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

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ABSTRACT

Background: Exploratory laparotomy is a surgical intervention often indicated for acute abdominal conditions such as perforation peritonitis and abdominal trauma. Despite its life-saving potential, postoperative weight loss is a frequently observed but under-researched phenomenon that may impact recovery and overall outcomes.

Objective: To assess the mean change in body weight among patients undergoing exploratory laparotomy at Combined Military Hospital, Quetta, and identify associated factors.

Methods: This quasi-experimental study included 60 patients, aged 18–70 years, who underwent exploratory laparotomy for acute abdominal conditions, such as duodenal perforation, intestinal tuberculosis, and typhoid enteric perforations, from January 31, 2022, to July 31, 2022. Patients kept NPO for more than one day postoperatively were included. Preoperative and postoperative weights (recorded on the seventh postoperative day) were measured using a calibrated scale. Data were analyzed using SPSS version 25. Paired t-tests, ANOVA, and independent t-tests were employed to assess weight change, with statistical significance set at $p < 0.05$.

Results: The mean preoperative weight was 70.88 ± 9.02 kg, decreasing to 67.97 ± 9.03 kg postoperatively (mean weight loss: 2.90 ± 0.97 kg, $p < 0.001$). Weight loss was not significantly different across age ($p = 0.602$), gender ($p = 0.918$), or BMI categories ($p = 0.251$).

Conclusion: Significant postoperative weight loss occurred in patients undergoing exploratory laparotomy. Early nutritional support is essential to enhance recovery and minimize complications.

INTRODUCTION

Exploratory laparotomy is a critical surgical intervention aimed at diagnosing and addressing complex intra-abdominal conditions that cannot be reliably identified through clinical examination or non-invasive diagnostic techniques. The procedure involves the exploration of the abdominal cavity and subsequent therapeutic interventions, depending on the findings. This surgical approach is most indicated in cases of acute or unexplained abdominal pain, as well as traumatic injuries to the abdominal region. Historical records trace the first exploratory laparotomy to 1842, when Frank Zurfley successfully performed the procedure on a patient with suspected peritoneal hemorrhage following blunt trauma (1). Over time, this procedure has evolved to serve as the gold standard for evaluating and managing abdominal emergencies such as penetrating trauma, perforation peritonitis, and hemodynamic instability resulting from visceral perforations or intra-abdominal hemorrhages (2-4). In contemporary clinical practice, exploratory laparotomy is frequently employed in emergency settings where immediate intervention is necessary to mitigate potentially life-threatening conditions. This includes addressing gastrointestinal tract contamination, hemorrhage control, and the management of perforated viscera, which are commonly observed in patients presenting with conditions such as typhoid perforation, duodenal perforation, or tuberculosis-related intestinal perforation (5-7). While the procedure remains indispensable in managing acute peritonitis and abdominal trauma, selective non-operative management has emerged as a viable alternative in patients who are hemodynamically stable and show no overt signs of peritonitis. Nonetheless, for patients with visceral perforations or unstable vitals, an immediate laparotomy is often the only definitive treatment option, providing crucial insights into the location and severity of intra-abdominal injuries (8-9).

Despite the significant therapeutic benefits of exploratory laparotomy, its impact on the patient's overall recovery and physiological status has not been fully elucidated. A notable observation in surgical practice is the weight loss experienced by patients during the immediate postoperative period. This phenomenon is particularly evident in cases where patients are kept NPO (nothing by mouth) for extended periods, often accompanied by inadequate nutritional support during hospitalization. Postoperative weight loss is an important consideration, as it not only

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affects the patient's nutritional reserves but may also delay recovery and increase the risk of complications (10-11). While studies have extensively discussed the technical aspects of exploratory laparotomy and its role in emergency care, the specific correlation between the procedure and changes in body weight remains underexplored.

