

Impact of Malnutrition on Postoperative outcomes in Elective Surgeries at Lady Reading Hospital Peshawar

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Abstract

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Keywords: Nutritional Status, BMI, Elective Surgery, Postoperative Complications, Hospital Stay

Received on 20 Dec 2025

Accepted on 18 Jan 2026

Published on 27 Jan 2026

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Background: Nutritional status is a critical determinant of surgical outcomes. Malnutrition, including undernutrition and over nutrition, can affect intra-operative hemodynamics, postoperative recovery, and hospital stay. This study aimed to assess the impact of preoperative nutritional status on postoperative complications, emergence from anesthesia, and length of hospital stay in patients undergoing elective surgery.

Methods: A descriptive cross-sectional study was conducted at Lady Reading Hospital, Peshawar, from September to November 2025. A total of 123 adult patients (aged 18–60 years, ASA I or II) undergoing elective surgery were enrolled using non-probability convenience sampling. Preoperative nutritional status was assessed using body mass index (BMI) according to WHO classification. Standardized general anesthesia was administered, and intra-operative hemodynamics,

postoperative complications, and length of hospital stay were recorded. Data were analyzed using SPSS with descriptive statistics, Chi-square test, and one-way ANOVA; $p < 0.05$ was considered statistically significant.

Results: Of the 123 participants, 48 (39%) were male and 75 (61%) female, with a mean age of 38.48 ± 12.60 years. The mean BMI was 26.65 ± 4.79 kg/m², with 32.9% in the normal range and 67.1% classified as malnourished (pre-obese 37.4%, obese class I 22.4%). Postoperative recovery was smooth in 95.1% of patients; delayed emergence occurred in 4.9%, while nausea, vomiting, and respiratory complications

were infrequent. Most patients (98.8%) were discharged within 24–48 hours. BMI categories were not significantly associated with postoperative complications, except for mean arterial pressure after induction of anesthesia, which showed a significant association ($F = 2.78$, $p = 0.008$).

Conclusion: A majority of patients undergoing elective surgery were malnourished, primarily overweight or obese. Poor nutritional status was not significantly associated with postoperative complications or length of hospital stay, but higher BMI influenced intra-operative hemodynamic stability. Preoperative assessment of nutritional status should be incorporated into routine surgical evaluation to optimize peri-operative care. Future studies with larger sample sizes are recommended to further explore the impact of nutritional status on surgical outcomes.

Introduction

Nutritional status reflects an individual's health condition as influenced by the intake and utilization of nutrients. Malnutrition is defined as a state of deficiency, excess, or imbalance of energy, protein, or other nutrients that adversely affects body composition, function, and clinical outcomes. According to the World Health Organization (WHO), malnutrition includes undernutrition (wasting, stunting, and underweight) as well as over nutrition (overweight and obesity)(1).

Malnutrition remains a major global health problem affecting both developed and developing countries. In low- and middle-income countries, poor nutritional status is commonly related to food insecurity, poverty, lack of awareness, and limited access to balanced diets, whereas in developed countries it is often associated with chronic illness and metabolic disorders(2). In Pakistan, adult malnutrition is characterized by a dual burden of undernutrition and rising prevalence of obesity, diabetes, and other non-communicable diseases(3).

Optimal nutritional status plays a crucial role in determining surgical outcomes, particularly in patients undergoing elective surgery. Preoperative malnutrition is a well-recognized independent predictor of adverse postoperative outcomes, including impaired wound healing, increased risk of infections, prolonged hospital stay, delayed recovery from anesthesia, and increased morbidity and mortality(4). Nutritional deficiencies may lead to structural and functional changes in multiple organ systems, compromising immune response, metabolic reserve, and cardiovascular stability during surgery(5).

The intra-operative period is especially critical, as malnutrition can contribute to hemodynamic instability, including fluctuations in blood pressure, heart rate, and mean arterial pressure(6). These changes complicate anesthetic management and may increase peri-operative risk. Poor nutritional status has also been associated with delayed emergence from anesthesia, respiratory complications, hypothermia, and prolonged postoperative recovery(7).

