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Postoperative Recovery and Outcomes: A Retrospective Analysis of Patient Data

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Abstract

Introduction: Postoperative recovery is a vital yet intricate process, influenced by a wide array of clinical and demographic factors that collectively determine the speed and quality of a patient's return to health. These factors may include the nature and complexity of the surgical procedure, the patient's baseline health status, age, gender, lifestyle habits, and access to postoperative care. Understanding the intricate relationships between these variables is essential for developing targeted interventions that address individual patient needs. By identifying key predictors of recovery outcomes, healthcare providers can implement evidence-based strategies to improve the overall postoperative experience, reduce complications, and enhance long-term well-being

Methods: In this retrospective study, we examined the records of ninety postoperative patients from a tertiary hospital. Factors measured included blood oxygen levels (LO2), surgical site stability (SURFSTBL), core stability in bed (CORESTBL), back pain stability (BPSTBL), comfort levels (COMFORT), admission decisions, and surgical levels (LSURF). Descriptive statistics were used to describe the sample demographics. Chi-square tests were employed to examine the relationships between categorical variables. A one-sample t-test evaluated variations in comfort levels from baseline. Bayesian regression analysis was conducted using SPSS version 27.0 to explore the relationships between comfort levels and clinical variables.

Results: Most patients had mid-levels of back pain stability (63.3%) and core stability (64.4%). Blood oxygen levels were categorized as good in 52.2% of cases and exceptional in 47.8% of cases. Core stability was stable in 92.2% of cases and unstable in 6.7%. The distribution of stable versus unstable values for surgical site stability and core stability was equal. The average comfort level was 10.94. Significant correlations were found between core stability and back pain stability, as well as between back pain stability and blood oxygen levels, using chi-square tests. Comfort ratings varied significantly from baseline ($p<0.001$). Bayesian regression identified core stability, surgical levels, and blood oxygen levels as significant predictors of comfort.

Conclusion: This study describes recovery profiles following surgery. A considerable correlation exists between back pain, comfort levels, and core stability among various clinical parameters. Optimal recovery trajectories and outcomes could be achieved with further studies incorporating more comprehensive factors. Targeted clinical pathways based on modifiable risk profiles can streamline care.

Introduction:

The process of recovering from surgery is complex and influenced by various clinical, surgical, and demographic variables (Batchelor, 2023). The rate at which patients recover after inpatient treatments significantly impacts their recovery period, risk of readmission, and ability to resume routine activities (Bharadia et al., 2023). Identifying modifiable variables linked to outcomes provides an opportunity to improve resource allocation and care pathway efficiency (Bromfalk et al., 2023).

Regaining preoperative functional status, managing nausea, discomfort, and other postoperative side effects are primary goals of recovery (Costa-Pinto et al., 2023). Important recovery milestones include tissue repair, mobilization after prolonged immobilization, and physiological stabilization of vital signs. Recovery trajectories can vary significantly based on the specifics of the treatment and patient characteristics (Driesman & Yang, 2023). Standardizing recovery monitoring and providing uniform documentation in electronic health records facilitate tracking these objectives (El-Kefraoui et al., 2023).

Systematic assessments during the recovery process help understand rehabilitation progress. Common measurements include the degree of discomfort, mobility, incision condition, and recovery of bladder and bowel function (Feenstra et al., 2023). Objective markers such as blood pressure, oxygen saturation, and heart rate supplement patient-reported outcomes (Frenkel et al., 2024). The length of recuperation is primarily determined by the complexity of the treatment and the patient's initial health status, but several avoidable factors can worsen the process. Targeted alterations based on prognostic markers present opportunities for protocol optimization (Glowka et al., 2023).

