



Stoma Complications Following Intestinal Diversion: Frequency and Associated Risk Factors at a Tertiary Care Centre in Pakistan

Article History:

Name of Author:

Ihsan Ullah^{1*}, Mahliqa Batool², Gultaj Ahmad³, Abdullah Khan⁴, Adil Jan⁵, Muhammad Umer Khan Ghauri⁶, Omar Khan⁷

Affiliation: ¹ Ayub Teaching Hospital Abbottabad; Email: drihsankhan988@gmail.com

²Shifa International Hospital Islamabad; Email: mahliqamohyuddin@gmail.com

³Ayub Teaching Hospital Abbottabad; Email: gultajahmad16@gmail.com

⁴Saidu Teaching Hospital Swat; Email: ak46481007@gmail.com

⁵Khyber Teaching Hospital Peshawar; Email: adiljanbmc5@gmail.com

⁶Ayub Teaching Hospital Abbottabad; Email: umar954a1@gmail.com

⁷Ayub Teaching Hospital Abbottabad; Email: omarkhanatd@gmail.com

Corresponding Author:

Dr. Ihsan Ullah

Email: drihsankhan988@gmail.com

Received: 12-11-2025

Revised: 23-11-2025

Accepted: 16-12-2025

Published: 31-12-2025

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-Noncommercial-Share Alike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Abstract: Background: Abdominal stoma is an opening of the intestine whether temporary or permanent on anterior abdominal surgically. Sometimes it may result in number of significant complications which may be starting from early postoperative periods to late compilations. This study was done to determine stoma complications in our population. **Objectives:** To determine frequency of complication of intestinal stoma in Ayub Teaching hospital Abbottabad **Study Design:** Descriptive cross sectional study **Study Setting:** Department of Surgical ward B, Ayub Teaching Hospital Abbottabad **Study Duration:** June 17, 2024 till May 16, 2025 **Subjects:** Patients aged 20 to 70 years of both gender having stoma formation were enrolled using non-probability consecutive sampling technique. **Methods:** Study was conducted after approval of hospital ethical committee and written informed consent of patients. 11 Demographic data was entered. Data was entered and analyzed using SPSS. **Results:** In our study 126 patients were enrolled with mean age of 40.16 ± 14.4 years. There were 55.6% males and 44.4% female patients. Most of patients belonged to middle socioeconomic status 49.2%, low socioeconomic status was present in 34.9% and high socioeconomic status was present in 15.9% patients. Primary education was present in 13.5%, secondary education was present in 31.7%, matric and above was present in 38.1% patients. Most common stoma complication was superficial necrosis in 59.5% patients, stoma retraction in 53.2% patients, bleeding in 46%, skin irritation in 15.9%, fixation problem in 8.7% and leakage in 7.9% patients. **Conclusion:** Superficial necrosis and stoma retraction are most common complications of intestinal stoma.

Keywords: Intestinal Stoma, Complications, Superficial necrosis

INTRODUCTION

A stoma is a surgically constructed aperture between a hollow organ and the body's exterior, indicated when primary anastomosis is unfeasible due to an elevated risk of failure or a lack of viable distal tissue for attachment.(1) An intestinal stoma, also known as fecal diversion, is defined as the surgical creation of an opening that connects the bowel to the surface of the abdominal wall.(2)Stoma creation is indicated for a spectrum of clinicopathological conditions, involving either temporary or permanent intestinal diversion. While the objective is to improve quality of life, inadequate stoma placement, suboptimal care, and complications can adversely impact patients, potentially leading to reduced quality of life, social withdrawal, and elevated medical costs and utilization. Consequently, patients often face substantial lifestyle modifications and challenges following stoma surgery.

