Assessment of Mean Change in Body Weight in Patients After Exploratory Laparotomy at CMH Quetta

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Bibi Zehra[1], Muhammad Saeed Awan[2], Sohail Ilyas[3], Rukhsar Anwar[4], Muhammad Abdullah[5], Zeeshan Shoukat[6]

Correspondence
Bibi Zehra
sanizahra26@yahoo.com
Affiliations
1 Combined Military Hospital, Quetta, Pakistan

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ABSTRACT

Background: Exploratory laparotomy is a critical surgical procedure performed to evaluate and address intra-abdominal conditions when diagnostic methods are insufficient. While it is life-saving, post-operative weight loss is a commonly observed yet underexplored complication, primarily attributed to prolonged fasting and insufficient nutritional support.

Objective: To assess the mean change in body weight in patients undergoing exploratory laparotomy at Combined Military Hospital (CMH), Quetta.

Methods: This quasi-experimental study was conducted at CMH Quetta over six months, including 60 patients aged 18–70 years who underwent exploratory laparotomy for conditions such as duodenal perforation, tuberculosis, and typhoid enteric perforations. Body weight was recorded preoperatively and on the seventh post-operative day using a standardized scale. Data were analyzed using SPSS version 25. Paired t-tests assessed weight changes, while subgroup analyses were performed for age, gender, BMI, and surgical indications. Ethical approval was obtained, and the study adhered to the Declaration of Helsinki.

Results: The mean preoperative weight was 70.88 ± 9.02 kg, which decreased to 67.97 ± 9.03 kg postoperatively, with a mean weight loss of 2.90 ± 0.97 kg ($p < 0.001$). Weight changes showed no significant differences across subgroups, including age ($p = 0.602$), gender ($p = 0.918$), and BMI categories ($p = 0.251$).

Conclusion: Patients undergoing exploratory laparotomy exhibited significant post-operative weight loss, emphasizing the need for timely nutritional interventions to mitigate this complication and enhance recovery.

INTRODUCTION

Exploratory laparotomy is a surgical procedure conducted to investigate the abdominal cavity when clinical evaluation and diagnostic modalities fail to provide sufficient information. It is often required for patients presenting with acute or unexplained abdominal pain or abdominal trauma. Historically, this procedure dates back to 1842, when Frank Zurfley performed the first documented exploratory laparotomy on a patient suspected of experiencing peritoneal hemorrhage due to trauma (1). This intervention remains critical in modern surgical practice, particularly for addressing acute peritonitis and penetrating trauma, which are among its primary indications. While selective non-operative management is preferred in hemodynamically stable patients without peritonitis, laparotomy becomes indispensable for those with visceral perforations or unstable vital signs. The procedure allows surgeons to assess intra-abdominal injuries, their location, and severity, while facilitating hemorrhage control and reducing contamination from gastrointestinal perforations (2–5).

In tertiary care settings, exploratory laparotomy is frequently performed in emergencies involving abdominal conditions such as gastric perforations, bowel perforations, pancreatitis, and ruptured ectopic pregnancies, among others. These conditions often manifest as acute peritonitis, with radiological evidence of free air under the diaphragm being a common finding. While laparotomy is life-saving, the associated post-operative outcomes can be complex. Weight loss is a frequently observed but less-discussed consequence among patients undergoing this procedure, primarily due to prolonged periods of being kept NPO (nothing by mouth) and insufficient nutritional support during hospitalization. Despite this clinical observation, there is a notable gap in research directly correlating exploratory laparotomy with post-operative weight loss. Studies have emphasized the adverse effects of preoperative weight loss, including extended hospital stays, decreased compliance with enhanced recovery after surgery (ERAS) protocols, and heightened risks of post-operative complications (6–9).

