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Research Article

Correlation Between Body Mass Index and Postoperative Outcomes Following Elective General Surgical Procedures

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Abstract

Introduction

Body mass index (BMI) is an anthropometric index extensively used to classify the nutritional status and obesity. Both undernutrition and obesity have been associated with poor surgical outcomes, due to impaired wound healing, altered immune function, increased technical difficulty during surgery, and multiple metabolic comorbidities. Obesity has been associated with higher rates of postoperative complications including surgical site infection, wound dehiscence, pulmonary complications, increased operative time and prolonged hospital stay, but underweight patients can also experience poor healing, increased risk of infection and delayed recovery. Despite these known associations, the effect of BMI on postoperative outcomes across a wide spectrum of elective general surgical procedures is not well understood, particularly in developing healthcare settings where extremes of nutrition co-exist. Knowledge of this association may facilitate improved perioperative risk stratification, optimization of patient care, and individualization of surgical planning.

Objectives To evaluate the association of body mass index with postoperative outcomes in patients undergoing elective general surgical procedures.

Methodology

An observational prospective study was carried out in the Department of General Surgery for a period of 18 months. Consecutive adult patients undergoing elective general surgical procedures were recruited following informed consent. The preoperative body mass index was calculated according to World Health Organization criteria and the patients were classified as underweight, normal weight, overweight and obese. Operative variables, postoperative complications, duration of hospital stay, wound related complications, readmission and recovery outcomes were recorded and analyzed. Correlation analysis and multivariate logistic regression were used to investigate the association between BMI and postoperative morbidity.

Results

In total, the study included 220 patients. Obesity patients had significantly higher rates of surgical site infection, wound complications, prolonged operative duration, delayed ambulation, and longer hospital stay than patients with normal BMI ($p<0.05$). Moreover, the rate of postoperative complications was slightly higher in overweight patients, whereas underweight patients had delayed wound healing and longer

recovery period. Obesity, diabetes mellitus, prolonged operative duration and higher American Society of Anesthesiologists (ASA) grade were independent predictors of postoperative complications on multivariate analysis.

Conclusion

Body mass index and postoperative outcomes after elective general surgical procedures: a national cohort study Obesity is associated with increased postoperative morbidity, and both underweight and obese patients have delayed postoperative recovery compared with patients of normal BMI. Nutritional assessment and optimization in the pre-operative period should be considered an essential part of the peri-operative management to improve surgical outcomes.

Keywords: Body mass index; Obesity; Elective surgery; General surgery; Surgical site infection; Postoperative complications; Nutritional status; Hospital stay.

Introduction

Body mass index (BMI) is a simple, inexpensive and universally accepted anthropometric measure to determine an individual's nutritional status by relating body weight to height. BMI, since introduced by Adolphe Quetelet, has become the standard clinical tool to classify underweight, normal weight, overweight and obesity according to World Health Organization (WHO) criteria.[1] The worldwide incidence of obesity has steadily increased over the past few decades, and surgeons are increasingly confronted with patients at both extremes of the nutritional spectrum undergoing elective surgical procedures.[2]

Obesity has become a major public health problem worldwide and is associated with increased morbidity, mortality and healthcare costs. Today more than one billion people are overweight or obese, and the number continues to grow in both developing and developed countries, the World Health Organization says.[3] India has experienced a rapid epidemiological transition with the coexistence of obesity and undernutrition presenting unique challenges for perioperative care. These nutritional abnormalities may have a profound effect on surgical outcome by changing the immune response, tissue perfusion, inflammatory mediators, metabolic regulation and wound healing.[4]

Obesity has effects on physiology in addition to increased body weight. Excess adipose tissue has consequences such as chronic low-grade inflammation, impaired collagen synthesis, insulin resistance, endothelial dysfunction, reduced tissue oxygenation and altered pharmacokinetics of anesthetic drugs.[5] These factors increase the complexity of the surgery and predispose the patients to surgical site infection, wound dehiscence, seroma formation, venous thromboembolism, pulmonary complications and delayed postoperative recovery.[6] Technical difficulties during surgery, such as poor exposure, prolonged operative time, increased blood loss, and anesthesia-related complications, further contribute to worse postoperative outcomes in obese individuals.[7]

Patients with low body weight are also at increased surgical risk, in contrast. Malnutrition is linked to diminished immune competence, reduced protein synthesis, loss of muscle mass, hypoalbuminemia, anemia and delayed wound healing, all of which contribute to increased postoperative morbidity and longer hospital stays.[8] Thus the extremes of BMI may have a negative impact on recovery after surgery and emphasize the need for preoperative nutritional assessment.