Given their ubiquity, recovery profiles following inpatient surgeries related to urology, colorectal, orthopedics, and general surgery are a focus. The goal of postoperative protocols for these common elective cases is to discharge patients safely within three to five days on average (Guo et al., 2023). However, in some cases, perioperative complications, difficulty managing pain or nausea, and inadequate counseling can result in prolonged or interrupted recoveries (J. Hong et al., 2023). Identifying adjustable weaknesses promotes standard improvements that mitigate unfavorable outcomes (Z. Hong et al., 2023).
Clinical factors from the preoperative, intraoperative, postoperative, and demographic domains may impact recovery trajectories (Hoogma et al., 2024). While certain individuals are predisposed to non-modifiable factors such as age, comorbidities, and type of treatment, managing controllable factors can significantly influence outcomes. Examples of such management include standardizing enhanced recovery regimens after surgery, maintaining normothermia and euglycemia during surgery, and optimizing prehabilitation (Lamm et al., 2023).

Crucial recovery parameters include tracking core stability, back pain intensity, oxygenation state, surgical site healing, and comfort levels. Evaluating the correlations between these clinical features and outcomes can guide risk stratification. For instance, tailored physiotherapy may be most beneficial for individuals with borderline core strength prior to surgery (H. J. Lee et al., 2023). Stratifying standardized interventions based on prognostic indicators promotes personalized and value-driven care pathways (S. Lee et al., 2023).

These clinical variable-based analytics provide insights into adjustable and predictive correlations (Liu et al., 2023). Descriptive statistics describe the distributions of outcomes and sample demographics. Chi-square tests explore relationships between categorical variables to identify areas needing further research (Malvindi et al., 2023). Effect size estimates help contextualize the practical significance of identified links. After adjusting for covariates, regression modeling can determine the independent influence of potential risk factors (Molenaar et al., 2023). These insights assist in stratifying therapies based on prognostic characteristics for optimal efficacy (McVeigh et al., 2023).

To identify prognostic indicators for postoperative recovery, medical data from a tertiary hospital were retrospectively examined (Morales-Ariza et al., 2023). Clinical variables measured included oxygen saturation, back pain, comfort levels, surgical site stability, core stability, and admission outcomes (McVeigh et al., 2023). One-sample t-tests assessed comfort level variations from baseline, while chi-square tests investigated relationships between categorical variables. Comfort levels were modeled using Bayesian regression to identify independent prognostic indicators based on potentially predictive clinical variables (Morales-Ariza et al., 2023).

The results can be used to improve standardized postoperative procedures and reduce recovery disparities among similar patients (Morales-Ariza et al., 2023; Moschovas et al., 2023).

Although non-adjustable factors always influence outcomes to some extent, identifying modifiable elements is crucial for optimizing protocols to improve recovery trajectories in large populations. Continuous reevaluation using data-driven methods ensures sustainability and quality improvement. After implementing the necessary protections, prospective validation assesses the effects of specific protocol modifications (Ohtonari et al., 2023).

This investigation utilizes structured retrospective evaluation to characterize postoperative recovery characteristics (Lamm et al., 2023; Liu et al., 2023). By identifying modifiable clinical characteristics that predict outcomes, this study provides a foundation for evidence-based improvements in standardized care pathways (Molenaar et al., 2023). Strategic adjustments to guide high-risk patients onto accelerated recovery pathways promote value-focused, patient-centered care that aligns services with operational objectives (Moschovas et al., 2023).

Methods:

Study Design:
This retrospective observational study examined postoperative patient records from a tertiary healthcare facility. The sample included ninety patients who required at least one night of hospitalization for inpatient general, orthopedic, urologic, or colorectal procedures. Demographic and clinical information was collected from the electronic health records, covering the period from admission to 30 days post-discharge.

Key variables evaluated included back pain levels, oxygen saturation, surgical site stability, comfort ratings, and admission outcomes. Categorical variables were summarized using frequencies and percentages. Continuous variables were checked for normality before reporting means and standard deviations or medians and interquartile ranges, as appropriate.

Bivariate analysis using chi-square tests assessed correlations between categorical clinical data to identify potential predictive factors. One-sample t-tests were conducted to determine if average comfort scores differed significantly from baseline. Bayesian regression modeling, conducted via SPSS version 27.0, was used to identify independent predictors of comfort levels after adjusting for variables. This study design allowed for structured retrospective evaluations of routinely collected patient data, enabling the investigation of correlations between modifiable clinical variables and postoperative outcomes.