Tuberculosis, inflammatory bowel disease, and anastomotic leakage are frequent indications for loop ileostomy. In contrast to Western nations, typhoid fever remains a prevalent cause of intestinal perforation necessitating stoma formation within this region. Reported stoma complication rates range from 5% to 100%, with such variability likely attributable to differences in the duration of postoperative follow-up. (3)

Wound infection, hematoma, anastomotic leakage, small bowel obstruction at the stoma site, iatrogenic bowel injuries, local abscess formation, and peristomal dermatitis are widely documented complications associated with the formation of an intestinal stoma. (4,5)Stoma formation is linked to various clinical morbidities and can negatively impact a patient's quality of life by causing physical discomfort and psychological distress related to disfigurement. (6) Stoma prolapse happens when the stoma is displaced, causing the proximal bowel to protrude through the lateral aspect of the stoma opening. Stoma retraction occurs when the stoma recedes approximately 5 cm below the skin surface; this is a late complication often associated with weight gain. Furthermore, stoma retraction may result from adhesions, sepsis, intestinal radiation, or specific surgical techniques. Bowel obstruction represents a frequent complication that commonly requires surgical intervention. (7,8)

Jonkers et al. (9) reported that 82% of patients experienced at least one stoma-related complication. Skin irritation, fixation problems, and leakage were identified as the most prevalent issues, while superficial necrosis, bleeding, and stoma retraction were observed in 20%, 14%, and 9% of patients, respectively. (9)

The primary objective of this study is to assess the incidence of complications following stoma formation in our local population. Previous research (5,6,8) has largely relied on retrospective data, which often results in the under-registration of complications. This pragmatic, prospective study aims to offer a comprehensive overview of all complications arising from stoma construction within the daily clinical practice of a large teaching hospital.

OBJECTIVE: To determine frequency of complication of intestinal stoma in Ayub Teaching hospital Abbottabad.

MATERIALS AND METHODS

Study Design: Descriptive Cross sectional study

Study Setting: Department of Surgical ward B, Ayub Teaching Hospital Abbottabad Study Duration: June 17, 2024 till May 16, 2025

Sampling Technique: Non probability consecutive sampling

Sample Size: Sample size was calculated using WHO calculator keeping 95% confidence level, 5% absolute precision and 9% previously reported frequency of skin retraction. (9) Sample size was 126 patients.

SELECTION CRITERION:

Inclusion Criteria:

- Patients aged 20 to 70 years
- Patients of both gender
- Patients having stoma formation

Exclusion Criteria:

- Patients taking immune suppressive medication
- Patients having malignancy 60
- Patients on radiotherapy or chemotherapy

DATA COLLECTION PROCEDURE: After approval from hospital ethical board, patients fulfilling the inclusion criteria was enrolled from surgical indoor of Ayub Teaching Hospital Abbottabad. A written informed consent was taken after explaining the purpose of study. Demographic data including age, gender, educational level, socioeconomic status, diabetes, hypertension, smoking and obesity was noted. Complete history was taken and physical examination was done. All stoma was created by consultant surgeon having atleast 5 years of post-fellowship experience. Stoma care was advised to all patients. All patients were examined at 1, 3 and 14 days; 4 and 6 weeks and 3 months for stoma complications. Stoma complications were noted. Data was entered in specially designed proforma.

DATA ANALYSIS PROCEDURE: Data was entered and analyzed by using SPSS version 22.0. Mean and standard deviation was calculated for quantitative variables like age. Frequency and percentage was calculated for categorical variables like gender, educational level, socioeconomic status, diabetes, hypertension, smoking, obesity and complications. Effect modifiers like age, gender,

educational level, socioeconomic status, diabetes, hypertension, smoking and obesity was addressed through stratification of data. Post stratification chi square was applied. P value ≤ 0.05 was taken as statistically significant.

RESULTS

Demographic and Baseline Characteristics

A total of 126 patients who underwent intestinal stoma formation were enrolled. The mean age was 40.16 ± 14.4 years (range: 20–70 years), as detailed in Table 1.