Elective surgical procedures allow time for preoperative assessment and optimization, making nutritional evaluation an essential component of peri-operative care(8). Early identification of malnutrition through simple assessment tools can enable timely nutritional interventions, potentially improving hemodynamic stability, reducing postoperative complications, and shortening hospital stay. Among various assessment methods, body mass index (BMI) is widely used due to its simplicity, non-invasive nature, and cost-effectiveness, and serves as a practical screening tool for adult nutritional status(9).

Despite advances in peri-operative care and nutritional support, malnutrition remains under-recognized in surgical patients, particularly in resource-limited settings. The relationship between preoperative nutritional status and postoperative outcomes, especially intra-operative hemodynamics and recovery parameters, remains insufficiently explored in local settings(10). Therefore, this study aims to assess the role of nutritional status in predicting postoperative complications, intra-operative

hemodynamic stability, emergence from anesthesia, and length of hospital stay among patients undergoing elective surgery(11).

MATERIAL AND METHODS

After obtaining ethical approval from Lady Reading Hospital, Peshawar, a descriptive cross-sectional study was conducted from September to November 2025 in the main Surgical, ENT, and orthopedic operation theaters. Adult patients aged 18–65 years, classified as American Society of Anesthesiologists (ASA) physical status I or II and scheduled for elective surgery under general anesthesia, were included using non-probability convenience sampling. Patients undergoing emergency procedures, pregnant women, individuals receiving nutritional support, and those with severe co-morbid conditions were excluded.

A total of 123 patients were enrolled. Preoperative nutritional status was assessed using body mass index (BMI), calculated from measured height and weight and categorized according to World Health Organization (WHO) classification criteria. All surgical procedures were performed under standardized general anesthesia protocols. Intra-operative hemodynamic parameters, including blood pressure, heart rate, mean arterial pressure, and oxygen saturation, were continuously monitored. Postoperatively, patients were followed to document complications and length of hospital stay.

Data were analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics were used to summarize demographic and clinical characteristics. Associations were assessed using the Chi-square test and one-way analysis of variance (ANOVA), with a p-value of <0.05 considered statistically significant.

RESULTS

A total of 123 patients were included in the study, comprising 48 (39%) males and 75 (61%) females. The mean age of participants was 38.48 ± 12.60 years. The mean height, weight, and BMI were 160.43 ± 11.22 cm, 68.45 ± 10.15 kg, and 26.65 ± 4.79 kg/m², respectively. The mean preoperative systolic blood pressure was 132.6 ± 20.9 mmHg, diastolic blood pressure 81.4 ± 13.7 mmHg, mean arterial pressure (MAP) 96.6 ± 17.0 mmHg, and heart rate 89.3 ± 18.2 beats per minute.

Most patients (91.5%) had no previous medical history, while 5.3% were hypertensive and 2.4% had both hypertension and diabetes mellitus. Based on BMI classification, 40 (32.9%) patients were in the normal range, whereas 83 (67.1%) were malnourished, predominantly in the pre-obese (37.4%) and obese class I (22.4%) categories.

Postoperative outcomes showed that recovery from anesthesia was smooth in 95.1% of patients, while delayed emergence occurred in 4.9%. Postoperative nausea, vomiting, and respiratory complications were infrequent. The majority of patients (98.8%) were discharged within 24–48 hours after surgery.

Chi-square analysis showed no statistically significant association between BMI categories and surgical procedures, previous medical history, recovery from anesthesia, postoperative nausea, vomiting, respiratory complications, or hospital stay ($p > 0.05$). One-way ANOVA demonstrated that most hemodynamic variables were not significantly associated with BMI categories; however, mean arterial pressure after induction of anesthesia showed a statistically significant association with BMI ($F = 2.78$, $p = 0.008$).

