, Vol. (29), No. (4), Pp. 651-668.

Smith, A. J., Daly, J., Arnolds, D. E., Scavone, B. M., & Carvalho, B. (2021): The Generalizability of Patients' Preferences and Concerns regarding Anesthesia Care for Cesarean Delivery: A Prospective Survey. Anesthesiology Research and Practice, 2021(1), 1–10. https://doi.org/10.1155/2021/9002061

Teshome, D. Mulat, Y. Fenta, E. Hunie, M. Kibret, S. Tamire, T. & Fentie, Y(2022): Patient satisfaction and its associated factors towards perioperative anesthesia service among surgical patients: A cross-sectional study, Heliyon, Vol. (8),No.(3),Pp.1-6.

Van der Storm, S.L., Jansen, M., Mulder, M., Marsman, H. A., Consten, E. C. J., Boer, F. den, Boer, H. D. de, Bemelman, W., & Christia, M. (2024). Improving Enhanced Recovery after Surgery (ERAS): The Effect of a Patient-Centred Mobile Application and an Activity Tracker on Patient Engagement in Colorectal Surgery. Urgical Innovation, 0(0), 1–11.

Wei, I. Pappou, E. Smith, J. & Widmar, M. (2020): Monitoring an Ongoing Enhanced Recovery After Surgery (ERAS) Program: Adherence Improves Clinical Outcomes in a Comparison of Three Thousand Colorectal Cases, Clinics in Surgery, Vol. (5), No. (2909), Pp.1-8.

Woodhouse, B. Panesar, D. & Koea, J (2021): Quality performance indicators for hepato-pancreatico-biliary procedures: a systematic review, HPB: the official journal of the international Hepato Pancreato Biliary Association, Vol. (23), No. (1), Pp.1-10.