Table 1: Age distribution of the study population (n=126)

Variable	N	Minimum	Maximum	Mean $\pm$ SD
Age (years)	126	20	70	40.16 ± 14.4

Males constituted 55.6% of the cohort (n=70) and females 44.4% (n=56) (Table 2). Hypertension was present in 32.5% of patients (n=41), diabetes mellitus in 49.2% (n=62), obesity in 38.9% (n=49), and smoking in 37.3% (n=47). Middle socioeconomic class was the most prevalent group (49.2%), and the majority had matriculation-level education or above (38.1%).

Table 2: Gender distribution of the study population

Gender	Frequency	Percent (%)
Male	70	55.6
Female	56	44.4
Total	126	100.0

Frequency of Stoma Complications

Superficial necrosis was the most common complication (59.5%), followed by stoma retraction (53.2%), bleeding (46.0%), skin irritation (15.9%), fixation problems (8.7%), and leakage (7.9%). The full breakdown is presented in Table 3 and illustrated in Figure 1.

Table 3: Frequency of stoma complications among enrolled patients (n=126)

Complication	Frequency (n)	Percent (%)
Superficial Necrosis	75	59.5
Stoma Retraction	67	53.2
Bleeding	58	46.0
Skin Irritation	20	15.9
Fixation Problem	11	8.7
Leakage	10	7.9

Figure 1. Frequency of Stoma Complications (n=126)

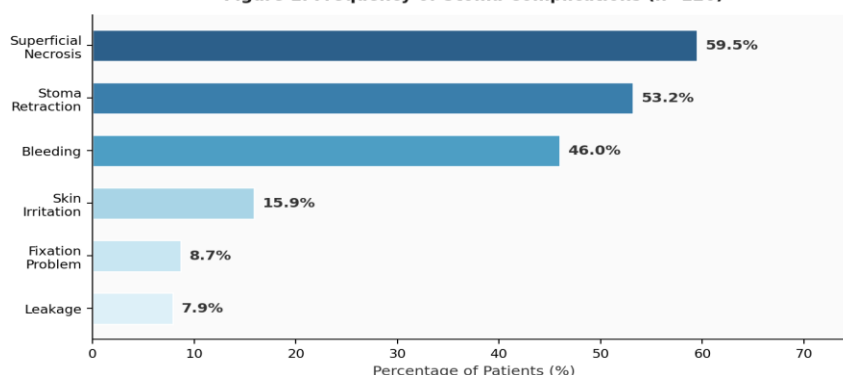


Figure 1. Distribution of stoma complications among 126 patients. Values represent percentage of total study population. Multiple complications could co-exist in the same patient.

Stratified Analysis of Stoma Complications

Data were stratified by age group, gender, hypertension, diabetes, smoking, obesity, socioeconomic status, and educational level. Table 4 summarises all statistically significant associations identified ($p < 0.05$).

Younger patients (20–45 years) showed a significantly higher frequency of skin irritation (85.0% vs. 15.0%; $p=0.035$) and fixation problems (100.0% vs. 0.0%; $p=0.010$). Superficial necrosis was significantly more prevalent in the older age group ($p=0.019$). Hypertension was significantly associated with higher rates of superficial necrosis (40.0% vs. 21.6%; $p=0.030$) and stoma retraction (43.3% vs. 20.3%; $p=0.006$), while skin irritation was paradoxically less frequent in hypertensive patients (5.0% vs. 37.7%; $p=0.004$). Among diabetic patients, leakage was substantially more common (90.0% of leakage cases; $p=0.007$). Leakage also showed a significant association with educational level, with 80.0% of cases occurring in patients with matriculation or above ($p=0.033$). Gender, smoking, obesity, and socioeconomic status showed no significant association with any of the studied complications.

