



## Original Article



## Impact of Early and Delayed Stoma Closure on Patients and Their Family Life

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## ABSTRACT

Temporary intestinal stomas are to preserve the distal anastomosis following colorectal surgery. Although stoma reversal is necessary to provide bowel continuity, the time of closure is debatable. Early closure might be more beneficial by minimizing stoma complications, hospitalization, and adverse psychosocial effects. **Objectives:** To compare clinical outcomes and psychosocial effects of early versus delayed stoma closure in patients with temporary stomas. **Methods:** This retrospective cohort study was done in the Surgical Wards of Jinnah Postgraduate Medical Centre (JPMC), Karachi, and involved 81 patients whose intestinal stoma was reversed. Patients were sorted into two groups: early closure (less than 6 weeks; n=40) and delayed closure (more than 6 weeks; n=41). The analysis of data was performed with the help of SPSS version 26. The p-value of 0.05 was taken to be statistically significant. **Results:** A total of 81 patients were included, with 40 undergoing early and 41 delayed stoma closure. Baseline characteristics were comparable between groups. Early closure was associated with shorter hospital stay ( $4.3 \pm 1.9$  vs  $7.1 \pm 2.4$  days) and earlier resumption of oral intake ( $2.8 \pm 1.2$  vs  $4.9 \pm 1.8$  days). Overall, postoperative complications were lower after early closure (17.5% vs 36.5%), particularly wound infection (10.0% vs 22.0%). Delayed closure showed higher psychological stress and greater socioeconomic burden. **Conclusions:** An earlier stoma closure had better clinical and psychosocial outcomes than a late stoma closure, which were characterized by quicker recovery.

## INTRODUCTION

Temporary intestinal stomas, in particular loop ileostomies, are often established after surgery on the rectum and the rest of the colon to shield distal anastomoses and minimize the effects of anastomotic leakage [1]. However, as important as stomas are as protection, their presence has a physical impact on the patient, psychologically, socially, and on the family life of a patient, and thus, timely reversal is a critical part of the overall postoperative management [2]. Stoma reversal, however, is not morbidity-free because patients are at risk of getting wound infections, postoperative pains, delayed recoveries, and bowel functional disturbances that can interfere with their normal lives and family duties [3]. Various patient-specific and operative causes have been

suggested to play a role in causing postoperative complications after ileostomy reversal, and this explains why they should be carefully chosen in terms of timing and patient selection [4]. The recommendation has been given to initiate early stoma closure to reduce complications associated with the stoma, enhance the quality of life, and be able to reintegrate easily into normal life and family roles [5]. On the other hand, there are situations in clinical practice where delayed closure could be required, and they have been linked with higher postoperative morbidity and extended recovery times [6]. Comparative research comparing early and late stoma closure reported inconsistent complication rates, implying that the best time to close the stoma is still disputable, and it might also



be influenced by the institutional measures and patient-specific characteristics [7]. Stomas have also been described to cause emotional and dependency stress, caregiving effects on the family, on top of surgical outcomes, highlighting the overall psychosocial implications of delayed closure [8]. The socioeconomic and family-related consequences have also been increased by prolonged delays in stoma reversal that are associated with longer hospitalization and increased postoperative morbidity [9]. Such new strategies as early same-admission closure have proven to be promising in recent times, but they must be well evaluated in terms of safety, feasibility, and availability of resources [10]. Although the use of temporary intestinal stomas has increased, there is no consensus on the time to close them, and the available literature presents mixed results and relies primarily on the effects of surgery and not on the overall psychosocial and family consequences. Long duration of stoma can give a lot of physical, emotional, social, and caregiving burden to patients and their families, and its premature closure can also have some risks. These uncertainties in the clinical decision-making process on the timing of the most suitable reversal. Thus, the study aims to compare early and late stoma closure, considering its postoperative outcomes and their impact on the quality of life of patients and their families, to determine the most appropriate time to close them.

## METHODS

A retrospective cohort study was conducted in the surgical wards of Jinnah Postgraduate Medical Centre, Karachi, from January 2025 to April 2025. The study protocol was approved by the Institutional Review Board of JPMC (IRB NO. F.2-81/2025-GENL/416/JPMC). Because of the study's retrospective design, informed consent was waived. All patient data were handled confidentially, and only de-identified records were used to ensure participants' privacy and compliance with ethical guidelines. The calculation of a sample size was conducted to provide sufficient statistical power to identify differences in the most important postoperative outcomes in the two groups of stoma closures: early and delayed. According to the existing literature, a 20% difference in absolute outcomes of overall post-operative complications was regarded as significant. When the alpha was assumed to be 2-sided and 0.05, and the power was assumed to be 80%, at least 36 patients in each group were needed. A total of 81 patients were enrolled to cover the possible exclusion and incomplete records (in the early closure, n=40, and delayed closure, n=41), which was considered adequate to identify any important variations in the clinical and psychological outcomes [5]. Selection bias was minimized by using consecutive sampling. Eligible subjects were aged 18 years