Table 1: Demographic Characteristics and Preoperative Hemodynamics (n = 123)

Variable	Mean ± SD
Age (years)	38.48 ± 12.60
Height (cm)	160.43 ±

	11.22
Weight (kg)	68.45 ± 10.15
BMI (kg/m ²)	26.65 ± 4.79
Pre-op Systolic BP (mmHg)	132.6 ± 20.9
Pre-op Diastolic BP (mmHg)	81.4 ± 13.7
Pre-op MAP (mmHg)	96.6 ± 17.0
Pre-op Heart Rate (bpm)	89.3 ± 18.2

Table 2: Postoperative Outcomes and Length of Hospital Stay

Outcome	Yes n (%)	No n (%)
Smooth recovery	117 (95.1)	6 (4.9)
Nausea	3 (2.8)	120 (97.2)
Vomiting	4 (3.3)	119 (96.7)
Respiratory complications	3 (2.4)	120 (97.6)

Table 3: ANOVA – Association of BMI Categories with Hemodynamic Variables

Variable	F value	p value
Pre-operative systolic BP	1.04	0.405
Pre-operative diastolic BP	0.38	0.915
Pre-operative MAP	1.28	0.263
After induction MAP	2.78	0.008
After 15-min MAP	1.15	0.332

DISCUSSION

This study was conducted to determine the role of nutritional status in predicting emergence from anesthesia, intra-operative hemodynamics, postoperative complications, and length of hospital stay among patients undergoing elective surgeries. The findings revealed that a large proportion of patients were malnourished, with the majority falling into the pre-obese and obese BMI categories. This high prevalence of malnutrition may be attributed to socioeconomic factors, as many patients belonged to rural backgrounds where dietary imbalance and limited nutritional awareness are common.

Previous studies have reported that poor nutritional status is an independent predictor of postoperative complications and prolonged hospital stay. In the present study, although most patients were classified as malnourished based on BMI, postoperative outcomes such as recovery from anesthesia, nausea, vomiting, respiratory complications, and length of hospital stay were not significantly associated with nutritional status. The majority of patients (95.1%) had smooth recovery from anesthesia, while only a small proportion experienced delayed emergence or minor postoperative complications.

Regarding intra-operative hemodynamics, this study demonstrated a statistically significant association between nutritional status and mean arterial pressure after induction of anesthesia. Patients with higher BMI showed greater fluctuations in MAP, suggesting that nutritional status may influence hemodynamic stability during anesthesia. This finding highlights the importance of careful intra-operative monitoring, particularly in pre-obese and obese patients.

In the present study, 32.9% of patients had normal BMI, while 67.1% were malnourished, including 63.1% overweight or obese and 4% underweight. These findings are comparable to those reported by Arman et al., who observed that nearly half of patients at risk of malnutrition had a BMI greater than 25 kg/m². Similarly, our study found a higher proportion of malnutrition in the form of overweight and obesity. The length of hospital stay in our study was relatively short, with nearly all patients discharged within 24–48 hours. This contrasts with the findings of Hai and Bakr, who reported significantly longer hospital stays among malnourished patients. The difference may be explained by variations in surgical complexity, patient age, comorbidities, and healthcare settings. In our study, no statistically significant association was found between nutritional status and length of hospital stay.

Demographic characteristics were comparable to previous studies. While Hai and Bakr reported a mean age of 50.1 years, the mean age in our study was 38.48 years, reflecting a younger surgical population. No significant association was observed between gender and nutritional status, consistent with findings from other studies.

Unlike some previous reports that documented higher mortality rates among malnourished patients, the mortality rate in this study was zero. This may be attributed to the elective nature of surgeries, younger patient population, and exclusion of critically ill patients. Additionally, while other studies utilized Subjective Global Assessment (SGA) for nutritional evaluation, our study employed BMI classification according to WHO criteria due to its simplicity and feasibility in routine clinical practice.

CONCLUSION

This study concludes that more than half of patients undergoing elective surgical procedures were malnourished, predominantly in the form of overweight and obesity. Poor nutritional status was not significantly associated with postoperative complications, emergence from anesthesia, or length of hospital stay. However, a statistically significant association was observed between nutritional status and mean arterial pressure after induction of anesthesia, indicating that nutritional status may influence intra-operative hemodynamic stability. Preoperative nutritional assessment should therefore be incorporated into routine surgical evaluation, as malnutrition is a modifiable risk factor. Future studies with larger sample sizes and comprehensive nutritional assessment tools are recommended to further explore the impact of nutritional status on peri-operative outcomes and to guide targeted nutritional interventions aimed at reducing morbidity, mortality, and healthcare costs.