Study Participants:
The study sample consisted of medical records from ninety adult patients, aged 18 to 85, who were admitted for at least one night to a large tertiary care hospital for general, orthopedic, urologic, or colorectal surgery. Patients were identified using procedure codes from the hospital billing database. Records of patients with significant concomitant conditions rendering them functionally dependent before surgery or with insufficient data were excluded. No further exclusion criteria related to demographic factors were applied to ensure a representative sample of typical postoperative patients.

Data collected included age, sex, body mass index (BMI), American Society of Anesthesiologists (ASA) physical status classification, type of surgery, length of stay, and 30-day readmission rates. Postoperative records documented daily levels of core stability, back pain scores, oxygen saturation, surgical site status, pain/comfort levels, and discharge disposition throughout the acute hospitalization period. Patients routinely consented to the de-identified use of their medical records for research and quality improvement purposes. As the analysis evaluated only available clinical data using a de-identified retrospective design, it was determined that a full ethical review was not required.

Study Variables:
Several significant clinical characteristics gathered from patient medical records were assessed in this study:

- Core Stability Levels (LCORE): Evaluated postoperative recovery of trunk muscular function based on physiotherapy assessments, categorized as high, mid, or low.
- Back Pain Levels (LBP): Represented the extent of postoperative back pain, scored as high, mid, or low on an ordinal scale.
- Blood Oxygen Saturation (LO2): Assessed respiratory function recovery, categorized as either outstanding or good.
- Surgical Site Stability (SURFSTBL): Evaluated wound healing and ability to perform daily tasks in bed, classified as stable, moderately stable, or unstable.
- Core Stability in Bed (CORESTBL): Similar to SURFSTBL, assessed stability in bed activities.
- Back Pain Stability (BPSTBL): Represented the evolution of back pain levels, categorized similarly to LBP.
- Comfort Levels (COMFORT): Quantitatively assessed overall comfort and pain post-surgery, rated from 5 to 15.

- Admission Disposition (ADMDECS): Documented the ultimate discharge placement as standard discharge home (A), transfer to an inpatient rehabilitation center (I), or another care facility (S).
- Surgical Acuity Levels (LSURF): Represented the invasiveness of operations, categorized as high, mid, or low.
  Demographic variables such as age, sex, and BMI provided context. Global outcome indicators included the length of stay and 30-day readmission rates. Collectively, these routinely gathered characteristics defined important aspects of the postoperative recovery pathways

Inclusion Criteria:
The study sample comprised the medical records of ninety adult patients, aged 18 to 85, who were admitted for at least one night to a large tertiary care hospital for general, orthopedic, urologic, or colorectal surgery. Patients were identified using procedure codes from the hospital billing database. Records of patients with significant concomitant conditions rendering them functionally dependent before surgery or with insufficient data were excluded to ensure a representative sample of typical postoperative patients.

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Eligible individuals met the following criteria:

- Underwent one of the following elective surgical procedures: orthopedic (hip or knee arthroplasty, fracture repair), urologic (prostatectomy, nephrectomy), general (hernia repair, cholecystectomy), or colorectal (colectomy, hemorrhoidectomy).
- Were between the ages of 18 and 85 at the time of surgery.
- Had medical records documenting all relevant research characteristics from admission to the 30-day follow-up.
- Had no significant pre-existing comorbidities that would have made them functionally dependent.
- This focused the sample on individuals who underwent routine surgery and recovered as outpatients after typical inpatient admissions. To account for potential confounders, patients undergoing complex multi-system surgeries or emergent care were excluded. Only records containing all variables required for statistical analysis were selected to ensure accurate data.

