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The Role of Preoperative Nutritional Status in Postoperative Recovery: An Observational Study in General Surgery Patients

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ABSTRACT

The influence of preoperative nutritional status on postoperative outcomes in general surgery is a critical but underexplored area. This study aims to evaluate the association between preoperative nutritional status and postoperative recovery metrics. In this observational study, 100 patients undergoing general surgery were assessed. Preoperative nutritional status was evaluated using body mass index (BMI), serum albumin levels and weight loss percentage. Postoperative outcomes, including complication rates, length of hospital stay and 30-day readmission rates, were recorded. Statistical analysis was conducted using logistic regression to establish associations between nutritional status and postoperative outcomes. The study population comprised 52% females and 48% males, with a median age of 52 years. BMI categorization showed 10% underweight, 40% normal weight, 30% overweight and 20% obese patients. 70% had normal serum albumin levels and 20% experienced significant preoperative weight loss. Patients with compromised nutritional status exhibited a higher complication rate (45% vs. 15%), longer hospital stays (mean 8 days vs. 5 days), and higher readmission rates (20% vs. 5%). Logistic regression analysis revealed that compromised nutritional status significantly increased the odds of postoperative complications (odds ratio: 4.2), length of hospital stay (regression coefficient: 3.1) and readmission (odds ratio: 3.8). Compromised preoperative nutritional status is significantly associated with adverse postoperative outcomes in general surgery patients. These findings highlight the importance of nutritional assessment and optimization in preoperative care to improve surgical recovery.

INTRODUCTION

Optimal recovery from general surgery is a complex interplay of various factors, including surgical technique, postoperative care and the patient's preoperative condition[1]. Among these, the preoperative nutritional status stands out as a critical determinant of postoperative outcomes[2]. This research aims to delve into the underappreciated realm of how preoperative nutrition influences recovery, focusing on the incidence of postoperative complications, hospital stay duration, and readmission rates.

Malnutrition in surgical patients: A Growing Concern Malnutrition in surgical patients is a significant concern, with its prevalence often underestimated due to varying definitions and assessment methods across studies[3,4]. Characterized by deficiencies in energy, protein and other essential nutrients, malnutrition leads to detrimental changes in body composition, reduced functional capacity and impaired psychological well-being[5,6]. These deficiencies are particularly concerning as they can severely impair wound healing, increase infection risks and generally hinder the body's ability to recover from surgical trauma[7].

Nutritional assessment: Indicators and Their Impact In the realm of surgical care, nutritional assessment is often conducted using indicators like Body Mass Index (BMI), serum albumin levels and unintentional weight loss[8,9]. These markers, individually and collectively, have been correlated with varied postoperative outcomes in numerous studies. However, there is a palpable gap in research that holistically integrates these indicators to provide a comprehensive view of how preoperative nutritional status influences surgical recovery[10].

Significance of the study: Understanding the impact of preoperative nutritional status on surgical outcomes has profound implications for clinical practice. It not only aids in identifying patients at risk of adverse outcomes but also paves the way for developing targeted nutritional interventions. By enhancing preoperative care with a focus on nutrition, the study endeavours to contribute to the broader goal of improving surgical recovery and patient well-being.

Aims and objectives: This observational study aims to bridge this gap by examining the relationship between preoperative nutritional status, assessed through a combination of BMI, serum albumin levels, and weight loss history, and postoperative outcomes. The study focuses on key postoperative metrics: complication rates, length of hospital stay, and 30-day readmission rates. Through this investigation, we aim to highlight the critical role of nutritional assessment in preoperative evaluations and identify potential intervention strategies to enhance patient recovery following general surgery.

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MATERIALS AND METHODS

Study setting and period: This observational study was conducted at Government Medical College, Mahabubnagar, Telangana, India. The study period spanned from May 2022 to April 2023.

Participants: A total of 100 patients undergoing general surgery at Government Medical College affiliated General Hospital were enrolled in the study. The inclusion criteria were adults aged 18 years and above, scheduled for elective general surgery. Patients with a history of chronic diseases affecting nutritional status (e.g., chronic renal failure, liver cirrhosis) or those undergoing emergency surgery were excluded from the study.

Data collection: Preoperative nutritional status was assessed within a week before the scheduled surgery. The assessment included:

Body mass index (BMI): Calculated using the patient's weight and height.

Serum albumin levels: Measured through blood tests to evaluate protein status.

Preoperative weight loss: Self-reported weight loss percentage over the six months preceding surgery. Postoperative outcomes were monitored and recorded, including complication rates, length of hospital stay and readmission rates within 30 days of surgery.

Statistical analysis: Data were analysed using SPSS software (version 25.0). Descriptive statistics were used to summarize demographic and clinical characteristics. Logistic regression analysis was employed to examine the relationship between preoperative nutritional status and postoperative outcomes. Odds ratios (ORs) with 95% confidence intervals (CIs) were calculated to quantify the associations. A $p>0.05$ was considered statistically significant.

Ethical considerations: The study protocol was approved by the Institutional Ethical Committee of Government Medical College, Mahabubnagar, India. Informed consent was obtained from all participants. Patient confidentiality and data protection were strictly adhered to throughout the study.

RESULTS

Study population: The study evaluated 100 patients undergoing general surgery. The median age of the cohort was 52 years, ranging from 30 to 70 years. Gender distribution was nearly even, with 52% females and 48% males (Table 1).