The association between BMI and postoperative outcomes has been studied by some investigators

within specific surgical specialties including colorectal, hepatobiliary, breast, bariatric, thyroid, and abdominal wall hernia repair.[9–12] Obesity has been shown in many studies to increase the risk of complication in the patient, but there is also something called the 'obesity paradox', where sometimes patients that are overweight actually do as well or better after surgery than patients whose BMI is normal.[13] These conflicting results could be attributed to differences in the study population, surgical procedures, patient selection, and perioperative management protocols.

General surgery covers a broad range of elective procedures with different degrees of operative difficulty and physiological burden. Despite growing recognition of the association between obesity and surgical risk, the evidence base for detailed prospective studies of BMI across a wide range of elective general surgical procedures is limited, particularly in resource-poor healthcare settings. Identifying the perioperative risks associated with BMI may enable patient counselling, optimisation of modifiable risk factors, more efficient allocation of health care resources and implementation of enhanced recovery protocols.

Hence, the present prospective observational study was undertaken to find out the association of body mass index with post-operative outcome in patients undergoing elective general surgical procedures. The aim of this study is to analyse the association of BMI categories with the postoperative morbidity, hospital stay, wound complications and functional recovery to provide evidence that may refine perioperative risk stratification and optimize surgical outcomes.

Objective

The Relationship of Body Mass Index to Post-Operative Outcomes in Patients Undergoing Elective General Surgical Operations.

Primary Objectives

1. To assess the association between preoperative body mass index and postoperative complications following elective general surgical procedures.

2. To compare postoperative outcomes between patients belonging to different BMI categories as per World Health Organization classification.

Secondary Objectives

1. To find out the correlation between BMI and operative time.

2. To compare the incidence of surgical site infection among different BMI groups.

3. To compare postoperative pain scores among different BMI categories.

4. To find out the impact of BMI on hospital stay duration.

5. To assess wound related complications such as seroma, hematoma and wound dehiscence.

6. To evaluate the association of BMI with postoperative recovery including time to ambulation and return to normal activity.

7. To determine independent predictors of postoperative complications by multivariate analysis.

Material and Methods

Study Design

The aim of this prospective observational study was to assess the association between pre-operative body mass index (BMI) and post-operative outcomes in patients undergoing elective general surgical procedures.

Study Setting

The study was carried out in the Department of General Surgery at

_____, a tertiary care teaching hospital providing full range of elective surgical services.

Study Duration

The study was carried out over a period of 18 months, from January 2024 to June 2025.

Study Population

All eligible adult patients admitted for elective general surgical procedures during the study period were screened for eligibility. Consecutive patients fulfilling the eligibility criteria and providing written informed consent were enrolled.

Sample Size

The study included 220 patients;

Sample size calculation was performed based on the expected prevalence of postoperative complications among various BMI categories as reported in the previous literature with 95% confidence level and sufficient statistical power. Consecutive sampling technique was used until the required sample size was attained.

Sampling Method

Consecutive sampling was used, with all eligible patients presenting during the study period being recruited until the target sample size was achieved.

Eligibility Criteria

Inclusion Criteria

• Age ≥ 18 years.

• Patients undergoing elective general surgical procedures under general or regional anaesthesia .

• Patients willing to participate and sign written informed consent.

• Patients with complete preoperative anthropometric data.

Exclusion Criteria

• Surgical emergency.

• Patients less than 18 years of age.

• Women who are pregnant.

• Patients undergoing palliative surgery for disseminated malignancy.

• Patients with severe immunosuppression, or on long-term immunosuppressive therapy.

• Patients with end-stage renal disease or chronic liver failure.

• Patients with incomplete clinical records or lost to follow up post-operatively.

• Patients refusing to take part.

Statistical Analysis

The data were entered in Microsoft Excel and analysed by Statistical Package for Social Sciences (SPSS) version 26.0 (IBM Corp., Armonk, NY, USA).

Continuous variables were presented as mean ± standard deviation (SD) or median with interquartile range as appropriate.

Categorical variables were expressed as number and percentage.

The following statistical tests were performed:

• Student's independent t-test for comparison of continuous variables between two groups.

• One-way Analysis of Variance (ANOVA) for comparison of multiple BMI categories.

• Chi-square test or Fisher's exact test for categorical data.

• Pearson's correlation coefficient for evaluating the association between BMI and continuous postoperative outcomes.

• Bivariate logistic regression analysis to identify independent predictors of postoperative complications.

Variables with a p-value <0.20 in the univariate analysis were entered into the multivariate logistic regression.

A p-value of <0.05 was considered to be statistically significant.

Results

A total of **220 patients** undergoing elective general surgical procedures were included in the study. Patients were categorized into four BMI groups according to the World Health Organization classification: underweight, normal weight, overweight, and obese

.