Table 4: Statistically significant associations between patient characteristics and stoma complications

Risk Factor	Complication	p-value
Age Group	Skin Irritation	0.035*
Age Group	Fixation Problem	0.010*
Age Group	Superficial Necrosis	0.019*
Hypertension	Skin Irritation	0.004*
Hypertension	Superficial Necrosis	0.030*
Hypertension	Stoma Retraction	0.006*
Diabetes	Leakage	0.007*
Education Level	Leakage	0.033*
* Statistically significant ($p < 0.05$)		

DISCUSSION

Intestinal stoma creation is established as one of the most frequently performed life-saving surgical procedures globally, serving a vital role in the management of both congenital and acquired gastrointestinal disorders. (10) Stoma formation is primarily indicated for fecal diversion, the protection of anastomotic sites, bowel decompression, or a combination of these clinical objectives (11,12). While colostomies and ileostomies represent the most frequently performed ostomy procedures in surgical settings, less common variations like jejunostomies are also employed for the decompression, lavage, and diversion of intestinal contents. (13,14) Pediatric indications for intestinal stoma differ from those in adults. Unlike the adult population, stoma creation in children is typically performed as a temporary measure to manage congenital intestinal malformations. (13) Hirschsprung's disease and anorectal malformations represent primary indications for pediatric stoma formation.. (15) Additionally, stoma formation in adults is sometimes necessary for the management of conditions such as trauma, diverticulitis, volvulus, and malignancies (11,15). Although intestinal stoma creation is a life-saving intervention for the management of numerous gastrointestinal conditions, its associated morbidity and mortality have been the focus of extensive research (12,15). Inadequate construction of a stoma may impede or delay the definitive repair of these malformations, which can, in severe cases, be fatal. (16) Numerous complications have been documented

regarding the construction and closure of intestinal stomas (12,16). Stoma-related complications, observed in 20–70% of patients, are broadly classified into early events—including ischemia, hemorrhage, and infection—and late sequelae, such as stenosis, fistula development, prolapse, hernia formation, bowel obstruction, and peristomal skin denudation (14,16,17). Factors that favor the creation of an abdominal stoma over primary closure include significant blood loss, shock, fecal contamination of the abdominal cavity, and the presence of multiple perforations (18). This study aimed to evaluate stoma-related complications within our patient population. A total of 126 patients were enrolled, with a mean age of 40.16 ± 14.4 years. The cohort consisted of 55.6% males and 44.4% females. Regarding comorbidities, hypertension was identified in 32.5% of patients, diabetes mellitus in 49.2%, obesity in 38.9%, and smoking in 37.3%. Socioeconomic status was distributed as follows: 49.2% middle class, 34.9% low class, and 15.9% high class. Educational attainment levels included primary education (13.5%), secondary education (31.7%), and matriculation or higher (38.1%). The most frequent stoma-related complications observed were superficial necrosis (59.5%), stoma retraction (53.2%), bleeding (46.0%), skin irritation (15.9%), fixation problems (8.7%), and leakage (7.9%). These findings are consistent with broader literature, which generally reports high rates of stoma complications. For instance, in a study by Jonkers et al. (9), 82% of patients experienced one or more stoma-related complications; skin irritation, fixation problems, and leakage were the most prevalent, whereas superficial necrosis, bleeding, and

retraction occurred in 20%, 14%, and 9% of patients, respectively. Another study involved 85 patients, with a gender distribution of 83.52% male and 16.47% female, representing a ratio of approximately 5:1. The most frequent age group for stoma formation across both genders was 21–30 years (23.52%), although male patients were more prevalent in the 51–60 age range. Regarding procedure type, 46 patients underwent end ileostomy, and 27 underwent loop ileostomy. Edema was most commonly noted in 19 patients who received a loop ileostomy. Reported complication rates included superficial necrosis or excoriations in 52.9% of patients, wound infection in 55.2%, and stoma retraction in 5.8% (19). Duchesne et al. observed complication rates of 26%, 25%, and 25% within their respective cohorts (20). Reported incidence rates of peristomal skin irritation range from 3% to 42%, encompassing conditions from mild peristomal dermatitis to full-thickness skin necrosis and ulceration. The most frequent complications identified in these studies were peristomal skin irritation and erythema, followed by laparotomy wound infection, peristomal skin infection, abscess formation, and fistula development. A separate study conducted in Karachi involving 84 intestinal stoma patients—predominantly male, with 22 females—identified underlying pathologies including tuberculous intestine, typhoid ileal perforation, trauma, and gangrenous appendicular perforation. Among this cohort, 61 patients developed complications, most notably skin excoriation, followed by wound infection, nonfunctioning stoma, prolapse, stenosis, retraction, high-output fistula, parastomal hernia, necrosis, and hemorrhage (21). These observations are consistent with the current findings.