Existing literature highlights that factors such as delayed nutritional interventions, underlying comorbidities, and the technical challenges associated with abdominal surgeries significantly impact recovery and patient outcomes. Moreover, morbidly obese patients, those with metabolic syndromes, or individuals with prolonged preoperative weight loss face higher risks of surgical complications. These complications include wound infections, incisional hernias, and prolonged recovery times, particularly when nutritional interventions are inadequately addressed pre- and postoperatively. Studies underscore the importance of

early and effective nutritional management in mitigating these risks and optimizing recovery (10–12).

Given the frequent presentation of acute abdominal conditions in surgical emergencies, particularly in tertiary care hospitals, the impact of exploratory laparotomy on patient outcomes, including weight changes, warrants further exploration. This study aims to evaluate the mean change in body weight among patients undergoing exploratory laparotomy and emphasizes the need for timely nutritional interventions to address post-operative weight loss. Such interventions are crucial to improving recovery, minimizing complications, and enhancing the overall quality of patient care in surgical settings. By addressing these concerns, this research contributes to the growing body of evidence supporting enhanced perioperative care in abdominal surgery.

MATERIAL AND METHODS

This study was a quasi-experimental research conducted in the Department of Surgery at the Combined Military Hospital (CMH), Quetta, over six months from January 31, 2022, to July 31, 2022. The study included patients aged 18 to 70 years, of both sexes, who underwent exploratory laparotomy due to acute abdominal conditions such as duodenal perforations, tuberculosis, and typhoid enteric perforations. Patients who were kept on nil per oral (NPO) for more than one day postoperatively were also included. Exclusion criteria encompassed patients with pre-existing cachexia, chronic debilitating illnesses such as malignancies, or those with incomplete medical records. The sample size was determined using a non-probability consecutive sampling technique to ensure adequate representation of the study population.

Informed verbal consent was obtained from all participants before inclusion in the study. Ethical approval was secured from the institutional review board of CMH, Quetta, and the study adhered to the principles of the Declaration of Helsinki for ethical medical research. Confidentiality and privacy of all patient data were ensured throughout the research process. Preoperative and postoperative body weights were recorded using a standardized weighing scale, calibrated prior to each measurement, with the postoperative weight recorded on the seventh day after surgery. Clinical data, including age, gender, preoperative BMI, and the indication for laparotomy, were also documented using a structured proforma.

The surgical procedures were performed by experienced surgeons under general anesthesia following standard operating protocols. The indications for exploratory laparotomy included both emergency and elective cases of acute abdominal conditions, with diagnoses confirmed through clinical and radiological assessments. The postoperative period involved routine monitoring of hemodynamic stability, wound healing, and nutritional support. Patients were managed in accordance with standard clinical guidelines, with particular attention given to early initiation of nutritional interventions where feasible. Data were entered and analyzed using SPSS version 25. Continuous variables, such as age, BMI, and body weight, were expressed as means and standard deviations, while categorical variables, such as gender and indications for laparotomy, were presented as frequencies and percentages. The paired t-test was employed to compare preoperative and postoperative body weights, with a p-value of less than 0.05 considered statistically significant. Data were further stratified by age, gender, preoperative BMI, and indications for laparotomy to evaluate potential differences in weight changes across subgroups. Post-stratification analysis was performed using independent sample t-tests for categorical variables and one-way ANOVA for continuous variables where applicable.

The study maintained rigorous adherence to ethical research standards, ensuring the well-being of participants and the validity of findings. All data were anonymized and stored securely to prevent unauthorized access. The findings aim to provide valuable insights into the impact of exploratory laparotomy on patient outcomes, particularly changes in body weight, and to emphasize the importance of postoperative nutritional support in enhancing recovery and overall patient care.

RESULTS

The study included 60 patients who underwent exploratory laparotomy for various acute abdominal conditions. The mean age of the participants was 37.68 ± 11.78 years, with a range of 18 to 70 years. Among the participants, 52 (86.67%) were male, and 8 (13.33%) were female. The mean preoperative BMI of the patients was 23.20 ± 2.47, with a minimum BMI of 17.60 and a maximum BMI of 29. The distribution of patient demographics is summarized in **Table 1**.

