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Evaluation of Weight Loss after Major Abdominal Surgeries:A Cross-Sectional Observational Study.

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Abstract

Background: Postoperative weight loss is a common consequence of major abdominal surgeries, influenced by surgical trauma, altered gastrointestinal anatomy, nutritional intake, and metabolic responses. While bariatric procedures target weight reduction, unintended loss in non-bariatric surgeries may reflect complications or inadequate recovery. This study is to evaluate early postoperative changes in body weight and body mass index (BMI) following major abdominal surgeries. ***Materials and Methods:*** Sixty adult patients (aged 18–80 years) undergoing elective or emergency major abdominal surgeries over 18 months, including hepato-pancreatico-biliary, colorectal, gastric, and retroperitoneal procedures, were enrolled using purposive sampling. Baseline clinical, biochemical, and anthropometric data were recorded. Body weight and BMI were measured preoperative and on postoperative days 14 and 30. Changes over time were analyzed using Student's t-test, with $p < 0.05$ considered statistically significant. ***Results:*** The study included 34 females (56.67%) and 26 males (43.33%), with a mean age distribution across 18–30 years (33.33%), 31–45 years (25%), 46–60 years (25%), and >60 years (16.67%). Preoperative mean weight and BMI were 61.50 ± 9.74 kg and 22.54 ± 3.19 kg/m^2, respectively. Postoperative measurements showed minimal changes: mean weight was 61.08 ± 9.49 kg on day 14 (Δ 0.41 kg) and 61.24 ± 9.35 kg on day 30 (Δ 0.26 kg), while mean BMI was 22.38 ± 3.08 kg/m^2 on day 14 (Δ 0.16) and 22.44 ± 3.04 kg/m^2 on day 30 (Δ 0.10), with no statistically significant differences from baseline. Most patients maintained their BMI category across the study period. ***Conclusion:*** Early postoperative weight loss after major abdominal surgery is minimal and clinically insignificant when perioperative care and nutritional support are appropriate. Patients with stable baseline clinical and biochemical profiles maintain healthy BMI during the first 30 days post-surgery.

Keywords: Major abdominal surgeries, Non-bariatic surgery postoperative weight loss, BMI.

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INTRODUCTION

Major abdominal surgeries encompass a wide range of procedures involving the gastrointestinal tract, liver, pancreas, and other visceral organs, performed to address both life-threatening and elective indications such as malignancies, inflammatory conditions, trauma, and metabolic disorders like obesity.[1]These procedures include colorectal resections, gastrectomies, hepatectomies, pancreaticoduodenectomies, and bariatric interventions such as gastric bypass or sleeve gastrectomy. [2] While these surgeries are effective for managing complex conditions, they frequently induce substantial physiological changes, most notably postoperative weight loss.

Postoperative weight loss is multi factorial, influenced by surgical trauma, altered gastrointestinal anatomy, nutritional deficiencies, and systemic metabolic responses. Reduced oral intake due to pain, nausea, or ileus is common immediately after surgery, while malabsorption, hormonal fluctuations, and metabolic disturbances may contribute to longer-term reductions in body mass index (BMI). [3]The clinical significance of weight loss depends on surgical context; in bariatric procedures, weight reduction is therapeutic, whereas in non-bariatric procedures, unintended weight loss may indicate complications or inadequate recovery. Understanding these dynamics is essential, as postoperative weight change affects recovery time, functional outcomes, quality of life, and long-term survival. [4]

The frequency of abdominal surgeries underscores the clinical relevance of postoperative weight changes. Worldwide, these procedures constitute a substantial proportion of inpatient surgical interventions, with over one million abdominal operations performed annually in some countries for cancer, obesity, and digestive disorders. [5] In oncologic populations,

significant weight loss may herald cachexia, negatively impacting prognosis, whereas in bariatric patients, careful monitoring ensures therapeutic efficacy and prevents malnutrition.

