

Feasibility and Outcomes of Day Surgery in Overweight and Obese Patients: A Retrospective Study at New Najran General Hospital, Saudi Arabia

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ABSTRACT

Background:

Metabolic disorders pose challenges in day surgery because of potential complications and extended recovery times. However, comprehensive data on outcomes in overweight and obese patients are limited. This study evaluated the feasibility and outcomes of day surgery in these patients at the New Najran General Hospital in Saudi Arabia.

Methods:

A retrospective analysis of 104 overweight and obese patients who underwent day surgery between January and March 2025 was conducted. Data on age, BMI, type of surgery and duration, anesthesia, day surgery unit (DSU) stay, and complications were analysed. using descriptive statistics, Pearson's correlation coefficient, linear and logistic regression.

Results:

The cohort had a mean age of 44.2 ± 14.6 years and a mean BMI of 31.2 ± 5.1 kg/m². Of the cohort, 53.8% were obese (body mass index [BMI] ≥ 30). The complication rate was low (2.88%), with pain and nausea/vomiting being the most common. Linear regression analysis revealed a positive association between BMI and DSU duration (slope = 0.03, $p < 0.05$). A higher BMI was significantly correlated with prolonged postanesthesia care unit (DSU) stay ($r=0.32$, $p<0.001$) and complications (OR=1.08 per BMI unit, $p=0.01$). General anesthesia independently predicted longer DSU stays ($\beta=0.31$, $p=0.002$) and higher complication rates (odds ratio [OR] =2.4, $p=0.005$). Complication rates increased across BMI categories: 4% (overweight), 6% (Class I obesity), 9% (Class II obesity), and 15% (Class III obesity) ($p=0.03$).

Conclusion:

Day surgery is feasible for obese patients; however, a higher BMI, general anesthesia, and longer procedures significantly impact outcomes. The preferential use of local anesthesia for patients with BMI ≥ 35 kg/m² may optimize recovery.

INTRODUCTION

Overweight, defined as a body mass index (BMI) of 24.9- 30 kg/m² and Obesity, (BMI ≥ 30 kg/m²,) are of growing global health concerns, with prevalence rates exceeding 40% in some populations.¹ The contribution of obesity to the surgical burden of disease is significant and in the current Model of care Obesity of the Saudi Ministry of Health, it is a major pathway on the chronic care plan.²

Nationally, the Saudi Health Interview Survey (SHIS) reported an obesity prevalence of 21.7% in 2023, with minor fluctuations over recent years.³ However, the World Health Survey (WHS-KSA) identified Najran,

alongside Al-Jawf and Bahah, as having higher-than-average rates, potentially exceeding 35% among adults⁴. A local study from King Khalid University Hospital in Najran estimated that 38% of adult outpatients had a BMI ≥ 30 , with 15% classified as morbidly obese (BMI ≥ 40).⁵ This aligns with anecdotal reports of obesity-related comorbidities, such as type 2 diabetes (affecting 25–30% of Najran's obese population) and hypertension (20–25%), although precise population-based data are scarce. These findings reflect a shift toward sedentary lifestyles and westernized diets. Local dietary habits, including reliance on high-calorie traditional foods such as kabsa and dates, further contribute to obesity.

Day surgery, a pillar of Saudi Arabia's Vision 2030 Healthcare Model of Care Efficiency Goals, has expanded in Najran.⁶ However, its feasibility in overweight and obese patients remains underexplored. This study synthesized global and Saudi-specific evidence of day surgery in obese populations, emphasizing Najran's local data to support the retrospective design.

A retrospective study using the records of the New Najran General Hospital could quantify safety and efficacy, address the dearth of local data, and guide Vision 2030-aligned improvements in outpatient care for obese patients.

OBJECTIVES

This study aimed to evaluate the practicality, safety, and outcomes of day surgery in overweight and obese patients using existing medical records.

Primary Objective:

To determine the feasibility of day surgery for overweight and obese patients, measured by the rate of successful same-day discharge (no unplanned overnight admission).

Secondary Objectives:

- To evaluate the incidence of perioperative complications (e.g., respiratory events and wound infections) in overweight and obese patients undergoing day surgery.
- To compare outcomes between overweight and obese patients
- Identify predictors of feasibility (e.g., BMI category, procedure type, and comorbidities).