CONCLUSION

Intestinal stomas are associated with a diverse range of complications. The most frequently observed issues include superficial necrosis, stoma retraction, hemorrhage, skin irritation, fixation challenges, and leakage. Investigating the incidence, severity, and etiology of these abdominal stoma complications is essential, as it establishes a scientific foundation for future research. Such insights are critical for developing evidence-based interventions designed to enhance clinical care and improve the quality of life for patients managing stomas.

BIBLIOGRAPHY

1. Babakhanlou R, Larkin K, Hita AG, Stroh J, Yeung SJ. Stoma-related complications and emergencies. *International Journal of Emergency Medicine*. 2022 May 9;15(1):17–17. doi:10.1186/s12245-022-00421-9 PubMed PMID: 35534817.
2. Tsujinaka S, Tan K, Miyakura Y, Fukano R, Oshima M, Konishi F, et al. Current Management of Intestinal Stomas and Their Complications. *Journal of the Anus Rectum and Colon*. 2020 Jan 29;4(1):25–33. doi:10.23922/jarc.2019-032 PubMed PMID: 32002473.
3. Khan IM, Rehman PM, Javed MA. Ileostomy complications: a broad analysis [Internet]. Vol. 35. 2019 Jan 1 [cited 2026 Jun];35(3):191–6. Available from: https://inis.iaea.org/search/search.aspx?orig_q=RN:50077937
4. Khan A, Haris M, Rehman M ur, Khan MJ, Abdullah A, Haris S. Early Postoperative Complications and Surgical Anatomy After Ileostomy Reversal Among the Population of Khyber Pakhtunkhwa, Pakistan. *Cureus*. 2021 Nov 17;13(11). doi:10.7759/cureus.19660 PubMed PMID: 34958658.
5. Ellebæk MB, Kjær MD, Spanggaard K, El-Faramawi M, Möller S, Qvist N. Protective loop-ileostomy in ileal pouch–anal anastomosis for ulcerative colitis – advantages and disadvantages. A retrospective study. *Colorectal Disease*. 2020 Aug 12;23(1):145–52. doi:10.1111/codi.15302 PubMed PMID: 32779825.
6. Hajibandeh S, Hajibandeh S, Sarma D, East J, Zaman S, Mankotia R, et al. Meta-analysis of temporary loop ileostomy closure during or after adjuvant chemotherapy following rectal cancer resection: the dilemma remains. *International Journal of Colorectal Disease*. 2019 May 25;34(7):1151–9. doi:10.1007/s00384-019-03321-2 PubMed PMID: 31129697.
7. Krishnamurthy DM, Blatnik JA, Mutch MG. Stoma Complications. *Clinics in Colon and Rectal Surgery*. 2017 May 22;30(3):193–200. doi:10.1055/s-0037-1598160 PubMed PMID: 28684937.
8. Hardt J, Meerpohl JJ, Metzendorf M, Kienle P, Post S, Herrle F. Lateral pararectal versus transrectal stoma placement for prevention of parastomal herniation. *Cochrane Database of Systematic Reviews*. 2019 Apr 24;2019(4). doi:10.1002/14651858.cd009487.pub3
9. Jonkers HAF, Draaisma WA, Roskott AM, Overbeeke AJ van, Broeders IAMJ, Consten ECJ. Early complications after stoma formation: a prospective cohort study in 100 patients with 1-year follow-up. *International Journal of Colorectal Disease*. 2012 Jan 29;27(8):1095–9. doi:10.1007/s00384-012-1413-y PubMed PMID: 22302593.
10. Bruns B, DuBose J, Pasley J, Kheirbek T, Chouliaras K, Riggle A, et al. Loop versus end colostomy reversal: has anything changed? *European Journal of Trauma and Emergency Surgery*. 2014 Sep 3;41(5):539–43.