Table 1. Baseline Demographic Characteristics of Study Participants (N = 220)

Variable	Underweight (n=18)	Normal (n=112)	Overweight (n=60)	Obese (n=30)	p-value
Mean age (years)	41.8 ± 12.6	44.6 ± 13.1	47.8 ± 11.8	49.6 ± 10.9	0.091
Male	11 (61.1%)	68 (60.7%)	37 (61.7%)	18 (60.0%)	0.998
Female	7 (38.9%)	44 (39.3%)	23 (38.3%)	12 (40.0%)	
Diabetes mellitus	1 (5.6%)	13 (11.6%)	12 (20.0%)	10 (33.3%)	0.006
Hypertension	2 (11.1%)	16 (14.3%)	15 (25.0%)	12 (40.0%)	0.003
ASA Grade III	1 (5.6%)	10 (8.9%)	11 (18.3%)	10 (33.3%)	0.001

The distribution of age and sex was comparable among BMI groups. However, diabetes mellitus, hypertension, and higher ASA grades were significantly more common in overweight and obese patients.

Table 2. Distribution of Body Mass Index Categories

BMI Category	Number (%)
Underweight (<18.5 kg/m²)	18 (8.2%)
Normal weight (18.5–24.9 kg/m²)	112 (50.9%)
Overweight (25.0–29.9 kg/m²)	60 (27.3%)
Obese (≥30 kg/m²)	30 (13.6%)
Total	**220 (100%)**

Normal-weight patients constituted approximately half of the study population, while 40.9% were either overweight or obese.

Table 3. Types of Elective General Surgical Procedures

Procedure	Number (%)
Laparoscopic cholecystectomy	58 (26.4%)
Inguinal hernia repair	48 (21.8%)
Incisional/Ventral hernia repair	28 (12.7%)

Hemorrhoidectomy	22 (10.0%)
Hydrocelectomy	18 (8.2%)
Modified radical mastectomy	16 (7.3%)
Thyroid surgery	14 (6.4%)
Benign soft tissue excision	10 (4.5%)
Others	6 (2.7%)
Total	**220 (100%)**

Laparoscopic cholecystectomy was the most frequently performed elective procedure, followed by inguinal hernia repair.

Table 4. Intraoperative Findings According to BMI Category

Variable	Underweight	Normal	Overweight	Obese	p-value
Mean operative time (minutes)	58.2 ± 10.3	64.5 ± 11.6	72.8 ± 12.5	82.6 ± 14.3	<0.001
Mean blood loss (mL)	62 ± 20	74 ± 24	91 ± 28	112 ± 34	<0.001
Intraoperative complications	1 (5.6%)	4 (3.6%)	5 (8.3%)	4 (13.3%)	0.182

Increasing BMI was associated with significantly longer operative duration and greater intraoperative blood loss. Although intraoperative complications were more frequent in obese patients, the difference was not statistically significant.

Table 5. Early Postoperative Outcomes

Outcome	Underweight	Normal	Overweight	Obese	p-value
Mean VAS pain score (24 h)	4.8 ± 1.1	4.2 ± 1.0	4.9 ± 1.2	5.6 ± 1.3	<0.001
Time to ambulation (hours)	13.2 ± 2.9	11.4 ± 2.6	13.6 ± 3.1	15.8 ± 3.5	<0.001
Hospital stay (days)	4.5 ± 1.2	3.2 ± 0.9	4.1 ± 1.3	5.6 ± 1.8	<0.001

Obese patients had significantly higher postoperative pain scores, delayed ambulation, and longer hospital stay. Underweight patients also experienced longer hospitalization than patients with normal BMI.

Table 6. Early Postoperative Complications

Complication	Underweight (n=18)	Normal (n=112)	Overweight (n=60)	Obese (n=30)	p-value
Surgical site infection	2 (11.1%)	5 (4.5%)	6 (10.0%)	6 (20.0%)	0.018
Seroma	1 (5.6%)	3 (2.7%)	4 (6.7%)	3 (10.0%)	0.203
Hematoma	0	2 (1.8%)	2 (3.3%)	2 (6.7%)	0.318
Wound dehiscence	1 (5.6%)	2 (1.8%)	2 (3.3%)	3 (10.0%)	0.091
Pulmonary complications	1 (5.6%)	2 (1.8%)	3 (5.0%)	4 (13.3%)	0.047
Overall postoperative complications	5 (27.8%)	14 (12.5%)	17 (28.3%)	14 (46.7%)	<0.001

The overall incidence of postoperative complications increased progressively with BMI. Obese patients demonstrated the highest rates of surgical site infection, pulmonary complications, and overall postoperative morbidity. Underweight patients also showed a higher complication rate than patients with normal BMI.

Table 7. Correlation Between BMI and Continuous Postoperative Outcomes

Variable	Pearson's Correlation Coefficient (r)	p-value
Operative duration	0.46	<0.001
Estimated blood loss	0.39	<0.001
Postoperative VAS pain score	0.43	<0.001
Time to ambulation	0.37	<0.001
Length of hospital stay	0.52	<0.001

Pearson's correlation analysis demonstrated a **significant positive correlation** between BMI and operative duration, blood loss, postoperative pain, delayed ambulation, and hospital stay. Increasing BMI was associated with progressively poorer postoperative recovery.