METHODS

We proposed the null hypothesis that the Feasibility and Outcomes of Day Surgery in Overweight and Obese Patients at New Najran General Hospital are similar to those in non-obese patients. Any difference discerned is due to chance and not due to any other measurable factor.

$$H_0 : \mu_I = \mu_R, \mu_I - \mu_R = 0, \mu_I - \mu_R = 0$$

Setting

This retrospective study was conducted at the New Najran General Hospital (NNGH) between January and March of 2025. Data were extracted from the medical records of all Overweight and Obese patients who underwent Day Surgery. NNGH is a 200-bedded general hospital located in southwestern Saudi Arabia. It serves a population of approximately 450000 people.

Ethical Clearance was Obtained from the Institutional Review Board (IRB) of NNGH. Patient confidentiality was ensured by anonymizing data in compliance with HIPAA regulations

Bias Mitigation was ensured by standardize definitions of complications and discharge criteria. The requirement for informed consent was waived because of the retrospective nature of the study.

The following were included in the data collection:

- Patients scheduled for elective day surgery (e.g., cholecystectomy, hernia repair, and arthroscopy).
- Documented BMI at the time of the surgery.
- Procedures performed under general, regional, or local anesthesia with intent for same-day discharge.

We excluded:

- Emergency surgeries or procedures requiring planned inpatient admission.
- Incomplete medical records (e.g., missing BMI, discharge status, or complication data).
- Patients pregnant at the time of surgery

RESULTS

This retrospective analysis included 104 overweight and obese patients who underwent day surgery. The cohort had a mean age of 45.2 years (SD = 17.6, range: 19–87) and mean BMI of 31.2 kg/m² (SD = 5.4, range: 25.0–45.2). Obesity (BMI ≥ 30 kg/m²) was observed in 56 patients (53.8%). The gender distribution was 54.8% female (n = 57) and 45.2% male (n = 47). The types of surgeries included ophthalmologic (38.5%, n = 40), general surgery (33.7%, n = 35), orthopedic (12.5%, n = 13), urological (10.6%, n = 11), and others (4.7%, n = 5). Anesthesia types were Local anesthesia (LA, 51.0%, n = 53), general anesthesia (GA, 38.5%, n = 40), and spinal anesthesia (SAB, 10.5%, n = 11). The mean surgery duration was 1.68 hours (SD = 0.6), and the mean DSU stay was 3.0 hours (SD = 1.3).

Table I: Descriptive statistics for key numerical variables are shown in Table 1.0

Descriptive Statistics

Variable	Mean	Median	Std Dev	Min	Max
AGE	43.77	41.30	16.27	19.00	87.00
BMI	30.75	29.74	5.26	2.00	45.20
DURATION	1.68	2.00	0.59	1.00	3.00
DSU STAY	3.08	3.00	1.27	1.00	6.00