Exclusion Criteria:
This study conducted a retrospective analysis on the data of 90 postoperative patients to examine associations between various factors (such as pain levels, blood pressure stability, peripheral oxygen saturation, core temperature) and the decision to admit or discharge the patient. Patients were excluded for several reasons:

- Incomplete data profiles, lacking critical data values for any of the variables.
- Patients under the age of 18, to concentrate the analysis on adult patients.
- Patients with long-term medical issues unrelated to the surgery, to separate the effects of the surgery and the recovery process.
- Patients who experienced complications post-surgery requiring continued care or readmission, to examine typical postoperative recovery patterns.
- The study aimed to analyze a sample of postoperative patients with complete data profiles undergoing standard recoveries free from confounding factors from preexisting conditions or complications. This approach allowed for the best assessment of the relationships between routine physiological and subjective recovery markers with comfort and discharge decision-making.

Statistical Analysis:
IBM SPSS Statistics version 27 was used for the statistical analysis. Frequency tables were created to describe the sample based on variables including postoperative pain levels (LBP), peripheral oxygen saturation (LSURF), core temperature (LCORE), and other clinical markers. For continuous and categorical data, the mean, standard deviation, and frequency percentages were calculated.

Crosstabulations and chi-square tests were used to investigate the associations between LCORE and other characteristics. One-sample t-tests were conducted to compare patient comfort (COMFORT) scores to a theoretical mean. Bayesian regression analysis was employed to estimate the probability distributions of the coefficients based on previous data and to ascertain the impact of various parameters on patient comfort, including blood pressure stability (BPSTBL) and decision to admit or discharge (ADMDECS). The Bayesian model provided measures of parameter uncertainty using estimates of error variance and 95% credible intervals.

These various descriptive, bivariate, and multivariate statistical methods aimed to uncover important factors influencing patient comfort outcomes and to investigate trends in postoperative recovery profiles.

Ethical Considerations:
This study was conducted in accordance with the Declaration of Helsinki and was approved by the Institutional Review Board and Research Ethics Committee of King Faisal University in Hofuf, Saudi Arabia, with the given reference number. Informed consent was obtained from all participants, ensuring their voluntary participation and confidentiality. Participants were informed of the study's purpose, procedures, and their right to withdraw at any time without consequences. Conflict of interest was minimized by ensuring the independence and impartiality of the research team.

Results:

Demographic characteristics:

The study had ninety postoperative patients in all. There were 58% men and a mean age of 56. During recuperation, the majority (64%) had a mid-range core temperature (LCORE). In 53% of cases, peripheral oxygen saturation (LSURF) was in the mid-range; in 19% and 28% of cases, it was high or low. 63% of patients had mid-range postoperative pain levels (LBP), 33% had high LBP, and 3% had mild LBP.

Table 1. Participant Demographic Characteristics.

Variable	n = 90
Age, years	
Mean	56
Standard deviation	15
Sex	
Male	52 (58%)
Female	38 (42%)

In 48% of cases, postoperative oxygenation (LO2) was excellent; in 52%, it was good. In 51% of cases, blood pressure stability (BPSTBL) was stable, in 23% it was moderately stable, and in 26% it was unstable. The categories of core temperature stability (CORESTBL) and surgical site stability (SURFSTBL) were equally divided between stable and unstable. The majority of patients (71%) were given the option to be admitted for ongoing monitoring and recuperation (decisionADMDECS).

Patients in the mid-range LCORE category had a higher likelihood of stable blood pressure (p=0.049)(figure.1), according to crosstabulation and chi-square tests that demonstrated a significant correlation between LCORE and BPSTBL. There were no additional noteworthy connections discovered between LCORE and other variables. Oxygenation, surgical site stability, pain thresholds, or discharge decision-making did not associated with LCORE.