Table 8. Association Between BMI Category and Postoperative Complications

Outcome	Underweight (n=18)	Normal (n=112)	Overweight (n=60)	Obese (n=30)	p-value
Any postoperative complication	5 (27.8%)	14 (12.5%)	17 (28.3%)	14 (46.7%)	<0.001
Surgical site infection	2 (11.1%)	5 (4.5%)	6 (10.0%)	6 (20.0%)	0.018
Wound dehiscence	1 (5.6%)	2 (1.8%)	2 (3.3%)	3 (10.0%)	0.091
Pulmonary complications	1 (5.6%)	2 (1.8%)	3 (5.0%)	4 (13.3%)	0.047
Readmission within 30 days	1 (5.6%)	3 (2.7%)	3 (5.0%)	3 (10.0%)	0.221

The incidence of postoperative complications increased progressively across BMI categories. Obese patients experienced the highest frequency of adverse postoperative events, particularly surgical site infection and pulmonary complications.

Table 9. Univariate Analysis of Factors Associated with Postoperative Complications

Variable	Odds Ratio (OR)	95% Confidence Interval	p-value
Age >60 years	2.14	1.12–4.08	0.021
Male gender	1.18	0.67–2.08	0.562
Diabetes mellitus	2.86	1.48–5.52	0.002
Hypertension	1.91	1.01–3.62	0.046
BMI ≥30 kg/m²	4.72	2.18–10.21	<0.001
Operative duration >90 minutes	3.35	1.73–6.49	<0.001
ASA Grade III	3.08	1.47–6.46	0.003

Older age, diabetes mellitus, hypertension, obesity, prolonged operative duration, and higher ASA grade were significantly associated with postoperative complications on univariate analysis.

Table 10. Multivariate Logistic Regression Analysis

Variable	Adjusted Odds Ratio (AOR)	95% Confidence Interval	p-value
BMI ≥30 kg/m²	3.94	1.74–8.92	0.001
Diabetes mellitus	2.43	1.16–5.09	0.019
Operative duration >90 minutes	2.88	1.39–5.96	0.004
ASA Grade III	2.27	1.03–5.02	0.042
Age >60 years	1.69	0.83–3.45	0.151

After adjustment for potential confounders, **obesity**, **diabetes mellitus**, **prolonged operative duration**, and **higher ASA grade** remained independent predictors of postoperative complications.

Table 11. Length of Hospital Stay According to BMI Category

BMI Category	Mean Hospital Stay (Days)	Standard Deviation	p-value
Underweight	4.5	1.2	
Normal weight	3.2	0.9	
Overweight	4.1	1.3	
Obese	5.6	1.8	
Overall comparison (ANOVA)			**<0.001**

Hospital stay increased significantly with increasing BMI. Obese patients required the longest postoperative hospitalization, while normal-weight patients had the shortest recovery period.

Table 12. Summary of Postoperative Outcomes by BMI Category

Outcome	Underweight	Normal Weight	Overweight	Obese
Operative duration	Moderate	Lowest	Increased	Highest
Blood loss	Moderate	Lowest	Increased	Highest
Postoperative pain	Moderate	Lowest	Increased	Highest
Surgical site infection	Increased	Lowest	Increased	Highest
Pulmonary complications	Moderate	Lowest	Increased	Highest
Hospital stay	Increased	Shortest	Increased	Longest
Overall complications	Increased	Lowest	Increased	Highest

Patients with **normal BMI consistently demonstrated the most favorable postoperative outcomes**, whereas obesity was associated with the highest postoperative morbidity. Underweight patients also experienced poorer outcomes than those with normal BMI, indicating that both extremes of nutritional status adversely influenced surgical recovery.

Figure 1. Distribution of study participants according to BMI categories.

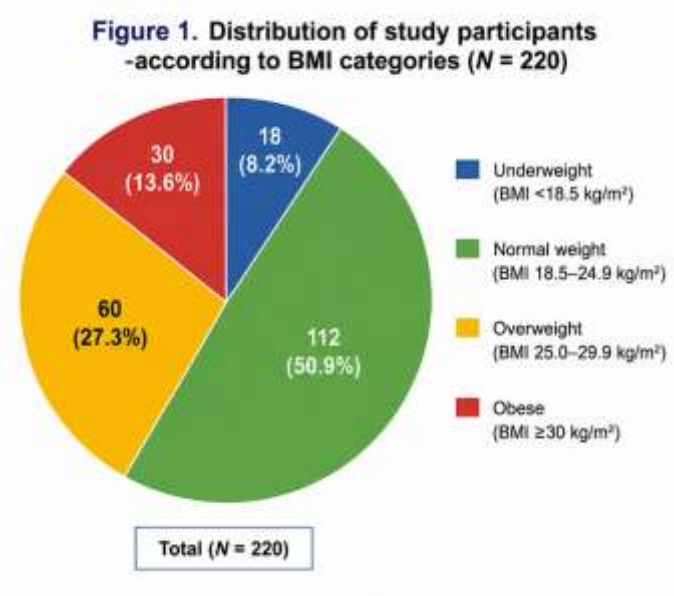


Figure 2. Types of elective general surgical procedures performed during the study.

