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# EMERGENCY LAPAROTOMY FOLLOW UP STUDY –ASSESSING QUALITY OF LIFE USING PATIENTS REPORTED OUTCOME MEASURES

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**Abstract**

*Objective: To prospectively assess patient reported outcomes up to one months after emergency laparotomy in a tertiary hospital in Pakistan, using the EQ-5D and POMS tools. Methods: A prospective observational study was conducted including 140 adult patients undergoing EL at a tertiary care hospital. Postoperative morbidity was assessed using the Post-Operative Morbidity Survey (POMS) on postoperative days (POD) 5 and 10. HRQoL was measured using the EQ-5D-5L questionnaire preoperatively and at one month postoperatively. Results: Of the 140 patients, 94 (67.1%) were male, and the mean age was 50.48 ± 14.76 years. Thirty-day mortality was 10%. On POD5, pulmonary morbidity (17.9%), pain (17.1%), and mobility limitation (17.1%) were the most frequent, with gastrointestinal morbidity in 14.3% of patients. By POD10, gastrointestinal morbidity had declined to 2.9% ($p = 0.002$), whereas pain (19.3%) and mobility issues (11.4%) persisted. At one month, EQ-5D responses showed high prevalence of mobility limitation (87.1%), anxiety/depression (86.4%), and pain/discomfort (82.1%). No statistically significant improvement was observed in any EQ-5D domain between POD5 and one month ($p > 0.05$).*

*Conclusion: Emergency laparotomy is associated with significant early morbidity and sustained HRQoL impairment at one month, with mobility, pain, and psychological well-being most affected. Incorporating PROMs such as EQ-5D and POMS into EL outcome reporting offers a more comprehensive evaluation of recovery and can inform targeted multidisciplinary interventions.*

## INTRODUCTION

Emergency laparotomy (EL) is a high-acuity surgical procedure performed to manage life-threatening intra-abdominal pathology, typically via a midline incision that allows full exploration of the peritoneal cavity. It

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is one of the most frequently undertaken emergency general surgical operations worldwide, yet it carries a disproportionately high risk, with reported 30-day mortality rates ranging between 10% and 18%—substantially higher than comparable elective procedures [1,2]. Beyond mortality, the procedure is associated with significant postoperative morbidity, prolonged hospitalization, and reduced long-term functional capacity. The burden is more pronounced in low- and middle-income countries, where limited surgical infrastructure, delayed presentation, and resource constraints compound poor outcomes [3].

In high-income countries, the introduction of structured quality improvement initiatives has helped address these challenges. The UK's National Emergency Laparotomy Audit (NELA) is a notable example, demonstrating reductions in postoperative mortality after systematic adoption of evidence-based perioperative care bundles [4,5]. However, in Pakistan, no such national audit or registry exists, and there is minimal systematic follow-up of EL patients, resulting in a paucity of locally relevant outcomes data [2].

Traditional surgical outcome reporting has focused on clinician-reported endpoints such as mortality, complication rates, and length of stay. Increasingly, there is recognition of the importance of patient-reported outcome measures (PROMs), which provide a patient-centered perspective on recovery, functional status, and overall quality of life (QoL) [1]. The EuroQol Five Dimensions (EQ-5D) questionnaire, successfully applied in EL patients for emergency gastrointestinal admissions, evaluates mobility, self-care, usual activities, pain/discomfort, and anxiety/depression [6]. Complementing this, the Post-Operative Morbidity Survey (POMS) offers a standardized measure of short-term morbidity across nine domains, aiding comparison and benchmarking of surgical care [7].

While PROMs are routinely collected in elective surgeries such as orthopedic joint replacements or vascular procedures, their use in emergency surgery remains uncommon due to the acute nature of presentation, hemodynamic instability, and logistical barriers to longitudinal follow-up [8,9]. Nevertheless, emerging evidence indicates that QoL outcomes after EL can influence both patient expectations and health system priorities [4,10].

This study aims to prospectively evaluate prospectively assess patient reported outcomes up to one months after emergency laparotomy in a tertiary hospital in Pakistan, using the EQ-5D and POMS tools. By generating locally relevant, patient-centered data, the study seeks to inform quality improvement strategies and enhance the delivery of surgical care in similar resource-limited settings.