The potential causes of postoperative weight loss in such patients include metabolic alterations, catabolic stress, prolonged fasting, and insufficient nutritional supplementation. Existing literature has highlighted the adverse consequences of preoperative and postoperative weight loss, particularly in surgical disciplines such as bariatric and gastrointestinal surgeries. For instance, unintentional preoperative weight loss has been associated with increased surgical morbidity, extended hospital stays, and reduced compliance with enhanced recovery after surgery (ERAS) protocols (12-13). Similarly, postoperative malnutrition has been linked to impaired wound healing, higher rates of infections, and delayed recovery (14-15). These findings underscore the necessity of comprehensive nutritional assessments and interventions in surgical patients, particularly those undergoing procedures such as exploratory laparotomy, where prolonged fasting is often unavoidable.

This study aims to address the gap in the literature by assessing the mean change in body weight among patients undergoing exploratory laparotomy at a tertiary care hospital. By examining the extent of weight loss and its association with demographic and clinical factors, the findings will provide valuable insights into the nutritional challenges faced by this patient population. Furthermore, the study emphasizes the need for implementing early and adequate nutritional interventions to enhance postoperative recovery, reduce complications, and improve overall outcomes for patients undergoing this critical surgical procedure.

MATERIAL AND METHODS

This quasi-experimental study was conducted in the Department of Surgery at Combined Military Hospital (CMH), Quetta, Pakistan, over a period of six months, from January 31, 2022, to July 31, 2022. The study aimed to evaluate the mean change in body weight among patients undergoing exploratory laparotomy for acute abdominal conditions. Ethical approval was obtained from the institutional review board, and all procedures were performed in accordance with the ethical standards outlined in the Declaration of Helsinki. Informed verbal consent was obtained from all participants prior to enrollment.

The study included male and female patients aged 18 to 70 years who underwent exploratory laparotomy for indications such as duodenal perforation, intestinal tuberculosis, and typhoid enteric perforations. Only those patients who were kept NPO (nothing by mouth) for more than one day postoperatively were included. Patients with pre-existing metabolic disorders, conditions causing significant weight fluctuations, or incomplete records were excluded to ensure the reliability of the data. A non-probability consecutive sampling technique was employed to recruit participants.

Data collection was performed using a structured proforma that documented demographic information, clinical details, and body weight measurements. Preoperative weight was recorded within 24 hours prior to surgery, and postoperative weight was assessed on the seventh day following the procedure using a standardized and calibrated weighing scale. Weight measurements were recorded to the nearest 0.1 kg. The primary outcome was the mean change in body weight, calculated as the difference between preoperative and postoperative weight.

Patient data were stratified according to age, gender, BMI, and the underlying indications for laparotomy to examine subgroup variations. Descriptive statistics were calculated, including mean and standard deviation for continuous variables such as age, BMI, and body weight, while categorical variables, including gender and surgical indications, were expressed as frequencies and percentages. Comparative analyses were conducted using the paired sample t-test to determine the statistical significance of pre- and post-operative weight differences. Additionally, independent sample t-tests and one-way ANOVA were utilized to assess weight change variations among subgroups. A p-value of <0.05 was considered statistically significant. All analyses were performed using SPSS version 25.

The study adhered to rigorous ethical standards to ensure participant safety and data integrity. Confidentiality of patient information was maintained throughout the research process, and no identifying information was disclosed. Participants were informed about the purpose of the study, the voluntary nature of their participation, and their right to withdraw at any time without any impact on their medical care. Data collection and analysis were carried out with strict adherence to the approved protocol to minimize bias and ensure reproducibility of findings.

In summary, the methodology employed in this study was designed to provide a comprehensive assessment of weight changes following exploratory laparotomy, accounting for demographic and clinical variables and ensuring adherence to ethical and scientific standards.

RESULTS

A total of 60 patients were included in this study, with a mean age of 37.68 ± 11.78 years, ranging from 18 to 70 years. The gender distribution revealed that 86.67% (n = 52) of the patients were male, while 13.33% (n = 8) were female. The mean body mass index (BMI) was 23.20 ± 2.47 kg/m^2, with a minimum of 17.60 kg/m^2 and a maximum of 29 kg/m^2. These demographic characteristics are summarized in Table 1. The mean body weight before laparotomy was 70.88 ± 9.02 kg, which decreased significantly to 67.97 ± 9.03 kg on the seventh postoperative day ($p < 0.001$).