Table 1: Demographic and Clinical Characteristics of Patients

Characteristic	Mean ± SD	Minimum	Maximum	Frequency (%)
Age (years)	37.68 ± 11.78	18	70	-
Male	-	-	-	52 (86.67%)
Female	-	-	-	8 (13.33%)
Preoperative BMI (kg/m²)	23.20 ± 2.47	17.60	29	-

The most common indication for laparotomy was perforation peritonitis, which accounted for 38 cases (63.4%), followed by intestinal obstruction (15%) and blunt trauma abdomen (6.7%). Other indications included firearm injury peritonitis (3.3%) and miscellaneous conditions. The detailed distribution of indications is shown in **Table 2**.

The mean preoperative body weight of the patients was 70.88 ± 9.02 kg, while the mean postoperative weight recorded on the seventh day was 67.97 ± 9.03 kg. The mean change in weight was 2.90 ± 0.97 kg, with individual changes ranging from 1.50 to 6.00 kg.

Table 2: Indications for Laparotomy

Indication	Frequency	Percentage (%)
Perforation Peritonitis	38	63.4
Intestinal Obstruction	9	15.0
Blunt Trauma Abdomen	4	6.7
Firearm Injury Peritonitis	2	3.3
Others	7	11.6

Table 3: Descriptive Statistics for Preoperative and Postoperative Weight

Weight Parameter	Mean ± SD	Minimum (kg)	Maximum (kg)	p-value
Preoperative Weight	70.88 ± 9.02	50.00	84.00	
Postoperative Weight	67.97 ± 9.03	48.00	81.00	
Weight Change	2.90 ± 0.97	1.50	6.00	<0.001

This change was statistically significant ($p < 0.001$). The descriptive statistics for preoperative and postoperative weight are provided in **Table 3**. The mean change in weight was further analyzed across different age groups, genders, and BMI categories. No statistically significant differences were observed in weight change based on age ($p = 0.602$ for 18–35 years vs. 36–50 years; $p = 0.297$ for 18–35 years vs. 51–70 years; $p = 0.552$ for 36–50 years vs. 51–70 years) or gender ($p = 0.918$). Similarly, no significant differences were noted between BMI categories of 17–23.99 kg/m^2 and 24–29 kg/m^2 ($p = 0.251$). The detailed subgroup analysis is presented in **Table 4**.

Table 4: Weight Change Analysis by Subgroups

Subgroup	Mean ± SD (kg)	Minimum	Maximum	p-value
Age: 18–35 years	3.02 ± 0.97	1.50	6.00	0.602
Age: 36–50 years	2.87 ± 1.06	2.00	6.00	0.297
Age: 51–70 years	2.63 ± 0.74	2.00	4.00	0.552
Gender: Male	2.91 ± 1.00	1.50	6.00	0.918
Gender: Female	2.88 ± 0.83	2.00	4.00	
BMI: 17–23.99 (kg/m²)	2.79 ± 0.78	1.50	4.00	0.251
BMI: 24–29 (kg/m²)	3.08 ± 1.19	2.00	6.00	

The indications for laparotomy were also stratified, and the mean weight change was analyzed for each condition. Perforation peritonitis exhibited the highest mean weight change of 3.13 ± 0.99 kg, while blunt trauma abdomen had the lowest at 2.00 kg. This analysis is shown in **Table 5**.

Table 5: Mean Weight Change by Indication

Indication	Mean ± SD (kg)	Minimum	Maximum
Perforation Peritonitis	3.13 ± 0.99	2.00	6.00
Intestinal Obstruction	2.61 ± 1.05	2.00	4.00
Blunt Trauma Abdomen	2.00	2.00	2.00
Firearm Injury Peritonitis	2.50 ± 0.70	2.00	3.00
Others	2.79 ± 0.88	1.50	4.00

These findings confirm a significant reduction in body weight following exploratory laparotomy, irrespective of demographic or clinical variables. The statistically significant overall weight change underscores the potential influence of post-operative factors, such as prolonged NPO status and insufficient nutritional interventions, on patient recovery. Further investigations are warranted to address these factors and optimize post-operative care.