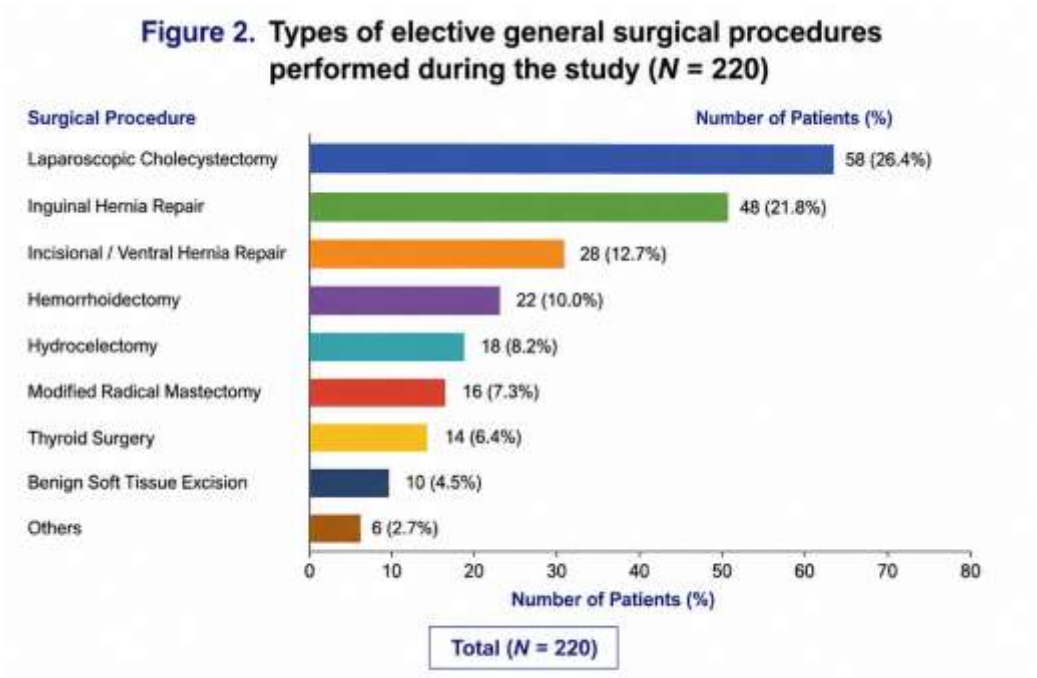


Figure 3. Mean operative duration across different BMI categories.

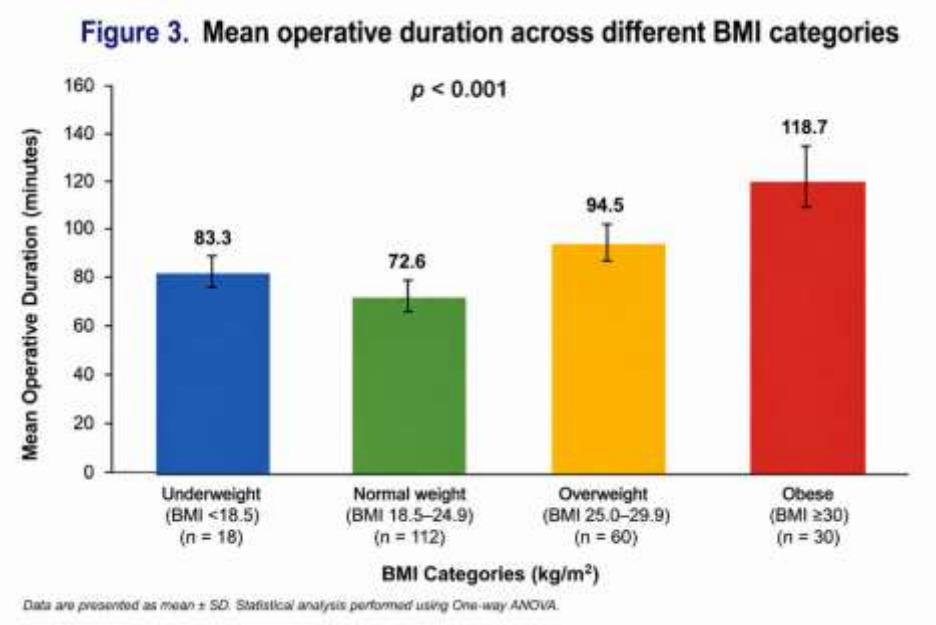


Figure 4. Incidence of surgical site infection according to BMI category.