Major abdominal surgeries are defined as invasive procedures under general anesthesia requiring entry into the abdominal cavity, with significant physiological and metabolic impact.[6] These include bariatric surgeries such as Roux-en-Y gastric bypass and sleeve gastrectomy, oncologic resections for colorectal and gastric cancer, and inflammatory bowel disease surgeries like ileocolic resection. The current study aims to systematically assess postoperative weight changes, evaluating trends, influencing factors, and clinical implications. Weight change is quantitatively assessed using BMI measurements at preoperative baseline and early postoperative intervals (14 and 30 days), with clinical correlations including complications and recovery trajectory.

This study focuses on adult patients aged 18–65 years undergoing elective or emergency major abdominal surgery, excluding pediatric and minor procedures without significant visceral manipulation. Both intended weight loss (bariatric) and unintended loss (non-bariatric) are considered, emphasizing differences in clinical outcomes across surgical types.[7]Postoperative weight loss is clinically significant because excessive or prolonged reduction can lead to malnutrition, delayed wound healing, infection, sarcopenia, frailty, and increased mortality. Clinically relevant weight loss (>5% of preoperative body weight) occurs in 20–50% of patients during the first month after major abdominal surgery. In bariatric patients, complications such as dumping syndrome or micronutrient deficiencies may limit expected recovery, whereas in non-bariatric patients, weight loss may result from disease burden, inadequate nutrient support, or postoperative complications.

Global demographic trends, including aging populations and rising prevalence of comorbidities such as diabetes and obesity, have increased both the volume and complexity of major abdominal surgeries. Consequently, establishing standardized protocols for assessing and managing postoperative weight loss is a priority. Literature indicates that while bariatric patients may achieve 50–70% excess weight loss at one year, data for non-bariatric surgical patients remain limited. Meta-analyses report 5–10% weight loss at three months in colorectal cancer patients, associated with poorer survival, highlighting the influence of cytokine-driven anorexia and hypermetabolism. Nutritional interventions, including enteral feeding, have demonstrated efficacy in mitigating weight loss. [8]

Long-term studies in bariatric populations show that 20–30% of patients regain weight within five years, emphasizing the need for ongoing monitoring. Emerging technologies, such as wearable devices for caloric tracking, offer potential but are not yet widely adopted. Risk factors for greater postoperative weight loss include advanced age, higher preoperative BMI, and comorbidities. [9] However, literature remains fragmented, with inconsistent methodologies, limited long-term data, and inadequate evaluation of psychosocial outcomes.
The present study aims to address these gaps by systematically evaluating postoperative weight change in adults undergoing major abdominal surgery, integrating quantitative weight assessment with clinical context to inform perioperative care and optimize recovery outcomes.

MATERIALS AND METHODS

Study Design: Hospital-based cross-sectional observational study.

Place of study: Department of General Surgery in Teaching Hospital, Uttar Pradesh (India).

Study Duration: June2024-Jan2026.

Study Population: The study population comprised patients undergoing major abdominal surgeries, including elective and emergency procedures.

Inclusion Criteria:
- Aged between 18 and 80 years
- Major abdominal elective or emergency surgeries, including hepato-pancreatico-biliary surgeries, radical cholecystectomy, pancreatic necrosectomy, colorectal surgeries, laparotomy for any cause, and surgeries involving the stomach, intestines, and retroperitoneum
- No comorbidities
- Willing to provide written informed consent

Exclusion Criteria:
- Aged below 18 years or above 80 years
- Immuno-compromised status

Sample Size: A total of 60 patients meeting the inclusion criteria were enrolled in the study.

Sampling Methodology: A purposive sampling technique was employed, where all eligible patients meeting the inclusion criteria during the study period were enrolled.