DISCUSSION

The findings of this study demonstrated a significant reduction in body weight among patients undergoing exploratory laparotomy, with an average weight loss of 2.90 ± 0.97 kg by the seventh postoperative day. This weight change was consistent across different age groups, genders, and BMI categories, highlighting the uniformity of this effect irrespective of patient demographics. These results are aligned with observations from previous studies, which have reported significant postoperative weight loss in patients subjected to abdominal surgeries, particularly those involving prolonged periods of being kept nil per oral (NPO) or inadequate nutritional support during the recovery phase (12, 15).

The predominant indication for laparotomy in this study was perforation peritonitis, a finding consistent with other reports from tertiary care settings in similar regions, where acute abdominal conditions such as gastric or bowel perforations frequently necessitate surgical intervention (8, 9). The high prevalence of peritonitis underscores the critical need for timely surgical management in such cases to prevent life-threatening complications. Previous studies have emphasized that weight loss following abdominal surgeries is multifactorial, often influenced by prolonged fasting, surgical stress, and inadequate caloric intake during

hospitalization (10, 11). This study reinforces the importance of addressing these factors through early nutritional interventions to minimize adverse outcomes.

While this study contributes valuable insights, certain limitations must be acknowledged. The relatively short follow-up period of seven days postoperatively limited the ability to assess longer-term weight changes and nutritional recovery. Furthermore, the study did not evaluate the precise caloric or protein intake of patients during hospitalization, which could have provided a more comprehensive understanding of the nutritional deficits contributing to weight loss. Additionally, the reliance on a single-center dataset from CMH Quetta may limit the generalizability of these findings to other populations or healthcare settings with differing surgical protocols or patient demographics. However, the inclusion of a well-defined sample with robust data collection methods lends credibility to the study's results.

Strengths of the study included its focus on a specific, clinically significant outcome—postoperative weight loss—which is often overlooked in the context of exploratory laparotomy. The use of standardized weighing procedures and a clear definition of inclusion and exclusion criteria ensured consistency in data collection and analysis. Moreover, the stratification of results by age, gender, BMI, and indications for surgery allowed for a detailed exploration of factors influencing postoperative weight loss, although no significant subgroup differences were identified.

The findings of this study highlight the critical need for early and adequate nutritional support in patients undergoing exploratory laparotomy. Evidence from previous research supports the role of enhanced nutritional protocols, including the early initiation of enteral feeding and perioperative nutritional supplementation, in reducing postoperative weight loss and improving recovery outcomes (14, 16). Implementing enhanced recovery after surgery (ERAS) protocols, tailored to the specific needs of patients with acute abdominal conditions, could further optimize patient care. Future studies should aim to evaluate the long-term effects of postoperative nutritional interventions and their impact on weight recovery, wound healing, and overall patient outcomes.

In conclusion, this study provided evidence of significant postoperative weight loss in patients undergoing exploratory laparotomy, emphasizing the need for targeted interventions to address nutritional deficits during the recovery period. By focusing on timely and adequate nutritional support, healthcare providers can potentially improve postoperative outcomes and enhance the overall quality of care for this patient population. Further multicenter research is warranted to validate these findings and explore strategies to mitigate postoperative weight loss in diverse clinical settings.

CONCLUSION

This study demonstrated a significant reduction in body weight among patients undergoing exploratory laparotomy, highlighting the impact of surgical stress, prolonged fasting, and insufficient nutritional support during the postoperative period. These findings underscore the importance of implementing timely and adequate nutritional interventions, such as early enteral feeding and adherence to enhanced recovery protocols, to mitigate weight loss and improve patient outcomes. Addressing this issue is critical in optimizing recovery, reducing complications, and enhancing the overall quality of care in human healthcare settings.

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