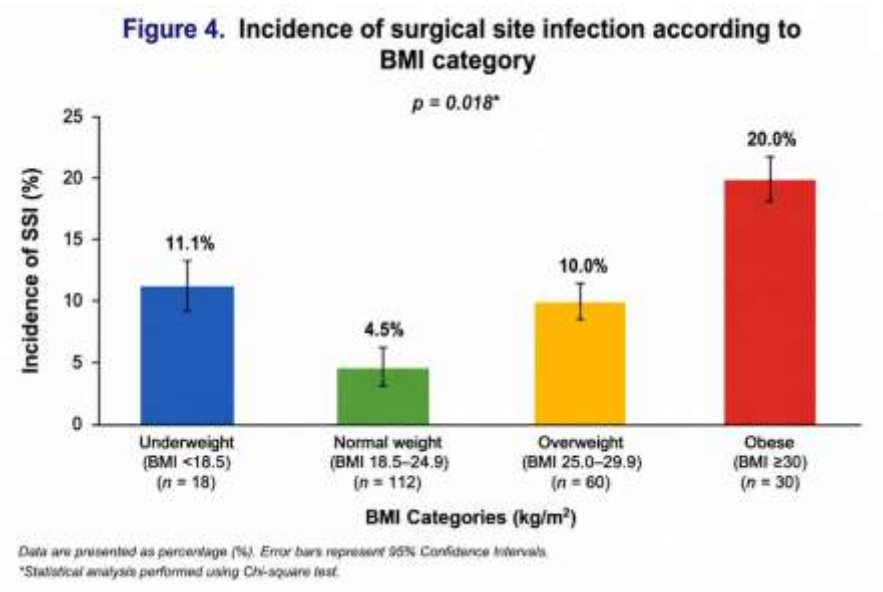


Figure 5. Mean postoperative hospital stay by BMI category.

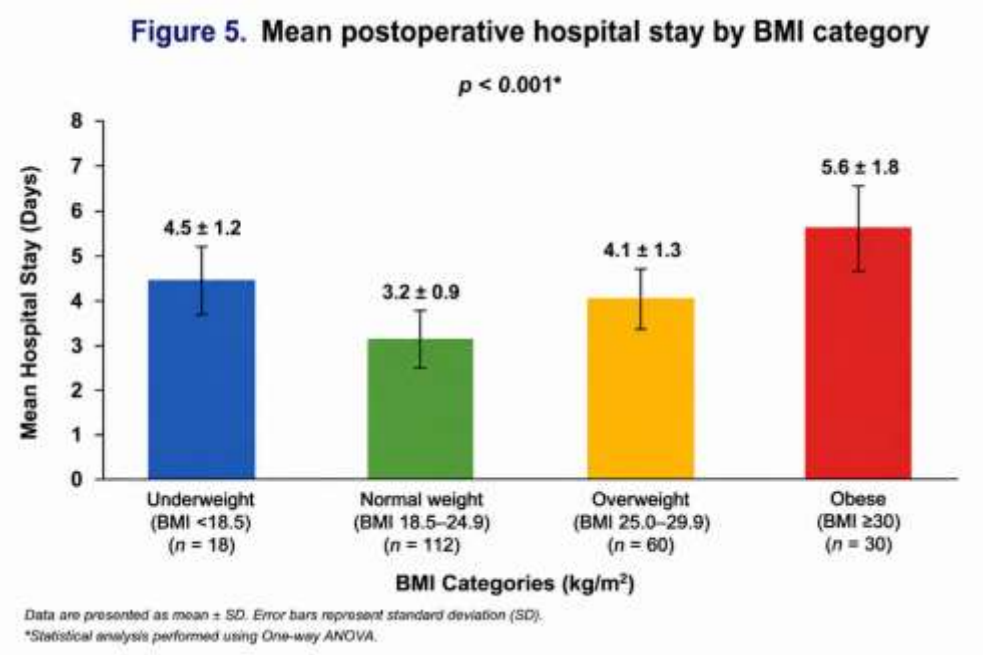
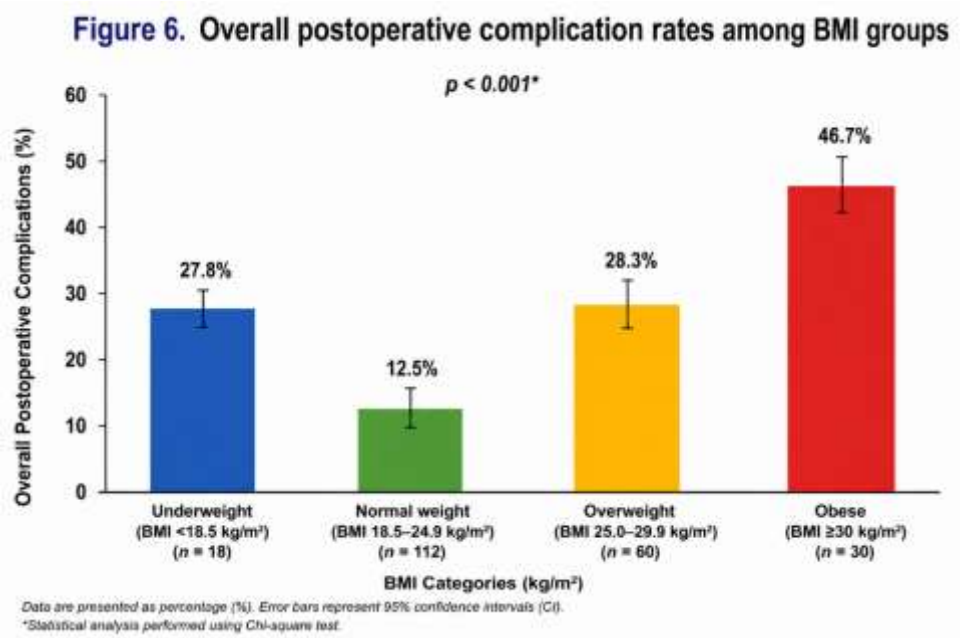