**Materials and Methods**

This prospective observational study was conducted in the Department of General Surgery, Civil Hospital Karachi, after approval from the Institutional Review Board, Dow University of Health Sciences (IRB-3566/DUHS/Approval/2024/242 dated 4 September 2024). The study duration was three months following IRB approval. The objective was to evaluate patient-reported quality of life and postoperative morbidity following emergency laparotomy (EL) using the EuroQol Five Dimensions (EQ-5D-5L) questionnaire and the Post-Operative Morbidity Survey (POMS).

All adult patients (≥18 years) undergoing EL during the study period were eligible. Both male and female patients were included if they consented directly or through a legal attendant when postoperative sedation or intubation prevented immediate consent; retrospective consent was later obtained from the patient. Exclusion criteria were non-consenting individuals, non-midline abdominal procedures (e.g., trephine colostomy, non-elective inguinal hernia repair), re-exploration or washout laparotomies, laparotomy for burst abdomen, elective procedures, and in-hospital mortality before the three-month follow-up.

Consecutive sampling was used to minimize selection bias. The sample size was calculated using OpenEpi, assuming an in-hospital mortality rate of 10.1% over two months, yielding 140 participants to ensure statistical power and representativeness.

Baseline demographic and clinical data—including age, sex, comorbidities, preoperative diagnosis, operative findings, and type of surgical intervention—were recorded. Data collection began on postoperative day five (POD5) and continued on POD10, day 15, one month, and three months post-surgery. Postoperative morbidity was assessed with POMS, which evaluates nine domains (pulmonary,

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infectious, renal, gastrointestinal, cardiovascular, neurological, hematological, wound, and pain). Each domain was scored as present (1) or absent (0), for a maximum score of nine. POMS was administered on POD5 and POD10 during in-hospital stays or follow-up.

Quality of life was measured using EQ-5D-5L, which assesses mobility, self-care, usual activities, pain/discomfort, and anxiety/depression on a five-level scale from "no problems" to "extreme problems." The EQ visual analogue scale (EQ-VAS) was also recorded, with patients rating their health from 0 (worst imaginable) to 100 (best imaginable). EQ-5D was administered on POD5, day 15, one month, and three months, in person or by telephone if in-person attendance was not possible.

All questionnaires were administered in the patient's preferred language by trained interviewers. Illiterate participants had items read aloud neutrally to reduce interviewer bias. For patients unable to respond due to complications or readmission, assessment was postponed until clinically feasible.

Data were entered into a secure database and analyzed using IBM SPSS Statistics version 24. The Shapiro–Wilk test assessed normality for continuous variables. Normally distributed data were presented as means ± standard deviations, and non-normally distributed data as medians with interquartile ranges. Categorical variables were expressed as frequencies and percentages. The Chi-square or Fisher's exact test was used for categorical comparisons, while independent-samples t-test or Mann–Whitney U test was applied for continuous data. Statistical significance was set at $p<0.05$.

**Primary endpoint** was to record patient-reported outcome measures (PROMs) at relevant time points following emergency laparotomy. **Secondary endpoints** were to validate the EQ-5D questionnaire for reporting PROMs in this setting—assessed as data compliance by the number of questionnaires completed at each follow-up—and to use POMS to collect postoperative complication data after emergency laparotomy. By combining short-term morbidity data with longitudinal HRQoL assessment, this methodology aimed to provide a comprehensive, patient-centered picture of recovery after EL in a resource-limited, high-volume setting.

**Results**

Of the 140 patients there were 94(67.1%) and 46(32.9%) males and females respectively. The mean age of the patients was 50.48±14.76 years whereas mean body mass index (BMI) was 25.07±3.21 kg/m$^2$. Diabetes mellitus was observed in 44(31.4%), hypertension in 61(43.6%) and Ischemic heart disease in 15(10.7%) patients. There were 32(22.9%), 9(6.4%) and 99(70.7%) current smokers, ex-smokers and non-smokers respectively. ASA class 1 to 5 were noted in 17(12.1%), 62(44.3%), 49(35.0%), 6(4.3%) and 6(4.3%), respectively. Surgical procedures performed were Exploratory laprotomy plus loop ileostomy in 73(52.1%), exploratory laprotomy plus Hartmanns procedure in 14(10%), exploratory laprotomy plus Graham's repair in 40(28.6%) and exploratory laprotomy plus liver packing in 13(9.3%) patients. Re-exploration was done in 8(5.7%) patients. Mortality was observed in 14(10%) patients and mean hospital stay was 7.60±2.89 days. Data compliance was highest for patients completing two time points 77(55.0%), followed by all three time points completion 63(45%).