and above, had a temporarily constructed loop ileostomy or colostomy due to benign or malignant colorectal disease, and were fit to medically undergo stoma reversal. Patients who had anastomotic leak, intra-abdominal sepsis, severe comorbidities, recurrent/metastatic disease, or incomplete records were eliminated. Demographic (age, gender) and clinical (type of stoma, indication, comorbidities, and time between stoma formation and closure) data were collected. Most of the postoperative outcomes were complications, length of stay, and oral intake time. The psychosocial burden was determined by a short interviewer-administered questionnaire of financial strain, emotional stress, returning to work, marital/relationship problems, and family planning effects. Before the actual use, the questionnaire was pilot tested on 10 local patients to test its clarity and cultural relevance. SPSS version 26 was used to analyze data. The continuous variables were presented in the form of mean and standard deviation. Normality of hospital stay and time to oral intake were evaluated with the Shapiro-Wilk test; those with non-normal distribution were compared with the Mann-Whitney U test, whereas normally-distributed variables were compared with the independent t-test. Chi-square test was used in the comparison of categorical variables. To increase the statistical power, ordinal psychosocial responses were categorized as no-mild and moderate-severe stress. The stratified analysis was adjusted for potential confounders such as comorbidities, the type of stoma, and underlying pathology. A p-value below 0.05 was taken to be statistically significant.

## RESULTS

Early and delayed stoma closure groups were comparable at baseline, with no significant differences in age, sex distribution, type of stoma, or indication for stoma formation, supporting baseline homogeneity and minimizing selection bias. By study definition, the interval between stoma creation and reversal was significantly shorter in the early closure group. Early stoma closure was associated with significantly faster postoperative recovery, demonstrated by shorter hospital stay and earlier resumption of normal oral intake. Overall postoperative morbidity—particularly wound infection—was significantly lower in the early closure group, while postoperative ileus and re-intervention rates did not differ significantly between groups (Table 1).

**Table 1:** Clinical Characteristics and Postoperative Outcomes of Early Versus Delayed Stoma Closure

Variables	Early Closure (n=40)	Delayed Closure (n=41)	Effect Size (95% CI)	p-value
Loop Ileostomy	29 (72.5%)	29 (70.7%)	OR 1.11 (0.43-2.86)	0.820
Loop Colostomy	11 (27.5%)	12 (29.3%)	OR 0.90 (0.35-2.33)	0.820

Duration Between Creation and Closure (Weeks)	4.2 ± 0.9	13.6 ± 3.1	MD -9.4 (-10.5 to -8.3)	<0.001
Hospital Stays (Days)	4.3 ± 1.9	7.1 ± 2.4	MD -2.8 (-3.7 to -1.9)	<0.001
Return to Normal Oral Diet (Days)	2.8 ± 1.2	4.9 ± 1.8	MD -2.1 (-2.8 to -1.4)	<0.001
Total Postoperative Complications	7 (17.5%)	15 (36.5%)	OR 0.37 (0.14-0.97)	0.040
Wound Infection	4 (10.0%)	9 (22.0%)	OR 0.39 (0.10-0.98)	0.040
Postoperative Ileus	2 (5.0%)	5 (12.2%)	OR 0.38 (0.07-1.87)	0.180
Re-Intervention Required	1 (2.5%)	3 (7.3%)	OR 0.32 (0.03-3.04)	0.310

OR=Odds Ratio; MD=Mean Difference

Continuous variables: mean ± SD, MD calculated as Early - Delayed Patients undergoing delayed stoma closure experienced a substantially higher psychosocial burden, characterized by greater levels of psychological stress, increased utilization of psychiatric consultation and treatment, and more pronounced socioeconomic and family-related difficulties. Delayed closure was significantly associated with financial strain, difficulty returning to work, marital disruption, and negative impact on family planning, underscoring the broader non-clinical consequences of prolonged stoma duration (Table 2).

**Table 2:** Psychosocial and Quality-of-Life Outcomes in Early Versus Delayed Stoma Closure

Variables	Early Closure (n=40)	Delayed Closure (n=41)	Effect Size (95% CI)	P-value
No stress	18 (45.0%)	8 (19.5%)	OR 3.38 (1.24-9.21)	<0.001
Mild stress	16 (40.0%)	15 (36.6%)	OR 1.16 (0.50-2.70)	0.010
Moderate stress	5 (12.5%)	12 (29.3%)	OR 0.35 (0.11-1.07)	0.030
Severe stress	1 (2.5%)	6 (14.6%)	OR 0.15 (0.02-1.10)	0.040
Psychiatric consultation required	5 (12.5%)	14 (34.1%)	OR 0.28 (0.09-0.81)	0.010
Psychiatric treatment received	3 (7.5%)	8 (19.5%)	OR 0.34 (0.08-1.40)	0.040
Severe financial burden	5 (12.5%)	16 (39.0%)	OR 0.23 (0.08-0.63)	0.010
Job loss/difficulty returning to work	4 (10.0%)	13 (31.7%)	OR 0.24 (0.07-0.78)	0.030
Marital separation/divorce	3 (7.5%)	8 (19.5%)	OR 0.34 (0.08-1.40)	0.040
Negative impact on family planning	6 (15.0%)	11 (26.8%)	OR 0.49 (0.17-1.37)	0.040