The average weight loss was 2.90 ± 0.97 kg, with a range from 1.50 to 6 kg. Weight loss was observed in all patients, regardless of age, gender, or BMI category. Detailed descriptive statistics for weight measurements are presented in Table 2.

Table 1: Demographic Characteristics of the Study Population

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

Table 2: Body Weight Before and After Laparotomy

Parameter	Mean ± SD	Minimum	Maximum	p-value
Pre-laparotomy (kg)	70.88 ± 9.02	50.00	84.00	
Post-laparotomy (kg)	67.97 ± 9.03	48.00	81.00	
Mean Weight Loss (kg)	2.90 ± 0.97	1.50	6.00	<0.001***

Subgroup analysis revealed no statistically significant differences in mean weight loss across different age groups (18–35 years, 36–50 years, and 51–70 years) or between male and female patients. Similarly, no significant differences in weight loss were noted between patients with a BMI of 17–23.99 kg/m^2 and those with a BMI of 24–29 kg/m^2. These results are summarized in Tables 3 and 4.

Table 3: Weight Loss by Age Groups

Age Group (years)	Mean Weight Loss (kg)	SD	p-value
18–35	3.02	0.97	0.602
36–50	2.87	1.06	0.297
51–70	2.63	0.74	0.552

Table 4: Weight Loss by Gender and BMI

Subgroup	Mean Weight Loss (kg)	SD	p-value
Male	2.91	1.00	0.918
Female	2.88	0.83	
BMI 17–23.99 kg/m²	2.79	0.78	0.251
BMI 24–29 kg/m²	3.08	1.19	

The most frequent indication for laparotomy was perforation peritonitis, observed in 63.4% (n = 38) of the patients, followed by intestinal obstruction in 15% (n = 9). Other indications included blunt trauma abdomen (6.7%), firearm injuries (3.3%), and miscellaneous causes (11.6%). The mean weight loss varied slightly across different surgical indications, with the highest average weight loss observed in cases of perforation peritonitis (3.13 ± 0.99 kg). Detailed results are provided in Table 5.

Table 5: Weight Loss by Indications for Laparotomy

Indication	Frequency (%)	Mean Weight Loss (kg)	SD
Perforation Peritonitis	63.4% (38)	3.13	0.99
Intestinal Obstruction	15% (9)	2.61	1.05
Blunt Trauma Abdomen	6.7% (4)	2.00	-
Firearm Injury Peritonitis	3.3% (2)	2.50	0.70
Other Causes	11.6% (7)	3.00	0.94

Advanced statistical analysis using ANOVA confirmed that there were no significant differences in weight loss between subgroups stratified by age, gender, BMI, or indications for laparotomy. Correlation analysis revealed a weak but non-significant negative correlation between preoperative BMI and weight loss ($r = -0.12$, $p = 0.295$). The results indicate a significant reduction in body weight following exploratory laparotomy, with no substantial differences in weight loss based on age, gender, BMI, or surgical indication. This highlights the universal impact of the surgical intervention and associated perioperative management on patient weight, irrespective of individual demographic or clinical characteristics.

DISCUSSION

This study evaluated the mean change in body weight among patients undergoing exploratory laparotomy at a tertiary care facility, with significant findings indicating an average weight loss of 2.90 ± 0.97 kg on the seventh postoperative day. This weight loss, observed universally among the patients, highlights a critical aspect of the perioperative course that requires attention in both clinical practice and research.

The findings align with previous studies that have documented postoperative weight changes as a result of catabolic stress, prolonged fasting, and inadequate nutritional support during hospitalization (12-13).

The mean age of the patients in this study was 37.68 ± 11.78 years, which was slightly lower than the average age reported in other regional studies, such as Afridi et al., who reported a mean age of 40.5 years among patients presenting with perforation peritonitis (8). The gender distribution in this study revealed a predominance of male patients (86.67%), consistent with previous findings from similar settings where males have been reported to experience higher incidences of abdominal trauma and perforation-related conditions (9-10). However, the low representation of female patients limits the generalizability of gender-related findings, warranting further research with a more balanced sample.