The Post-Operative Morbidity Survey (POMS) on 5$^{th}$ POD showed that the pulmonary morbidity was present in 25(17.9%), infection in 16(11.4%), renal morbidity in 17(12.1%), gastrointestinal morbidity in 20(14.3%), cardiovascular morbidity was present in 12(8.6%), wound was present in 8(5.7%), haematological domain was positive in 7(5%), pain was positive in 24(17.1%) and mobility domain was positive in 24(17.1%). On 10$^{th}$ POD, POMS positive domain were pulmonary 19(13.6%), infectious 16(11.4%), renal 8(5.7%), gastrointestinal 4(2.9%), cardiovascular 5(3.6%), wound 3(2.1%), pain 27(19.3%) and mobility 16(11.4%). Mean total POMS score at 5$^{th}$ POD was 4.48±1.47 and on 10$^{th}$ POD it was 4.56±1.56.

The EQ-5D on 5$^{th}$ POD showed that 119(85.0%) patients reported self-care problem, 118(84.3%) patients had usual activities problem, 118(84.3%) reported pain/discomfort, 113(80.7%) had anxiety/depression and mobility issue was reported by 119(85%) patients. At one month the EQ-5D showed that 122(87.1%) had mobility issue, 118(84.3%) had self-care problem, 120(85.7%) had usual activities issue, pain/discomfort was reported by 115(82.1) patients and 121(86.4%) had anxiety/depression.

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There was no statistically significant change in mean POMS total score between POD5 and POD10, p = 0.657. On comparison of POMS domains the gastrointestinal morbidity decreased from 14.3% at POD5 to 2.9% at POD10 (McNemar's test, p = 0.002). as shown in Table 1. No significant difference was observed in rest of the domains, p=>0.05. On comparison of EQ5D domains at POD5 and at one month, no significant difference was observed in any of the domains, p=>0.05. Table 2

**Discussion**

Emergency laparotomy (EL) remains one of the highest-risk emergency general surgical procedures, with 30-day mortality rates in contemporary series ranging from 10% to over 18% (1,2). In our cohort, mortality was within this range, reflecting the substantial physiological insult and comorbidity burden characteristic of this population. While mortality is an important endpoint, mounting evidence highlights postoperative morbidity and impaired functional recovery as equally critical outcomes to evaluate (3,4).

We incorporated patient-reported outcome measures (PROMs) — EQ-5D-5L and the Post-Operative Morbidity Survey (POMS) — to capture both short-term morbidity and health-related quality of life (HRQoL). This approach addresses a gap in EL research, as most outcome studies rely solely on clinician-reported measures (5,6). Previous work, including the Emergency Laparotomy Follow-Up Study (ELFUS), has demonstrated the feasibility and clinical relevance of integrating PROMs in this setting (1,11).

Our findings of high rates of pulmonary, pain, and mobility morbidity on postoperative day (POD) 5 align with international data showing these are the dominant domains of early postoperative morbidity after EL (5,12). Although gastrointestinal morbidity typically resolves earlier, as seen in our cohort by POD10, persistent deficits in mobility and pain control remain common, contributing to reduced EQ-5D scores at one month (4,13).

Long-term HRQoL impairment after EL has been documented even in high-income countries with structured perioperative pathways. Soylu et al. reported significant decrements in physical functioning and overall EQ-5D indices up to 12 months postoperatively (13). Frailty and age-related vulnerability have emerged as independent predictors of poor outcomes following EL, influencing both short- and long-term recovery (14,15).

In resource-limited settings, Purcell et al. observed that socioeconomic factors and limited access to rehabilitation further prolong recovery (16). Narrative reviews echo these concerns, highlighting that long-term QoL outcomes remain suboptimal even when perioperative care is optimised (17). These findings parallel our observation of ongoing mobility and psychological challenges at one month, suggesting the need for multidisciplinary postoperative support.