Data Collection: After obtaining written informed consent, eligible patients were enrolled using a predesigned and pretested proforma. Detailed history and thorough clinical examination were performed for all patients.Baseline body weight was recorded preoperatively using a standardized weighing scale. Postoperative body weight was measured on day 14 and day 30 following surgery. Body Mass Index (BMI) was calculated at each time point. Details regarding type of surgery performed and postoperative course were documented. Postoperative assessment included evaluation of weight loss and documentation of any associated complications or co-morbidities in the postoperative period, in accordance with the study objectives.

Data Analysis: Data were entered and compiled using Microsoft Excel and analyzed using SPSS software. Continuous variables were expressed as mean ± standard deviation, while categorical variables were expressed as frequencies and percentages. Changes in weight and BMI over time were analyzed using Student's t-test. A p-value <0.05 was considered statistically significant.

Institutional Ethics Committee Approval: SU/R/2024/1588[3] Dated 13 June 2024.

RESULTS

A total of 60 patients were included in the study, patients aged 18–30 years comprised maximum 20 cases (33.33%), followed by aged 31–45 years and 46–60 year. Females constituted 34 patients (56.67%) and males 26 patients (43.33%). With respect to occupation, housewives formed the largest group with 21 participants (35.00%), followed by individuals involved in business (18 participants; 30.00%). Laboratory parameters included hemoglobin, total leukocyte count, differential counts, blood urea, creatinine, random blood sugar, electrolytes, calcium, and albumin. Baseline vital parameters recorded were pulse rate, blood pressure, respiratory rate, and temperature.(Table-1)

The distribution of BMI categories at different time points is shown in Table 2. Preoperatively, most patients were in the healthy weight category, followed by overweight, underweight, and obesity. This distribution remained largely similar on postoperative day 14 and day 30, with small changes in the number of patients in each category. Changes in mean body weight and BMI over time, along with delta changes from baseline, are summarized in (Table 3). There was a slight decrease in weight and BMI at postoperative day 14, which showed a minimal change by day 30. The corresponding delta changes are also presented, and p values indicate no statistically significant differences compared with preoperative values.

Table 1: Baseline parameters, and operative duration of the study participants.

Category	Parameter	Mean ± SD
Baseline Laboratory Investigations	Hemoglobin (g/dL)	12.75 ± 1.71
	Total Leukocyte Count (/mm³)	154.10 ± 935.80
	Neutrophils (%)	62.74 ± 11.87
	Lymphocytes (%)	28.22 ± 8.50
	Monocytes (%)	4.83 ± 5.75
	Eosinophils (%)	4.64 ± 7.18
	Basophils (%)	1.01 ± 1.48
	Blood Urea (mg/dL)	24.70 ± 10.24
	Creatinine (mg/dL)	2.25 ± 8.81
	Random Blood Sugar (mg/dL)	102.24 ± 23.75
	Sodium (mEq/L)	139.46 ± 2.68
	Potassium (mEq/L)	4.27 ± 0.44
	Calcium (mg/dL)	9.47 ± 1.64
	Albumin (g/dL)	4.49 ± 0.38
Baseline Vital Parameters	Pulse Rate (beats/min)	78.27 ± 7.86
	Systolic Blood Pressure (mmHg)	120.57 ± 8.81
	Diastolic Blood Pressure (mmHg)	76.68 ± 5.95
	Respiratory Rate (breaths/min)	19.25 ± 0.84
	Temperature (°F)	97.91 ± 0.42
Operative Parameter	Duration of Surgery (minutes)	151.65 ± 34.15

Table 2: Distribution of BMI Categories at Different Time Points

BMI Category	Preoperative	Postoperative Day 14	Postoperative Day 30
Underweight	4	4	3
Healthy weight	44	45	46
Overweight	10	10	9
Obesity	2	1	2
Total	**60**	**60**	**60**

Table 3: Mean body weight and BMI at the preoperative period with postoperative day 14 and postoperative day 30