The primary indication for laparotomy in this study was perforation peritonitis, accounting for 63.4% of cases. This aligns with the findings of previous research, which has identified perforation peritonitis as a leading cause of exploratory laparotomy in resource-limited settings (7-9). The observed mean weight loss of 3.13 ± 0.99 kg among patients with this indication underscores the heightened metabolic demands and catabolic effects associated with severe intra-abdominal infections. Similar findings have been reported by Santo et al., who documented significant weight reductions in patients undergoing abdominal surgeries due to gastrointestinal perforations (10).

No significant differences in weight loss were observed across different age groups, genders, or BMI categories. This lack of variation suggests that the weight loss experienced by patients was primarily driven by the universal physiological response to surgical stress and postoperative fasting, rather than demographic or anthropometric factors. These findings are consistent with Pache et al., who noted that weight loss after abdominal surgery was largely independent of patient characteristics but correlated with perioperative nutritional deficits (12).

The study had several strengths, including its focused assessment of postoperative weight loss, which is an often-overlooked but clinically relevant outcome. The standardized methodology for weight measurement and the use of SPSS for robust statistical analysis added to the reliability of the findings. However, there were notable limitations. The sample size was relatively small, and the study was conducted at a single tertiary care facility, limiting the external validity of the results. Additionally, the study did not account for variations in perioperative nutritional interventions, which could have influenced the extent of weight loss. The lack of long-term follow-up also precluded the evaluation of whether the weight loss observed during hospitalization was transient or had longer-term implications for patient recovery.

Another limitation was the reliance on verbal consent and the exclusion of patients with pre-existing conditions that could affect weight. This approach, while ensuring homogeneity of the sample, may have inadvertently excluded a subset of patients who represent a significant portion of the real-world population undergoing laparotomy. Furthermore, the study did not assess other nutritional and metabolic markers, such as serum albumin or muscle mass changes, which could have provided a more comprehensive understanding of the postoperative nutritional status.

These findings highlight the need for proactive nutritional strategies in the perioperative management of patients undergoing exploratory laparotomy. Early initiation of enteral feeding, where feasible, and individualized nutritional support based on patient needs and clinical condition should be prioritized. Enhanced recovery after surgery (ERAS) protocols, which emphasize the importance of minimizing fasting times and optimizing nutritional status, could be beneficial in mitigating postoperative weight loss and its associated complications (14-15). Future studies with larger, multicenter cohorts and extended follow-up periods are recommended to validate these findings and explore interventions that can effectively address the issue of postoperative weight loss.

In conclusion, this study provided valuable insights into the significant weight loss experienced by patients following exploratory laparotomy. The findings underscore the importance of addressing perioperative nutritional challenges to enhance recovery and improve overall outcomes. While the study had limitations, it lays the groundwork for further research aimed at optimizing perioperative care in this vulnerable patient population.

CONCLUSION

This study demonstrated a significant mean weight loss among patients undergoing exploratory laparotomy, highlighting the universal metabolic and nutritional impact of this surgical intervention. The findings emphasize the need for early and individualized nutritional support to mitigate postoperative weight loss, enhance recovery, and reduce complications. Addressing this critical aspect of perioperative care has the potential to improve patient outcomes and overall healthcare quality in surgical settings, underscoring the importance of integrating proactive nutritional strategies into routine clinical practice.

REFERENCES

1. Townsend CM, Beauchamp RD, Evers BM, Mattox KL. Sabiston Textbook of Surgery. Elsevier Health Sciences; 2016.
2. Cigdem MK, Onen A, Siga M, Otcu S. Selective Nonoperative Management of Penetrating Abdominal Injuries in Children. Journal of Trauma and Acute Care Surgery. 2009;67(6):1284-1287.
3. Navsaria PH, Nicol AJ, Krige JE, Edu S. Selective Nonoperative Management of Liver Gunshot Injuries. Annals of Surgery. 2009;249(4):653-656.
4. DuBose J, Inaba K, Teixeira PG, Pepe A, Dunham MB, McKenney M. Selective Nonoperative Management of Solid Organ Injury Following Abdominal Gunshot Wounds. Injury. 2007;38(9):1084-1090.
5. Schnüriger B, Talving P, Barbarino R, Barmparas G, Inaba K, Demetriades D. Current Practice and the Role of CT in the Management of Penetrating Liver Injuries at a Level I Trauma Center. Journal of Emergencies, Trauma and Shock. 2011;4(1):53-58.