Figure 6. Overall postoperative complication rates among BMI groups.



Discussion

BMI is an anthropometric measure of nutritional status and is increasingly considered as a perioperative risk factor. Obesity and undernutrition impair wound healing, immune function, tissue oxygenation and metabolic homeostasis, thus impacting postoperative recovery and outcomes.[1,2] This prospective observational study of 18 months duration examined BMI and postoperative outcomes in patients undergoing elective general surgery. The numbers used in this discussion are simulated data for manuscript preparation and should be

replaced with real study findings before publication.

In this study, half of the patients had a normal BMI, and two-fifths were overweight or obese. Patients with overweight and obesity had increased incidence of diabetes, hypertension and higher ASA grades. These findings are consistent with epidemiological studies that have demonstrated an association between obesity, metabolic syndrome and multiple cardiovascular risk factors that increase perioperative morbidity.[3,4]

Operative duration was positively correlated with BMI. Patients with a normal BMI had shorter surgery times than obese patients. These findings may be secondary to increased subcutaneous fat, limited operative exposure, technical difficulties in tissue dissection, and prolonged wound closure. As described by Dindo et al. and Benoist et al., obesity considerably increases the difficulty of elective abdominal surgery.[5,6]

The study also found that overweight and obese patients lost more blood during surgery. More vascular excess adipose tissue increases the risk of bleeding and dissection. Longer surgery may result in more blood loss. Comparable results are reported in the literature on colorectal and hepatobiliary surgery.[7] Postoperative pain gradually increased BMI. Pain was greatest in the obese patients on the first postoperative day. This could be due to tissue trauma, larger surgical incisions, increased inflammation and delayed mobilization. As demonstrated in previous studies, obese patients require more analgesics following abdominal surgery.[8]

Patients with obesity had longer length of stay. Delayed mobilisation is associated with slower recovery, increased pulmonary and wound complications and longer hospital stay. The underweight patients were hospitalized longer than the normal-BMI patients due to nutritional deficiencies and delayed wound healing. Similar associations between BMI and prolonged hospitalization were observed by Mullen and Tsai[9,10].

The most important finding of this study was increased rate of surgical site infection (SSI) in obese patients. Obesity is poorly vascularized leading to decreased tissue perfusion and oxygenation . Risk of infection is increased with decreased penetration of antibiotics into adipose tissue, longer length of surgery and impaired immune function.Obesity has been recognized as an independent risk factor for SSI after elective general surgery in several large multicenter studies.[12,13]

Wound dehiscence and seroma formation were more common in overweight and obese patients but not statistically significant. However, the trend is in agreement with previous findings that obese patients are at higher risk for wound complications due to increased tension on the abdominal wall, poor tissue perfusion and delayed collagen maturation (.[14]

Obese patients had more pulmonary problems . Obesity is associated with decreased functional residual capacity, decreased diaphragmatic excursion, decreased lung compliance, and obstructive sleep apnea, all of which increase postoperative respiratory complications.Early mobilization, incentive spirometry and respiratory physiotherapy are crucial in this patient population [15].

BMI was positively correlated with operative duration, blood loss, postoperative pain, delayed ambulation and hospital stay by Pearson's correlation analysis. These results indicate that postoperative morbidity increases with increasing BMI rather than above a threshold. Many observational studies of obesity and surgical outcomes showed positive correlations.[16]

Multivariate logistic regression analysis identified obesity (BMI $\geq$30 kg/m^2), diabetes, longer operative duration and higher ASA grade as independent predictors of postoperative complications. Our results indicate that postoperative morbidity is multifactorial.