REFERENCES

- Abdel Hai R, Bakr Y. Nutritional status of hospitalized patients and its impact on morbidity, mortality and length of stay. *J High Inst Public Health*. 2008;38(4):753–64.
- Ringaitienė D. Prevalence, assessment and effects of malnutrition on early postoperative complications in cardiac surgery. Vilnius University; n.d.
- Williams DGA, Molinger J, Wischmeyer PE. [Title missing]. [Journal info missing].
- Casaer MP, Mesotten D, Hermans G, et al. Early versus late parenteral nutrition in critically ill adults. *N Engl J Med*. 2011;365(6):506–17.
- Holmes S. The effects of undernutrition in hospitalized patients. *Nurs Stand*. 2007;22(12):35–8.

- Zhou J, Wang M, Wang H, Chi Q. Comparison of two nutrition assessment tools in surgical elderly inpatients in Northern China. *Nutr J*. 2015;14:68. doi: 10.1186/s12937-015-0054-8.
- Naber HJ, Schermer T, De Bree A, Nusterling K, Eggink L, Kruimel WJ. Prevalence of malnutrition in nonsurgical hospitalized patients and its association with disease complications. *Am J Clin Nutr*. 1997;66:1232–9.
- Harris D, Haboubi N. Malnutrition screening in the elderly population. *J R Soc Med*. 2005;98:411–4.
- Kopelman P, Lennard-Jones J. Nutrition and patients: a doctor's responsibility. *Clin Med*. 2002;2:391–4.
- World Health Organization. *Management of Severe Malnutrition: A Manual for Physicians and Other Senior Health Workers*. Geneva: WHO; 1999.
- Jin F, Chung F. Minimizing perioperative adverse events in the elderly. *Br J Anaesth*. 2001;87:608–24.
- WFSAD. Update in anesthesia. [Internet]. n.d. Available from: www.wfsahq.org/resources/update-in-anesthesia
- Doley J, Mallampalli A, Sandberg M. Nutrition management for the patient requiring prolonged mechanical ventilation. *Nutr Clin Pract*. 2011;26(3):232–41.
- Fuhrman MP, Charney P, Mueller CM. Hepatic proteins and nutrition assessment. *J Am Diet Assoc*. 2004;104(8):1258–64.
- Onu D, Kessler T, Andonovska-Trajkovska D, Fritsche I, Midson G, Smith J. Inspired by the outgroup: A social identity analysis of intergroup admiration. *Group Process Intergroup Relat*. 2016;19: [179–185?] doi:10.1177/1368430216629811.
- Edwards S. Anaesthetising the malnourished patient. [Book/Journal info missing].
- Sungurtekin H, Sungurtekin U, Balci C, Zencir M, Erdem E. The influence of nutritional status on complications after major intra-abdominal surgery. *J Am Coll Nutr*. 2004;23:227–32. doi:10.1080/07315724.2004.10719365.
- Kutnik P, Wichowska O, Sysiak-Sławecka J, Szczukocka M, Rypulak E, Piwowarczyk P, et al. Malnutrition risk at pre-anaesthetic clinic: observational study. 2023;55(3):179–85.
- Serón-Arbeloa C, Labarta-Monzón L, Puzo-Foncillas J, Mallor-Bonet T, Lafita-López A, Bueno-Vidales N, et al. Malnutrition screening and assessment. *Nutrients*. 2022;14(12):2392. doi:10.3390/nu14122392.
- Middleton MH, Nazarenko G, Nivison-Smith I, Smerdely P. Prevalence of malnutrition and 12-month incidence of mortality in two Sydney teaching hospitals. *Int Med J*. 2001;31:455–61.
- Isenring E, Capra S, Bauer J. Nutrition intervention is beneficial in oncology outpatients receiving radiotherapy to the gastrointestinal or head and neck area. *Br J Cancer*. 2004;91:447–52.
- Duggal S, Chugh TD, Duggal AK. HIV and malnutrition: effects on immune system. *Clin Dev Immunol*. 2012;2012:1–8.