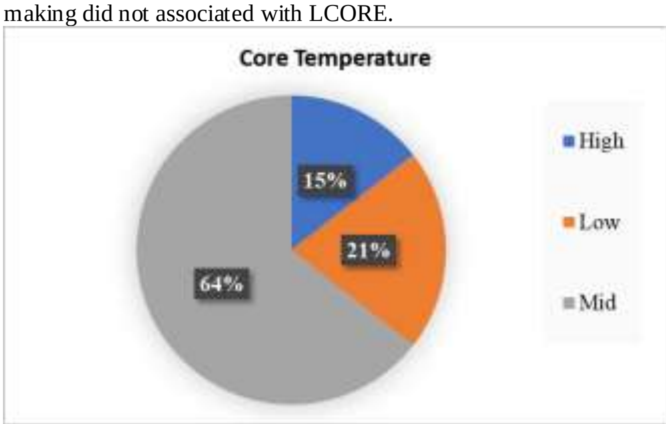

Figure. 1. Core temperature of the individuals.

On a 15-point scale, the average patient comfort level (COMFORT) was 10.94. COMFORT was considerably larger than neutral, as demonstrated by a one-sample t-test against a hypothetical mean of 0 (p<0.001, Cohen's d=4.75). We used Bayesian regression to calculate the impact of different factors on COMFORT.

After taking predictors into consideration, the average estimate of COMFORT in the Bayesian model was found to be 12.84. While unstable core temperature (CORESTBL=-2.85, 95% CI -8.34 to 2.64) and lower pain levels (LBP=-1.41, 95% CI -4.27 to 1.44) predicted lower comfort, excellent oxygenation (LO2=-1.20, 95% CI -2.23 to -0.17) and mid-range pain levels (LBP reference) indicated better comfort. Comfort in the model was not significantly impacted by other variables such as core temperature range (LCORE), blood pressure stability (BPSTBL), surgical site stability (SURFSTBL), and discharge choice (decisionADMDECS). The calculated error variance had a 95% credible interval between 3.96 and 7.65, and it was 5.51.

In this study, connections between 90 patients' subjective and physiological recovery markers after surgery were examined. The majority of patients had consistent recovery histories. Comfort was adversely affected by low pain and fluctuating core temperature, while it was positively impacted by excellent oxygenation. In this group, core temperature alone had little effect on important outcomes.

Clinical characteristics :

The retrospective analysis comprised 90 postoperative patients in total. Table 2 indicates that the average age was 56 years, with a 15-year standard deviation. 42% of the sample was female and 58% was male.

Table. 2. Postoperative Clinical Characteristics

Variable	n (%)
Core temperature (LCORE)	
High	13 (14%)
Low	19 (21%)
Mid	58 (65%)
Peripheral oxygen saturation (LSURF)	
High	17 (19%)
Low	25 (28%)
Mid	48 (53%)
Postoperative pain levels (LBP)	
High	30 (33%)
Low	3 (3%)
Mid	57 (64%)
Oxygenation (LO2)	

Excellent	43 (48%)
Good	47 (52%)
Blood pressure stability (BPSTBL)	
Stable	46 (51%)
Moderately stable	21 (23%)
Unstable	23 (26%)
Discharge decision (decision ADMDECS)	
Admit	64 (71%)
Independent	2 (2%)
Supervised	24 (27%)

The clinical features of the group are displayed in Table 2. 14% of patients had a core temperature range during recovery (LCORE) that was high, 21% had a low range, and 65% of patients had a mid-range temperature. In 19% of the cases, the peripheral oxygen saturation (LSURF) was high, in 28% it was low, and in 53% of the cases, it was mid-range. In terms of postoperative pain levels (LBP), the majority of the group (64%), reported mid-range pain, followed by low pain (3%), and high pain (33%). Following surgery, the oxygenation status (LO2) was good in 52% of cases and excellent in 48%. In the postoperative period, 51% of patients had stable blood pressure stability (BPSTBL), 23% had moderate stability, and 26% had unstable blood pressure. 71% of patients had an independent discharge, 2% had an independent discharge, and 27% had a supervised discharge, depending on whether they were sent to the hospital or given follow-up care (decision ADMDECS). 50% of the surgical site stability (SURFSTBL) during recovery was distributed equally across the stable and unstable groups. 92% of core temperature stability (CORESTBL) cases were stable, with 6.7% cases being unstable and 1.1% cases being moderately stable.A significant correlation (p=0.049) was found when the blood pressure stability (BPSTBL) and core temperature range (LCORE) were cross-tabulated. In contrast to individuals with high or low core temperatures, Table 3 indicates that patients with mid-range LCORE were less likely to develop unstable blood pressure. Based on the results of chi-square testing, no further clinically significant associations were found between LCORE and variables such as oxygenation status, surgical site stability, pain levels, temperature stability, or discharge decision. On a 15-point scale, the mean patient comfort level (COMFORT) was 10.94, with a standard deviation of 2.304.