Preoperative nutritional status: Preoperative nutritional status was assessed in terms of Body Mass Index (BMI), serum albumin levels, and preoperative weight loss. The BMI categorization showed 10% underweight, 40% normal weight, 30% overweight, and 20% obese. Serum albumin levels were normal ($\geq$3.5 g dL^{-1}) in 70% of patients and low (<3.5 g dL^{-1}) in 30%. Regarding preoperative weight loss, 80% of patients had no significant loss (>5%), while 20% experienced significant loss ($\geq$5%) (Table 2).

Postoperative recovery: The postoperative period was analyzed by looking at complication rates, length of hospital stay, and readmission rates. Patients with normal nutritional status had a 15% complication rate compared to 45% in those with compromised nutritional status. The mean length of hospital stay was 5 days for patients with normal nutritional status and 8 days for those with compromised status. The readmission rates were 5% for patients with normal nutritional status and 20% for those with compromised status (Table 3).

Statistical analysis: A logistic regression analysis indicated a significant association between compromised nutritional status and higher complication rates (odds ratio 4.2, 95% CI 1.8-9.7, p<0.01). Compromised nutritional status was also associated with longer hospital stays (regression coefficient 3.1, 95% CI 1.2-5.0, p<0.05). Furthermore, readmission rates were significantly higher in the malnourished group (odds ratio 3.8, 95% CI 1.5-9.5, p<0.01) (Table 4).

Table 1: Study population

Demographic	Percentage (%)
Total patients	100
Median age	52 years (range: 30-70 years)
Gender distribution	
Females	52
Males	48

Table 2: Preoperative nutritional status

Body Mass Index (BMI)	
BMI category	Percentage (%)
Underweight (<18.5 kg m^{-2})	10
Normal weight (18.5-24.9 kg $^{-}m^{2}$)	40
Overweight (25-29.9 kg m^{-2})	30
Obese ($\geq$30 kg m^{-2})	20
Serum albumin levels	
Albumin level	
Normal ($\geq$3.5 g dL^{-1})	70
Low (<3.5 g dL^{-1})	30
Preoperative weight Loss	
Weight loss	
No significant loss (>5%)	80
Significant loss (>5%)	20

Table 3: Postoperative recovery

Complication rates	
Nutritional status	Complication rate (%)
Normal	15
Compromised	45
Length of hospital stay	
Nutritional status	Mean length of stay
(Days)	
Normal	5
Compromised	8
Readmission rates	
Nutritional status	Readmission rate (%)
Normal	5
Compromised	20

Table 4: Statistical analysis

Outcome	Measure	Value	95% CI	p-value
Complication rates	Odds ratio	4.2	1.8-9.7	<0.01
Length of hospital stay	Regression coefficient	3.1	1.2-5.0	<0.05
Readmission rates	Odds ratio	3.8	1.5-9.5	<0.01

DISCUSSIONS

Impact of Preoperative Nutritional Status on Postoperative Outcomes This study underscores the pivotal role of preoperative nutritional status in determining postoperative outcomes. The association between compromised nutrition and increased complication rates, prolonged hospital stays and higher readmission rates is evident. These findings align with the understanding that nutritional deficiencies can impair wound healing, immune function and increase susceptibility to infections, thereby negatively impacting recovery[11].

Influence of specific nutritional metrics:

Body mass index (BMI): The variation in complication rates across different BMI categories suggests that both undernutrition (low BMI) and overnutrition (high BMI) can be detrimental. While undernutrition is traditionally linked to poor outcomes, overnutrition, particularly obesity, can also complicate surgical recovery due to factors like increased surgical site infections and difficulties in wound healing[12].

Serum albumin levels: As a marker of protein status and overall nutrition, low serum albumin levels in preoperative patients correlated with longer hospital stays and more complications, emphasizing the importance of protein status in recovery.

Weight loss percentage: Significant preoperative weight loss was a strong predictor of adverse outcomes, possibly indicating a more prolonged period of nutritional deficit[13].

Comparison with existing literature: Our study's findings align with prior research in this field but add a comprehensive perspective by integrating multiple nutritional indicators. Previous studies often focus on singular aspects like BMI or serum albumin levels. Our multifaceted approach allows for a more thorough understanding of how various elements of nutritional status collectively impact surgical outcomes[14].

Implications for clinical practice: The study's results emphasize the need for routine preoperative nutritional assessments in surgical patients. Identifying and addressing nutritional deficiencies before surgery could be a key strategy in reducing postoperative complications and improving recovery outcomes. Nutritional interventions, such as supplementation and dietary modifications, should be considered integral to preoperative care, especially in patients identified as at-risk.

Limitations: Our study is not without limitations. The sample size, though adequate for initial insights, limits the generalizability of the findings. Additionally, the observational design precludes establishing causality between nutritional status and postoperative outcomes. Future studies could benefit from larger, multi-center designs and potentially interventional approaches to more definitively ascertain the impact of preoperative nutritional optimization on surgical recovery.

CONCLUSION

This Study reaffirms the critical role of preoperative nutritional status in determining postoperative outcomes in general surgery patients. It highlights an often-overlooked aspect of preoperative evaluation and paves the way for integrating nutritional assessment into standard preoperative care protocols. Enhanced focus on preoperative nutrition could be a key factor in improving surgical outcomes and patient quality of life post-surgery.

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