## DISCUSSION

This current research proves that early stoma closure correlates with significantly better postoperative recovery and lower morbidity as compared to the delayed closure without undermining patient safety. Such results are not isolated, as present-day evidence shows that early ileostomy reversal is a viable and useful intervention in selected patients after colorectal surgery [11]. Among the major discoveries that were made in this research was the fact that the overall rate of postoperative complications was much lower among the early closure group, especially in wound infection. The same results are also reported in

the study by Li et al. who found a long stoma period as one of the independent risk factors of an incisional surgical site infection following stoma reversal [12]. Randomized and prospective cohort studies also demonstrated that early closure helps to decrease stoma-related skin contamination and chronic inflammation exposure and thus minimize infection risks [13]. The present cohort also related early stoma closure to accelerated gastrointestinal recovery as measured by the earlier oral intake and reduction in hospitalization. These results are consistent with recent prospective statistics that show that bowel continuity restoration at an early age can help in the earlier initiation of enteral nutrition and improved recovery following surgery [14]. Decreased hospitalization has a significant impact on patient outcomes as well as on healthcare resources. The more prevalent rates of postoperative ileus and re-intervention in the delayed closure group, even though not statistically significant, do carry clinical relevance and correlate with general findings that a longer duration of stoma results in a higher burden of complications. A systematic analysis by Solitano et al. emphasized the point that delayed closure was related to cumulative stoma-related complications, such as dehydration, electrolyte imbalance, and infectious morbidity [15]. In addition, it has been reported that delayed ileostomy closure is associated with higher chances of developing Clostridium difficile infection, which further supports the issue of prolonged fecal diversion [16]. This study, in addition to the outcome of the surgical procedures, highlights the huge psychosocial and socioeconomic effects of delayed stoma closure. The patients of the delayed group had a much greater level of psychological stress and demanded psychiatric consultation and treatment. These results indicate the increased awareness of the fact that stomas influence body image, emotional state, and social functioning, especially in the case of delay in reversal [15, 17]. The poor socioeconomic outcomes that were found in this research, such as the financial burden, the inability to resume work, marital instability, and the impact of the stoma care on family planning, reflect a rarely reported aspect of stoma care. Past clinical trials have also reported the same observation that an extended stoma period is detrimental to the employment rate and family life, especially in younger and economically active individuals [18]. The linkage of delayed closure to augmented wound complications has also been supported by meta-analysis data, which is likely to prolong recovery, resulting in worsened social and financial pressures indirectly [19]. Recent large-scale observational research still indicates that early ileostomy closure, when clinically warranted, does not elevate the risk after the operation and can greatly

decrease physical and psychosocial morbidity [20]. Combined, the present study results contribute to the emerging recommendations of personalized yet prompt stomareversal plans.

The limitations of this study include its retrospective design, which may be subject to residual confounding despite baseline comparability, and its single-center setting, which may limit generalizability. Future multicenter prospective studies with larger sample sizes are warranted to validate these findings and establish robust clinical guidelines regarding the optimal timing of stoma closure. Whenever feasible, early stoma closure should be considered, as it appears to be associated with fewer postoperative complications, shorter recovery, and improved psychological, social, and economic outcomes. Incorporating routine psychosocial assessment into postoperative decision-making may further enhance patient-centered care and support better reintegration into normal family life.

## CONCLUSIONS

A timely closure of the stoma is linked to superior clinical and psychosocial results as compared with late closure. Patients who receive early reversal have a greater rate of bowel recovery, reduced post-operative complications, shorter hospital stay, and better quality of life with a lower financial and emotional cost. On the other hand, delayed closure predisposes to wound infection, ileus, stoma-related and social restrictions. Nevertheless, timing should be personalized according to the stability of the patient, his/her nutrition, and the integrity of the anastomosis. All in all, in case of the favorable clinical conditions, early stoma closure is the treatment of choice as it improves patient recovery and reduces long-term physical, psychological, and economic consequences.

## Authors' Contribution

Conceptualization: TK

Methodology: TK, AI, NA

Formal analysis: DK, MI, NA

Writing and Drafting: DK, MI, NA

Review and Editing: TK, DK, AI, MI, NA

All authors approved the final manuscript and take responsibility for the integrity of the work

## Conflicts of Interest

All the authors declare no conflict of interest.

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