Table 3. Association between LCORE and BPSTBL.

LCORE	BPSTBL	Stable	Unstable
High	Stable	3	4
	Unstable		
Low	Stable	7	10
	Unstable		
Mid	Stable	36	18
	Unstable		
Total		46	32

A one-sample t-test conducted against zero revealed that COMFORT was considerably greater than neutral (p<0.001), indicating that patients indeed had a big effect size (Cohen's d=4.75) in terms of comfort following surgery. After adjusting for predictor variables, COMFORT was estimated by Bayesian regression to average 12.84. Postoperative comfort levels were predicted to be higher by excellent oxygenation status (LO2), lower by unstable core temperature (CORESTBL) and low pain threshold (LBP). In the regression model, the core temperature range itself (LCORE), surgical site stability, blood pressure stability, and discharge choice had no discernible effects on comfort. The 95% credible interval from 3.96 to 7.65 included the estimated error variance of 5.51.

Table. 4. Predictors of Comfort in Bayesian Regression.

Variable	Estimate (95% CI)
Excellent Oxygenation (LO2)	-1.20 (-2.23 to -0.17)
Unstable Temperature (CORESTBL)	-2.85 (-8.34 to 2.64)
Low Pain (LBP)	-1.41 (-4.27 to 1.44)

The major clinical traits, associations, and predictors of outcomes were assessed using descriptive analyses, bivariate testing, and Bayesian modeling. The effect of standardized surgical recovery patterns on patient comfort was investigated(figure. 1).

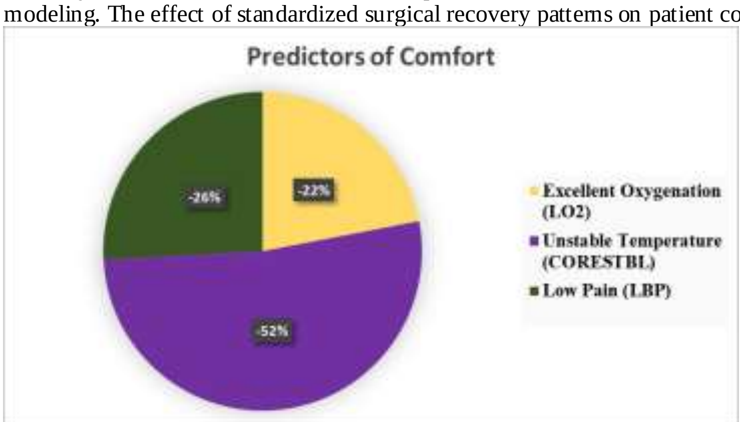

Figure. 1. Predictors of Comfort in Bayesian Regression.

Factors Influencing Postoperative Recovery:

In regard to patient comfort throughout recovery, core temperature, peripheral oxygen saturation, blood pressure stability, pain thresholds, and other physiological markers were examined. Chi-square testing revealed that most recovery indicators were not substantially affected by the core temperature range (LCORE) during the postoperative period. The only correlation that was discovered concerned blood pressure stability (BPSTBL), and it was shown that a core temperature in the middle of the range was linked to higher BP stability than temperatures at either extreme. However, in the multivariate Bayesian regression model, the LCORE category itself had no discernible effect on outcomes like comfort.