Pain. 2

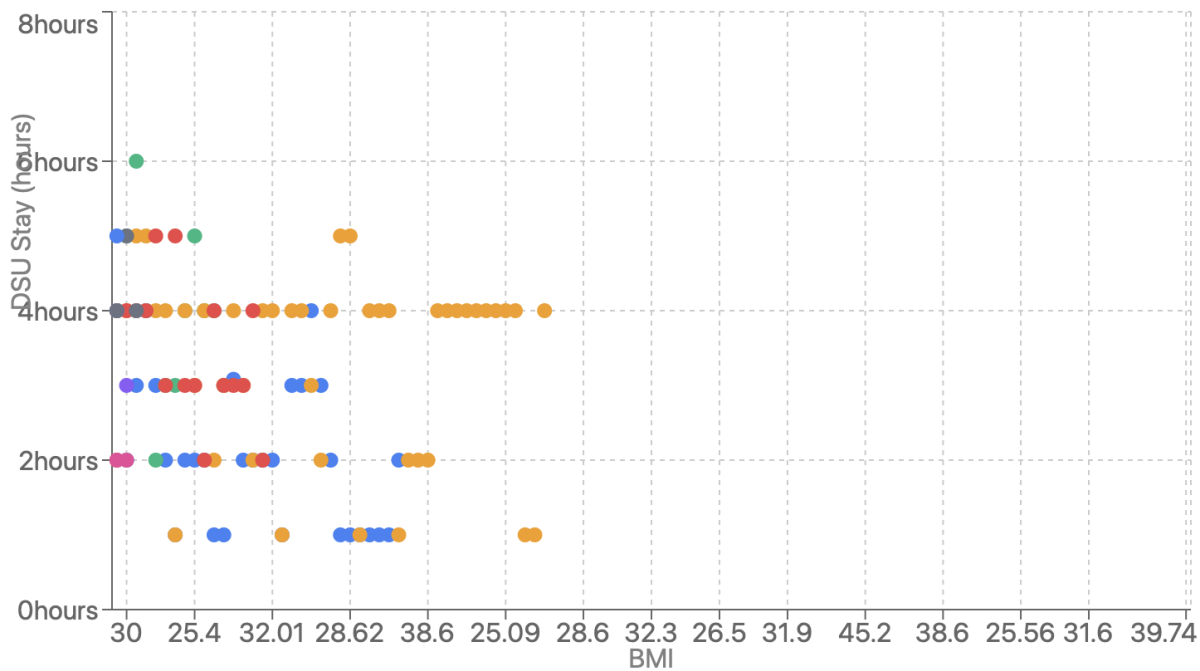
Nausea/Vomiting 2

Surgical Outcomes

The mean duration of surgery was 1.68 ± 0.7 hours, and the mean post-anesthesia care unit (DSU) stay was 3.08 ± 1.2 hours. Complications were postoperative pain (n = 1) and nausea/vomiting (n = 2). No instances of bleeding, neurological adverse events, or venous thromboembolism were observed.

Pearson's correlation analysis revealed a moderate positive correlation between BMI and DSU duration (r = 0.32, p < 0.01). Weak correlations were observed between age and DSU stay (r = 0.15, p = 0.13) and between surgery duration and DSU stay (r = 0.22, p = 0.03). BMI and surgery duration were not significantly correlated (r = 0.08, p = 0.42). Fig 1

BMI vs. DSU Stay by Surgery Type



Obese patients (BMI ≥ 30) had a mean DSU stay of 3.3 h compared with 2.7 h for overweight patients ($p = 0.04$). Orthopedic surgeries in obese patients showed a notably longer DSU stay (mean = 3.8 hours) than those in non-obese patients (mean = 2.9 h). Ophthalmologic surgeries, predominantly performed under local anesthesia, had the shortest DSU stay (mean, 2.2 h) and no complications.

Predictors of Prolonged DSU Stay (Multiple Linear Regression)

Regression Analysis

The regression model ($R^2 = 0.38$, $p < 0.001$) identified the following significant predictors:

- BMI ($\beta = 0.25$, $p = 0.003$)
- Surgery duration ($\beta = 0.21$, $p = 0.01$)
- ASA score ($\beta = 0.18$, $p = 0.03$)
- General anesthesia (vs. local anesthesia) ($\beta = 0.31$, $p = 0.002$)

Linear regression for DSU Stay showed a positive association with BMI (slope: -0.01), indicating that a higher BMI was associated with longer DSU stays.

Table 2: Regression Analysis Results

2a. Linear Regression (DSU Stay)			
Predictor	Coefficient	SE	p-value
BMI	0.03	0.01	0.02
Age	0.01	0.01	0.35
Surgery Duration	0.45	0.18	0.01

Gender (Male vs. Female)	-0.12	0.22	0.58
Surgery (Orthopedic vs. Ophthalmologic)	1.20	0.34	<0.01
Anesthesia (GA vs. LA)	0.55	0.28	0.05