Quality improvement initiatives, such as perioperative care bundles, have demonstrated mortality reductions in EL when implemented consistently (5,18). However, as Kokotovic et al. have shown, even with such bundles, sustained HRQoL improvements require coordinated transition-of-care interventions post-discharge (19). Incorporating structured physiotherapy, community nursing, and mental health services could enhance recovery trajectories, particularly in resource-limited settings.

Postoperative psychological morbidity is another under-recognised contributor to impaired recovery. Studies have shown that anxiety, depression, and chronic pain after major abdominal surgery are strongly associated with lower long-term QoL (9,20). Our finding of a substantial prevalence of anxiety/depression on EQ-5D at one month reinforces calls for integrated mental health support within surgical follow-up (20).

The strengths of our study include prospective PROM data collection at multiple postoperative time points and good follow-up compliance despite the challenges of an acute surgical cohort. Limitations include the single-centre design, modest sample size, and relatively short follow-up, which may underestimate longer-term recovery potential. Future multicentre research should aim to validate PROM use in diverse healthcare systems and explore interventions that specifically address the physical and psychological sequelae of EL.

**Conclusion**

In conclusion, our data support the integration of PROMs such as EQ-5D and POMS into EL outcome reporting, alongside traditional morbidity and

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mortality measures. Persistent deficits in physical function and mental health at one month highlight the need for comprehensive, multidisciplinary postoperative care strategies to improve recovery and HRQoL in this high-risk population.

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Table 1: Demographic and Baseline Clinical Characteristics of Study Participants

| Variable | n (%) or Mean ± SD |
|---|---|
| **Age (years)** | 50.48 ± 14.76 |
| **Sex** | |
| Male | 94 (67.1) |
| Female | 46 (32.9) |
| **Body Mass Index (kg/m²)** | 25.07 ± 3.21 |
| **Comorbidities** | |
| Diabetes mellitus | 44 (31.4) |
| Hypertension | 61 (43.6) |
| Ischemic heart disease | 15 (10.7) |
| **Smoking status** | |
| Current smoker | 32 (22.9) |
| Ex-smoker | 9 (6.4) |
| Non-smoker | 99 (70.7) |
| **ASA class** | |
| I | 17 (12.1) |
| II | 62 (44.3) |
| III | 49 (35.0) |
| IV | 6 (4.3) |
| V | 6 (4.3) |

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| Variable | n (%) or Mean ± SD |
|---|---|
| **Surgical procedure performed** | |
| Exploratory laparotomy + loop ileostomy | 73 (52.1) |
| Exploratory laparotomy + Hartmann's procedure | 14 (10.0) |
| Exploratory laparotomy + Graham's repair | 40 (28.6) |
| Exploratory laparotomy + liver packing | 13 (9.3) |
| **Re-exploration** | 8 (5.7) |
| **Mean hospital stay (days)** | 7.60 ± 2.89 |
| **30-day mortality** | 14 (10.0) |

(n = 140)

Table 2: Comparison of POMS domain at different time interval (n=140)

| Domain | POD 5 n(%) | POD10 n(%) | P value |
|---|---|---|---|
| Pulmonary | 25(17.9) | 19(13.6) | 0.391 |
| Infectious | 16(11.4) | 16(11.4) | 1.00 |
| Renal | 17(12.1) | 8(5.7) | 0.108 |
| Gastrointestinal | 20(14.3) | 4(2.9) | 0.002* |
| Cardiovascular | 12(8.6) | 5(3.6) | 0.118 |
| Wound | 8(5.7) | 3(2.1) | 0.227 |
| Haematological | 7(5) | 00 | 0.016 |
| Pain | 24(17.1) | 27(19.3) | 0.749 |
| Mobility | 24(17.1) | 16(11.4) | 0.230 |

Table 3: Comparison of EQ 5D domains at different time interval (n=140)

| Domain | POD 5 n(%) | One month n(%) | P value |
|---|---|---|---|
| Self-care | 119(85.0) | 118(84.3) | 1.00 |
| Usual activities | 118(84.3) | 120(85.7) | 0.874 |
| Pain/discomfort | 118(84.3) | 115(82.1) | 0.755 |
| Anxiety/depression | 113(80.7) | 121(86.4) | 0.268 |
| Mobility | 119(85) | 122(87.1) | 0.749 |