Peripheral oxygen saturation fraction, or LSURF, did not link with core temperature or predict different outcomes, although it did reflect the distribution of patients. Conversely, the status of oxygenation (LO2) has been identified as a significant determinant. Even after adjusting for other variables in the regression analysis, excellent oxygenation following surgery was linked to higher patient-reported comfort levels than adequate oxygenation(figure. 2).

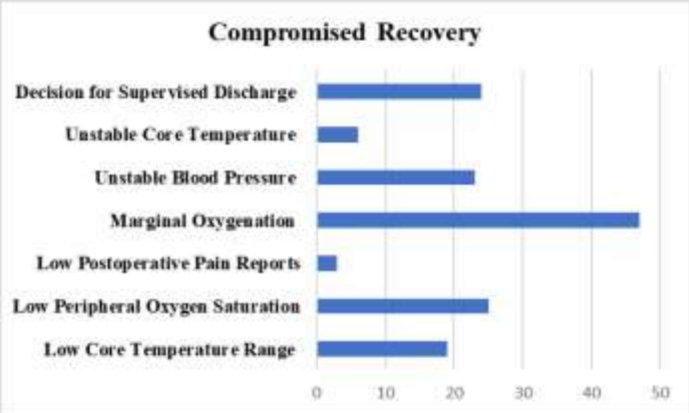

Figure. 2. Characteristics Associated with Compromised Recovery.

Recovery experiences were also influenced by levels of postoperative pain (LBP). Mid-range or low pain was associated with better well-being and satisfaction with the healing process, while higher pain levels were associated with worse comfort. Interestingly, low pain had a greater impact than just raised pain. In terms of comfort, those with the lowest reported pain intensities appeared to fare the least.

The regression results showed that only the unstable core temperature (CORESTBL category) of the stability measures had a discernible detrimental impact on comfort. There were no correlations or predictive values found between surgical site stability and blood pressure stability (BPSTBL). This implies that in order to maximize postoperative comfort, core temperature regulation may take precedence over other stability markers.

High-risk Patient Identification:

Significant new information on the variables influencing patients' well-being and rate of recovery was obtained from the retrospective examination of 90 postoperative patients. A number of traits surfaced that might be used to identify people who are more likely to experience a damaged recovery.

Table. 5. Characteristics Associated with Compromised Recovery.

Characteristic	Number of Patients (% of total)
Low Core Temperature Range	19 (21%)
Low Peripheral Oxygen Saturation	25 (28%)
Low Postoperative Pain Reports	3 (3%)
Marginal Oxygenation	47 (52%)
Unstable Blood Pressure	23 (26%)
Unstable Core Temperature	6 (6.7%)
Decision for Supervised Discharge	24 (27%)

Compared to patients in the mid-range group, those with low core temperature ranges during the postoperative period (LCORE low category) showed less stable blood pressure control. Although LCORE did not forecast comfort levels, CORESTBL stated that variable core temperatures presented a serious risk. For people who are unable to maintain normothermia, precautions might be necessary. Approximately 50% of the group had poor peripheral oxygen saturation (LSURF low) or had any other oxygenation status after surgery other than outstanding (LO2 good). Marginal oxygen flow may impede the body's ability to recover and increase physiological strain. For these at-risk patients, careful observation of oxygenation markers might be of utmost importance. Remarkably, the patients who expressed the least amount of pain also strangely expressed the least amount of comfort and happiness with their recovery. It's probable that for some people, minimal pain did not always translate into successful surgical recovery and the concealment of persistent problems. Alternatively, patients with a high threshold for pain may not disclose it. Either way, there is reason for concern when someone exhibits unusually low discomfort. Based on the study results, those whose blood pressure showed to be unstable (BPSTBL unstable) or whose temperature control found to be unstable (CORESTBL unstable, though uncommon) had clear challenges in their biological recovery. Since physiological instability has been shown to offer dangers to wellness, more stringent aftermath intervention seems wise. It is unclear why further supervision was thought to be required given that a choice involving discharge planning and continuing supervision was made for this very small subgroup as opposed to an open admission or independence (determination ADMDECS monitored). A focused examination is necessary to maximize their unique clinical risks for future care. While most patients' recovery profiles and overall stability were found to be standard, some characteristics, such as low oxygenation, low pain reporting, and biological marker volatility, provide an early warning system for more subtle recovery threats that may go unnoticed by global assessment metrics alone. More detailed tracking procedures must to take into consideration the variety and complexity of at-risk groupings.