- doi:10.1007/s00068-014-0444-1 PubMed PMID: 26037983.
11. Amelung FJ, Mulder CLJ, Broeders IAMJ, Consten ECJ, Draaisma WA. Efficacy of loop colostomy construction for acute left-sided colonic obstructions: a cohort analysis. *International Journal of Colorectal Disease*. 2016 Nov 12;32(3):383–90. doi:10.1007/s00384-016-2695-2 PubMed PMID: 27838818.
12. Krstic S, Resanović V, Alempijević T, Resanovic A, Šijački A, Djukić V, et al. Hartmann's procedure vs loop colostomy in the treatment of obstructive rectosigmoid cancer. *World Journal of Emergency Surgery*. 2014 Oct 4;9(1):52–52. doi:10.1186/1749-7922-9-52 PubMed PMID: 25324896.
13. Davis BR, Valente M, Goldberg JE, Lightner AL, Feingold DL, Paquette IM. The American Society of Colon and Rectal Surgeons Clinical Practice Guidelines for Ostomy Surgery. *Diseases of the Colon & Rectum*. 2022 May 24;65(10):1173–90. doi:10.1097/dcr.0000000000002498 PubMed PMID: 35616386.
14. Pisano M, Zorcolo L, Merli C, Cimbanassi S, Poiasina E, Ceresoli M, et al. 2017 WSES guidelines on colon and rectal cancer emergencies: obstruction and perforation. *World Journal of Emergency Surgery*. 2018 Aug 13;13(1):36–36. doi:10.1186/s13017-018-0192-3 PubMed PMID: 30123315.
15. Franklyn J, Varghese G, Mittal R, Rebekah G, Jesudason MR, Perakath B. A prospective randomized controlled trial comparing early postoperative complications in patients undergoing loop colostomy with and without a stoma rod. *Colorectal Disease*. 2017 Jan 9;19(7):675–80. doi:10.1111/codi.13600 PubMed PMID: 28067986.
16. Whiteley I, Russell MJ, Nassar N, Gladman MA. Outcomes of support rod usage in loop stoma formation. *International Journal of Colorectal Disease*. 2016 Mar 29;31(6):1189–95. doi:10.1007/s00384-016-2569-7 PubMed PMID: 27023628.
17. Lyerly HK, Mault JR. Laparoscopic ileostomy and Colostomy. *Annals of Surgery*. 1994 Mar 1;219(3):317–22. doi:10.1097/00000658-199403000-00013 PubMed PMID: 8147614.
18. Memon AS, Memon JM, Malik A, Soomro AG. Pattern of acute intestinal obstruction. *Pakistan J Surg*. 1995;11:91–3.
19. Pal N, Poonam P, Jangra A, Mishra V. Analysis of complications and management of abdominal stoma. *International Surgery Journal*. 2019 Jul 25;6(8):2828–2828. doi:10.18203/2349-2902.isj20193325
20. Duchesne J, Wang YZ, Weintraub SL, Boyle M, Hunt JP. Stoma Complications: A Multivariate Analysis. *The American Surgeon*. 2002 Nov 1;68(11):961–6. doi:10.1177/000313480206801106 PubMed PMID: 12455788.
21. Mehboob A, Perveen S, Iqbal M, Bux KM, Waheed A. Frequency and Complications of Ileostomy. *Cureus*. 2020 Oct 29;12(10). doi:10.7759/cureus.11249 PubMed PMID: 33274131.