Parameter	Time Point	Mean ± SD	p value	Δ Change
Weight (kg)	Preoperative	61.50 ± 9.74	–	–
	Post-op Day 14	61.08 ± 9.49	0.81	0.41
	Post-op Day 30	61.24 ± 9.35	0.79	0.26
BMI (kg/m²)	Preoperative	22.54 ± 3.19	–	–
	Post-op Day 14	22.38 ± 3.08	0.88	0.16
	Post-op Day 30	22.44 ± 3.04	0.87	0.10

DISCUSSION

Postoperative physiological and metabolic stress following major abdominal surgery can impact body weight and nutritional status during early recovery. In the present study, changes in weight and body mass index (BMI) were monitored preoperatively and on postoperative days 14 and 30, demonstrating only modest fluctuations. The observed postoperative trends reflect the interplay between baseline patient characteristics, clinical status, and surgical factors, providing insight into short-term nutritional stability in elective abdominal surgery.

This study comprised 60 participants, a predominance of younger adults; 33.33% were aged 18–30 years,followed by the 25% each were aged 31–45 years and 46–60 years, Females slightly outnumbered males (56.67% versus 43.33%), This distribution reflects elective surgical populations with preserved physiological reserve and is consistent with findings from Hussen et al. (2020) [10], who reported a mean age of 34 ± 9.6 years in adults undergoing abdominal surgery, and Akula and Doctor (2021) [11], where men aged 40–60 years formed the majority of the cohort. In contrast, older populations have been reported in tertiary or oncologic settings by Butti et al. (2020) [12] and Kanemoto et al. (2023) [13], which typically show higher perioperative nutritional vulnerability. The female predominance observed aligns with higher rates of benign gastrointestinal and hepatobiliary conditions in women and patterns of healthcare utilization, as described by Wan et al. (2021) [14] and Ljungqvist et al. (2017). [15] Occupational distribution indicated that housewives were the largest subgroup, followed by individuals in business and students. While occupation is not a direct determinant of postoperative weight loss, it may influence baseline nutritional status, dietary habits, and postoperative compliance. Studies by Gillis and Carli (2015) [16] and Cederholm et al. (2019) [17]

highlighted the impact of socioeconomic and occupational factors on postoperative nutritional outcomes, though structured perioperative protocols can mitigate this variability as reported by Gustafsson et al. (2016) [18]. In the present study, occupational distribution likely reflects sociocultural background rather than affecting early postoperative weight changes.Baseline laboratory and clinical parameters suggested that the cohort was physiologically stable and nutritionally adequate before surgery. Hemoglobin, albumin, electrolytes, renal function markers, and vital signs were within normal ranges, supporting preserved hematological and metabolic reserves. Early postoperative assessment showed no significant decline in weight or BMI, indicating limited metabolic stress in the initial recovery phase. Weimann et al. (2017) [19] reported that patients with normal preoperative hemoglobin and albumin experienced improved postoperative adaptation and reduced metabolic complications, while Lew et al. (2017) [20] confirmed that preserved baseline nutritional status is associated with better short-term outcomes after abdominal surgery.

Conversely, patients with preoperative malnutrition, as shown by Ho et al. (2015) [21] and Karanikki et al. (2024) [22], experienced more pronounced early postoperative weight loss and delayed recovery. These findings underscore that adequate preoperative reserves likely contributed to the minimal changes observed in this cohort.The mean operative duration was 151.65 ± 34.15 minutes, reflecting standard major abdominal surgery without excessive intraoperative stress. Prolonged operative time has been linked to increased postoperative morbidity, including infection and delayed recovery, as reported by Cheng et al. (2017) [23], Daley et al. (2015) [24], and Procter et al. (2010) [25]. However, evidence suggests that operative duration alone may not independently determine early postoperative metabolic disturbances when perioperative care and surgical complexity are considered, consistent with observations by Yamashita et al. (2024) [26] and Thiele et al. (2015) [27]. In this study, operative times within the expected range likely minimized metabolic stress,

contributing to early weight stability. BMI category analysis revealed that the majority of patients remained in their baseline categories at postoperative days 14 and 30, with minor shifts in underweight, overweight, and obese groups. Healthy weight participants consistently formed the largest subgroup.