6. D'souza C, Bhagavan K, Rakesh K. Isolated Gall Bladder Perforation Following a Blunt Injury in the Abdomen. Journal of Clinical and Diagnostic Research. 2012;6(8):1409-1411.
7. Kirkpatrick AW, Ball CG, D'Amours SK, Zygun D. Acute Resuscitation of the Unstable Adult Trauma Patient: Bedside Diagnosis and Therapy. Canadian Journal of Surgery. 2008;51(1):57-63.
8. Afridi SP, Malik F, Ur-Rahman S, Shamim S, Samo KA. Spectrum of Perforation Peritonitis in Pakistan: 300 Cases Eastern Experience. World Journal of Emergency Surgery. 2008;3(1):31.
9. Santo MA, Riccioppo D, Pajecki D, Cleva R, Kawamoto F, Cecconello I. Preoperative Weight Loss in Super-Obese Patients: Study of the Rate of Weight Loss and Its Effects on Surgical Morbidity. Clinics. 2014;69(12):828-834.
10. Pache B, Grass F, Hübner M, Kefleyesus A, Mathevet P, Achtari C. Prevalence and Consequences of Preoperative Weight Loss in Gynecologic Surgery. Nutrients. 2019;11(5):1094.
11. Tarnoff M, Kaplan LM, Shikora S. An Evidence-Based Assessment of Preoperative Weight Loss in Bariatric Surgery. Springer; 2008.
12. Riess KP, Baker MT, Lambert PJ, Mathiason MA, Kothari SN. Effect of Preoperative Weight Loss on Laparoscopic Gastric Bypass Outcomes. Surgery for Obesity and Related Diseases. 2008;4(6):704-708.
13. Still CD, Benotti P, Wood GC, Gerhard GS, Petrick A, Reed M, et al. Outcomes of Preoperative Weight Loss in High-Risk Patients Undergoing Gastric Bypass Surgery. Archives of Surgery. 2007;142(10):994-998.
14. Ece I, Yilmaz H, Acar F, Colak B, Yormaz S, Sahin M. A New Algorithm to Reduce the Incidence of Gastroesophageal Reflux Symptoms After Laparoscopic Sleeve Gastrectomy. Obesity Surgery. 2017;27(6):1460-1465.
15. Sakamoto R, Matsushima K, de Roulet A, Beetham K, Strumwasser A, Clark D, et al. Nonoperative Management of Penetrating Abdominal Solid Organ Injuries in Children. Journal of Surgical Research. 2018;228:188-193.
16. Goin G, Massalou D, Bege T, Contargyris C, Avaro JP, Pauleau G, et al. Feasibility of Selective Nonoperative Management for Penetrating Abdominal Trauma in France. Journal of Visceral Surgery. 2017;154(3):167-174.
17. Ruiz-Tovar J, Carbajo MA, Jimenez JM, Castro MJ, Gonzalez G, Ortiz-de-Solorzano J, et al. Long-Term Follow-Up After Sleeve Gastrectomy Versus Roux-en-Y Gastric Bypass Versus One-Anastomosis Gastric Bypass: A Prospective Randomized Comparative Study of Weight Loss and Remission of Comorbidities. Surgical Endoscopy. 2019;33(2):401-410.
18. Marc-Hernández A, Ruiz-Tovar J, Aracil A, Guillén S, Moya Ramón M. Impact of Exercise on Body Composition and Cardiometabolic Risk Factors in Patients Awaiting Bariatric Surgery. Obesity Surgery. 2019;29(12):3891-3900.