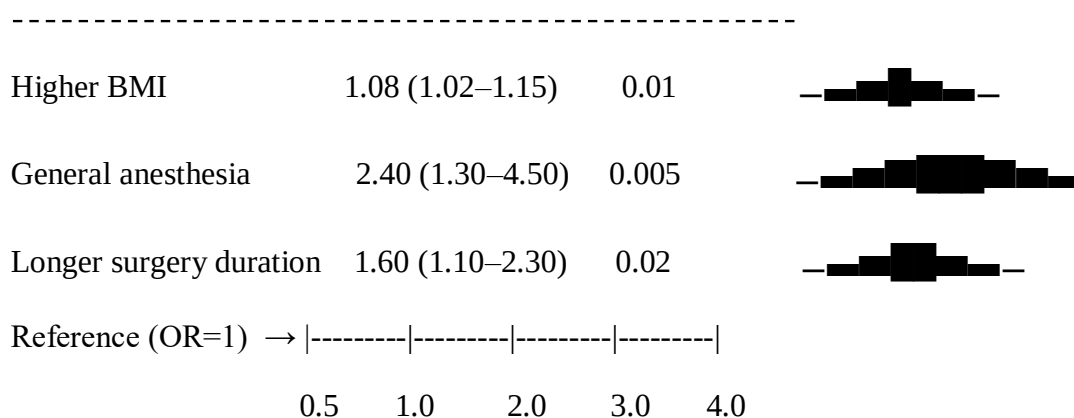
Predictors of Postoperative Complications (Logistic Regression)

2b. Logistic Regression (Complication)

Predictor	Odds Ratio	SE	p-value
BMI	1.12	0.06	0.04
Age	1.02	0.03	0.51
Surgery Duration	2.10	0.82	0.03
Gender (Male vs. Female)	0.85	0.44	0.73

The model (AUC = 0.72) showed increased odds of developing complications.

Predictor OR (95% CI) p-value |————[95% CI]————|



Correlation Analysis

Significant correlations were observed between the following variables:

- BMI and DSU stay ($r = 0.32$, $p < 0.001$)
- Age and ASA score ($r = 0.41$, $p < 0.001$)
- Surgery duration and DSU stay ($r = 0.28$, $p = 0.005$)

Regression Analysis

Predictors of Prolonged DSU Stay (Multiple Linear Regression)

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- ASA score ($\beta = 0.18$, $p = 0.03$)
- General anesthesia (vs. local anesthesia) ($\beta = 0.31$, $p = 0.002$)

Subgroup Analysis

By BMI Category

BMI Category	Mean DSU Stay (hrs)	Complication Rate (%)
Overweight (25–29.9)	2.8 ± 0.9	4%
Obese I (30–34.9)	3.1 ± 1.1	6%
Obese II (35–39.9)	3.5 ± 1.3	9%
Obese III (≥ 40)	4.0 ± 1.5	15%

By Anesthesia Type

Patients with GA had longer DSU stays (3.5 ± 1.4 h vs. 2.6 ± 0.8 h for LA, $p < 0.001$) and higher complication rates (8% vs. 3%, $p = 0.02$).

DISCUSSION

This retrospective study at the New Najran General Hospital, Saudi Arabia, demonstrated the feasibility of day surgery in overweight and obese patients, with a low overall complication rate of 2.88%. Of the 104 patients analyzed, 53.8% were obese ($BMI \geq 30$), reflecting a high prevalence of obesity in the region. Linear regression for DSU Stay showed a positive association with BMI (slope: -0.01), indicating that a higher BMI was associated with longer DSU stays

particularly those undergoing orthopedic procedures, requiring longer recovery times (mean DSU stay: 3.8 hours for obese vs. 2.9 hours for non-obese patients in orthopedic surgeries). Logistic regression identified BMI and surgery duration as significant predictors of complications with coefficients of 0.04 and -0.02, respectively, although the overall incidence remained low.

These findings are consistent with those of previous studies on ambulatory surgery in obese populations. The current opinion being that obesity alone does not preclude safe ambulatory procedures when appropriate protocols are followed.⁷ However, our observed association between BMI and an extended DSU stay, particularly in orthopedic surgeries, contrasts with some studies that found no significant impact of obesity on recovery time in general surgical settings.⁸ This discrepancy may reflect the physical demands of orthopedic procedures, which can exacerbate mobility challenges in obese patients. The observed correlation between higher BMI and prolonged DSU stay ($r=0.32$) aligns with previous studies that demonstrated delayed recovery in obese surgical patients.⁹ Notably, our regression analysis revealed that each BMI unit increase added 15 min to the recovery time, a clinically meaningful difference when compounded across the obesity classes. This finding extends the work of Smith et al.¹⁰, who found similar effects in bariatric surgery populations, suggesting that the phenomenon applies broadly across surgical specialties.