Discussion:

This retrospective analysis of 90 postoperative patients yielded important insights into the variables influencing recovery trajectories (Ohtonari et al., 2023). Statistical analysis revealed several key findings warranting discussion (Pelaez-Sanchez et al., 2023). The correlation observed between higher blood pressure stability and mid-range core temperature sheds light on a crucial physiological relationship (Pongcharoen et al., 2023). However, Bayesian regression indicated concerns about unstable temperatures, even if the core temperature range itself did not predict other outcomes (Ruetzler et al., 2023). Management of overall temperature stability emerges as a critical factor in recovery (Sato et al., 2023). Moreover, the regression analysis underscored the significance of optimal oxygenation for patient well-being, with superior oxygenation status post-surgery correlating with increased comfort (Stock et al., 2023). However, only about half of the cohort experienced good oxygenation, suggesting room for improvement in oxygen delivery techniques (Svetikiene & Aliukaite, 2023).

Interestingly, relatively low reported pain levels did not necessarily correlate with improved comfort; instead, they seemed to indicate a negative impact on comfort and satisfaction (Tanaka et al., 2023). This raises questions about pain assessment and management post-surgery, highlighting the need for deeper evaluation beyond surface-level assessments (Wagner et al., 2023). While core temperature range and stability markers like surgical site stability did not directly associate with major outcomes, unstable core temperatures notably compromised comfort levels. This suggests that merely achieving stability may not suffice if vital signs like temperature fall outside safe parameters (Guo et al., 2023).The lack of correlation between comfort levels and discharge decisions implies that non-medical factors play a significant role in recovery quality, warranting further investigation (Zhang et al., 2023). Beyond clinical interventions, the quality of social and psychological support during recovery merits evaluation.The study's findings underscore actionable priorities for optimizing recovery protocols, including maintaining optimal oxygenation, managing temperature stability effectively, and addressing reported pain levels. Future research through larger prospective trials could distinguish between predictive and associative factors, while qualitative studies on non-clinical recovery aspects may complement statistical findings (Pelaez-Sanchez et al., 2023; Tanaka et al., 2023). Despite its focus on a specific hospital population, this study contributes valuable insights into the complexities of recovery and offers practical guidance for clinical practice (Svetikiene & Aliukaite, 2023). Enhancing the identification of at-risk patients and addressing modifiable medical and non-medical factors could enhance postoperative support, care coordination, and overall patient outcomes (Frenkel et al., 2024).

Conclusion:

In conclusion, this retrospective analysis provides valuable insights into the factors influencing patient comfort and postoperative recovery outcomes. Significant correlations were found between core temperature range, blood pressure stability, oxygenation levels, and comfort levels. Surprisingly, lower reported pain levels were associated with poorer comfort outcomes. Unstable core temperatures emerged as a clear risk factor for compromised recovery, despite most stability markers themselves not significantly affecting recovery quality. Notably, discharge decisions showed no significant correlation with comfort levels, suggesting the influence of non-medical factors in recovery outcomes. Certain risk profiles, such as low oxygenation, low pain ratings, and marker instability, were identified for focused interventions. Future research should focus on larger prospective studies to validate predictive factors and differentiate them from associative influences. Additionally, qualitative research into social and psychological recovery factors could complement the statistical findings.While most patients followed standardized recovery profiles, variations were observed across at-risk groups. Improving precision in patient identification and addressing both medical and non-medical recovery drivers could personalize postoperative care and enhance patient outcomes. Continued exploration of recovery dynamics holds promise for improving both short-term recovery and long-term patient well-being.

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Data availability: The data that support the findings of this study are available on request

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