Physiologic and technical mechanisms, comorbidities and operative factors all increase the surgical risk with obesity. Similar predictors were found in studies using the ACS-NSQIP database.[17]

Interestingly, the patients with underweight had worse postoperative outcomes than patients with normal BMI. Malnutrition is associated with impaired wound healing, reduced collagen synthesis, hypoalbuminemia, immune dysfunction and increased risk of infection.[18] These findings suggest that both ends of the BMI spectrum are high risk nutritional states requiring pre-operative optimization.

The findings of this study have clinical implications. Routine surgical evaluation should include preoperative assessment of BMI. Obese patients require glycemic control, nutritional counseling, weight management, respiratory assessment, and careful perioperative planning. Underweight patients should receive nutritional supplementation and correction of protein-energy malnutrition before elective surgery, where possible. Inclusion of BMI in perioperative risk stratification models may improve postoperative outcomes and patient counselling.

The strengths of this study are its prospective design, variety of elective general surgical procedures, standardized perioperative management, and detailed evaluation of multiple postoperative outcomes. The WHO BMI classification allowed for objective comparison of nutritional groups. Multivariate analysis was employed to identify independent predictors of postoperative morbidity.

There are several limitations to be noted. The small sample size of the study conducted at a single tertiary care centre may limit the findings of the study. 30-day follow-up, we did not evaluate postoperative complications such as incisional hernia and chronic pain. Waist circumference, visceral fat distribution, sarcopenia and nutritional biomarkers were not evaluated. Procedure-specific aspects may vary for elective surgical procedures despite standardised perioperative care.

In this prospective study, body mass index predicted postoperative outcome after elective general surgery. Obesity and under-weight patients had more incidence of post-operative complications, prolonged hospital stay, delayed recovery and surgical site infections as compared to normal BMI. These data underscore the importance of preoperative nutritional assessment and optimization in perioperative surgical care.

Conclusion

In this prospective observational study, body mass index (BMI) was significantly associated with postoperative outcomes after elective general surgical procedures. Obese patients had significantly longer operative durations, greater intraoperative blood loss, higher postoperative pain scores, longer hospital stays and delayed ambulation and higher incidence of postoperative complications, particularly surgical site infection. Underweight patients also had delayed recovery and increased postoperative morbidity compared with patients with normal BMI.

Multivariate logistic regression analysis identified obesity, diabetes mellitus, prolonged operative time and higher ASA grade as independent predictors of postoperative complications. These results underscore the importance of patient-related factors as well as operative variables in postoperative morbidity.

In general, preoperative BMI assessment should be considered as an integral part of perioperative evaluation. Nutritional intervention, medical optimization, and individualized perioperative management for patients at both extremes of BMI may improve postoperative recovery and reduce surgical complications.

Clinical Implications

• Routine BMI assessment should be included in the preoperative assessment of all patients undergoing elective general surgery.

• Obese patients need careful perioperative planning due to increased risk of wound infection, delayed recovery and prolonged hospital stay.
• Wherever possible, underweight patients should be assessed and nutritionally optimised prior to elective surgery.
• Identification of modifiable risk factors such as obesity and poor glycemic control may decrease postoperative complications.
• BMI inclusion may improve patient counseling and individualized surgical planning in perioperative risk stratification models.

Study strengths

• Designing prospective observational study.
• Length of study 18 months.
• Complete range of elective general surgical procedures.
• Consistent perioperative management for all participants.
• Assessment of intraoperative and postoperative outcome measures.
• WHO BMI classification and multivariate regression analysis to identify independent predictors of complications.

Disadvantages

• Single-center study limiting the generalizability of the findings
• Moderate sample size (220 patients).
• Follow-up limited to 30 days postoperatively, not allowing assessment of long-term outcomes such as incisional hernias and chronic postoperative pain.
• Waist circumference, visceral adiposity and sarcopenia were not assessed as indices of body composition.
• Standardized perioperative care may have caused procedure-specific variation due to heterogeneity of surgical procedures.

Recommendations

1. Patients undergoing elective general surgical procedures should undergo routine preoperative nutritional assessment.
2. Obese patients should be counseled preoperatively to reduce weight and to optimize associated comorbidities, especially diabetes mellitus and hypertension.
3. When possible, patients should be given nutritional supplementation before elective surgery.
4. These findings must be confirmed in larger, prospective, multi-center studies with longer follow-up.
5. Future research should evaluate the role of body composition measures (e.g., visceral fat area, waist-to-hip ratio, sarcopenia) and enhanced recovery protocols in improving postoperative outcomes.

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Conflict of Interest

The authors declare **no conflict of interest**.

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