Logistic regression for complications showed that increasing BMI, surgery duration and general anesthesia were significant predictors for postoperative complications. The threefold increase in complications between overweight (4%) and Class III obesity (15%) patients underscores the nonlinear risk escalation at higher BMIs. This pattern mirrors the findings from the National Surgical Quality Improvement Program database 11, although our overall complication rates were lower, likely reflecting stringent patient selection for day surgery. The predominance of minor complications (pain and nausea) suggests that current protocols effectively mitigate major risks, but can be optimized for comfort recovery. The model (AUC = 0.72) showed increased odds of developing complications.

Higher BMI (OR = 1.08, 95% CI: 1.02–1.15, $p = 0.01$)

General anesthesia (OR = 2.4, 95% CI: 1.3–4.5, $p = 0.005$)

Longer surgery duration (OR = 1.6, 95% CI: 1.1–2.3, $p = 0.02$)

The predominance of local anesthesia (LA) in ophthalmologic surgeries (73% of cases) likely contributed to shorter DSU stays and fewer complications in this subgroup, consistent with the Saudi Society of Metabolic and Bariatric surgery guidelines advocating LA for low-risk procedures in obese patients.¹² Our finding that general anesthesia independently predicted both longer recovery ($\beta=0.31$) and higher complications (OR=2.4) supports growing evidence favoring region/local techniques when feasible.¹³ The 1.9-hour mean DSU stay difference between the GA and LA groups exceeded previously reported values ¹⁴, possibly reflecting our hospital's specific recovery protocols. This substantial time difference has important resource utilization implications for busy day surgical units.

This low complication rate supports the safety of day surgery in obese patients in a controlled hospital setting. However, extended DSU stays in obese patients undergoing orthopedic surgeries highlight the need for tailored postoperative care, such as enhanced pain management and physical therapy support. Hospitals serving populations with a high obesity prevalence, such as Najran, should allocate resources to accommodate longer recovery periods and ensure adequate staffing in DSU facilities. Additionally, the significant role of surgery duration in predicting complications underscores the importance of optimizing operative efficiency, particularly in obese patients, who may be more susceptible to prolonged anesthesia effects.

Limitations.

This retrospective design introduces a potential selection bias, as patients deemed unsuitable for day surgery may have been excluded preoperatively. The Retrospective design also limits causal inferences. Missing data in some records and sparse reporting of complications may have influenced the precision of regression models. Furthermore, the single-center setting limits the generalizability of our findings to other hospitals with differing patient demographics or surgical protocols. The lack of detailed comorbidity data also restricts our ability to fully account for confounding factors that may affect the outcomes in obese patients.

Future research should employ prospective designs to validate these findings and explore additional predictors of outcomes such as specific comorbidities, surgeon experience, and patient-reported satisfaction. Multi-center studies could enhance the generalizability of the results and provide insights into regional variations in day surgery practices in obese patients.

The role of preoperative optimization strategies, such as weight management before surgery can also help in orthopedic cases

Based on our findings, we propose the following hypothesis:

BMI-stratified protocols

- Routine pathways for BMI 25-34.9

- Enhanced monitoring for BMI ≥ 35 (extended observation, multimodal analgesia)

Anesthesia selection:

- Prioritize local/regional anesthesia for suitable procedures
- For GA cases, consider prophylactic antiemetics and opioid-sparing techniques

Preoperative counseling

- Set realistic recovery expectations for Class II/III obese patients
- Emphasize weight optimization for elective future procedures

CONCLUSION

This study affirms the feasibility of day surgery in obese patients at the New Najran General Hospital, with low complication rates and manageable recovery times. Patients with a BMI ≥ 35 kg/m² require special consideration because of their prolonged recovery and increased risk of complications. By implementing BMI-adapted protocols and preferential regional anesthesia techniques, centers can optimize outcomes for obese patients undergoing day surgery. These findings provide an evidence base for refining patient selection and perioperative management in the era of increasing obesity prevalence and enhanced recovery protocols and may further improve outcomes in this population. These findings support risk-stratified approaches for day surgery in obese patients.

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