These results suggest that short-term postoperative physiological stress did not translate into clinically relevant nutritional decline. Similar observations were reported by Wobith and Weimann (2022) [1], Wagner et al. (2022) [2], and Ande et al. (2024) [4], where patients with adequate baseline reserves maintained stable BMI during the first month post-surgery. By contrast, oncologic and nutritionally compromised cohorts, as observed by Malietzis et al. (2016) [28], demonstrated progressive postoperative BMI reduction due to disease burden and catabolic stress. Comparison of mean body weight and BMI across preoperative, postoperative day 14, and postoperative day 30 showed modest, non-significant declines. Mean weight decreased slightly from 61.50 ± 9.74 kg preoperatively to 61.08 ± 9.49 kg at day 14 (Δ 0.41 kg) and 61.24 ± 9.35 kg at day 30 (Δ 0.26 kg), while BMI decreased from 22.54 ± 3.19 kg/m² preoperatively to 22.38 ± 3.08 kg/m² at day 14 (Δ 0.16) and 22.44 ± 3.04 kg/m² at day 30 (Δ 0.10). These small variations are consistent with findings by Wagner et al. (2022) [29], Tweed et al. (2022) [30], and Kouki et al. (2022) [31], who reported minimal short-term weight and BMI changes in elective abdominal surgery cohorts with preserved preoperative nutritional status.

Early postoperative fluctuations likely reflect temporary shifts in fluid balance, limited oral intake, and mild inflammatory responses rather than true nutritional depletion. In contrast, studies involving extensive oncologic resections demonstrated significant early postoperative weight loss. Zhang et al. (2022) [32] reported substantial postoperative weight reduction following major hepatopancreatobiliary surgery, while Tian et al. (2020) [33] observed progressive weight loss after gastrectomy for gastric cancer, with severity proportional to resection extent and nutritional compromise. These comparisons underscore that surgical magnitude, disease burden, and baseline nutritional reserves are primary determinants of postoperative weight loss, rather than inconsistencies in measurement.

Overall, the present study indicates that early postoperative weight and BMI remain largely stable in elective major abdominal surgery patients with preserved baseline nutritional and physiological status. Minor delta changes observed do not reflect clinically meaningful weight loss. These findings highlight the importance of adequate preoperative nutrition, timely return of oral intake, and uncomplicated postoperative recovery for maintaining short-term nutritional stability. Understanding that significant early postoperative weight loss is not inevitable allows tailored nutritional interventions, avoiding unnecessary escalation in patients with stable recovery. Early weight stability may serve as a positive predictor of functional recovery and quality of life after major abdominal surgery.

CONCLUSION

In this study, patients undergoing major abdominal surgeries showed minimal and clinically insignificant changes in weight and BMI during the first 30 postoperative days, with most maintaining a healthy BMI. Short-term weight loss is limited when appropriate peri-operative care and nutritional support are provided. Limitations due to the small sample size, short follow-up, heterogeneous surgeries, reliance on weight and BMI alone, and single-center design, highlighting the need for longer-term, multi-center studies with detailed nutritional assessment to confirm these observations.

Author contributions

KS: writing—review and editing, writing original draft, vali¬dation, supervision, methodology, investigation, formal analysis, data curation, and conceptualization. HM and AG: writing—review and editing, writing—original draft, validation, super¬vision, methodology, investigation, formal analysis, and data curation. SG and KS : writing—review and editing, writing—original draft, visualization, software, resources,project administration,methodology, investigation, formal analysis, and data curation. All authors have read and agreed to the final version of the manuscript.

Data availability statement

All data sources described in this study are directed to the corre¬sponding author.

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Conflicts of interest statement

The authors declare that they have no conflicts of interest.

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