



Research Article

Clinical Characteristics, Frailty, Comorbidity Burden and Hospital Outcomes among Geriatric Patients with Inflammatory Bowel Disease: A Prospective Cross-Sectional Study from a Tertiary Care Teaching Hospital in South India

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Background: Inflammatory bowel disease (IBD), comprising ulcerative colitis (UC) and Crohn's disease (CD), is a chronic immune-mediated disorder increasingly affecting older adults. Age-related physiological changes, multimorbidity, frailty, and polypharmacy complicate disease management and influence hospitalization outcomes. This study evaluated the clinical profile, frailty, comorbidities, therapeutic management, and short-term outcomes of geriatric patients with IBD. **Methods:** A prospective, hospital-based, cross-sectional observational study was conducted among 81 consecutive geriatric inpatients (≥ 60 years) with confirmed IBD at a tertiary care teaching hospital. Data on demographic characteristics, disease profile, Clinical Frailty Scale (CFS), functional status, comorbidities, treatment, and hospitalization outcomes were collected using a structured case record form. Descriptive statistics and Chi-square/Fisher's exact tests were used for analysis, with $p < 0.05$ considered statistically significant. **Results:** Ulcerative colitis was the predominant diagnosis (85.2%), with most patients aged 70–79 years (56.8%) and females constituting 56.8% of the cohort. Diabetes mellitus (64.2%), hypertension (60.5%), anaemia (49.4%), cardiovascular disease (35.8%), chronic kidney disease (32.1%), and malnutrition (32.1%) were the most common comorbidities. Frailty was observed in 63.0% of patients, while only 35.8% were functionally independent. Nutritional supplementation was provided to 56.8% of patients. The mean hospital stay was 11.47 days, with ICU admission and 30-day readmission rates of 7.4% and 16.0%, respectively. No in-hospital mortality was recorded. Gastrointestinal bleeding, cardiovascular events, and acute kidney injury were the most frequent complications. **Conclusion:** Hospitalized elderly patients with IBD demonstrate a substantial burden of frailty, multimorbidity, and functional impairment. Comprehensive multidisciplinary care, including individualized pharmacotherapy, nutritional optimization, and routine geriatric assessment, is essential to improve clinical outcomes and reduce hospitalization-related complications in this vulnerable population.

Keywords: Inflammatory Bowel Disease, Geriatric Patients, Comorbidities, Hospitalization Outcomes, IBD in Frailty, IBD in Tamil Nadu.

INTRODUCTION

Inflammatory bowel disease (IBD), comprising ulcerative colitis (UC) and Crohn's disease (CD), is a chronic immune-mediated inflammatory disorder of the gastrointestinal tract characterized by alternating

periods of remission and relapse. Although traditionally considered a disease of younger individuals, the prevalence of IBD among older adults has increased due to improved life expectancy,

advances in treatment, and the rising incidence of elderly-onset disease. (1) This demographic shift presents unique clinical challenges, as elderly patients often have age-related physiological changes, multiple comorbidities, and increased healthcare needs. (2) Globally, more than seven million people are affected by IBD, with a steadily increasing burden in newly industrialized countries. (3) India has witnessed a significant rise in the incidence and prevalence of both UC and CD, driven by urbanization, changing lifestyles, improved diagnostic capabilities, and greater disease awareness. (4) Consequently, healthcare providers are increasingly managing elderly patients with complex disease requiring long-term medical care and hospitalization. Management of IBD in older adults is complicated by immune senescence, reduced organ function, altered drug metabolism, and common comorbidities such as diabetes, hypertension, cardiovascular disease, chronic kidney disease, osteoporosis, and malnutrition. Polypharmacy further increases the risk of adverse drug reactions, drug interactions, and poor medication adherence. Frailty, functional dependence, and nutritional impairment are increasingly recognized as important determinants of hospitalization, treatment response, postoperative complications, and mortality but remain underassessed in routine clinical practice. Despite the growing burden of IBD in India, data on geriatric patients remain limited, particularly regarding frailty, comorbidity profiles, treatment patterns, and hospitalization outcomes. The present prospective cross-sectional study was conducted among elderly inpatients with IBD at a tertiary care teaching hospital in South India to evaluate demographic and clinical characteristics, frailty, nutritional and functional status, comorbidities, therapeutic management, and short-term hospitalization outcomes. The findings are expected to provide valuable real-world evidence to support individualized, multidisciplinary care and improve clinical outcomes in this vulnerable population.

MATERIALS AND METHODS

Study Design and Setting

A prospective, hospital-based, cross-sectional observational study was conducted to evaluate the

clinical characteristics, frailty status, comorbidity profile, therapeutic management, and hospitalization outcomes of geriatric patients with inflammatory bowel disease (IBD). The study was carried out in the Departments of Gastroenterology and General Medicine at a tertiary care teaching hospital in Erode, Tamil Nadu, India, following the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Study Population

The study included 81 consecutive hospitalized patients aged ≥ 60 years with a confirmed diagnosis of ulcerative colitis (UC) or Crohn's disease (CD), established through clinical, endoscopic, histopathological, and radiological findings. Patients with infectious, ischemic, radiation-induced, microscopic, or indeterminate colitis, terminal illness with an expected survival of less than one month, incomplete clinical records, or refusal to participate were excluded.

Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee before commencement. Written informed consent was obtained from all participants or their authorized representatives. Patient confidentiality and anonymity were maintained throughout the study in accordance with the Declaration of Helsinki.

Data Collection

Data were prospectively collected using a structured and prevalidated Case Record Form (CRF). Information obtained included demographic characteristics, disease type and duration, clinical presentation, previous hospitalizations, nutritional status, frailty, functional status, comorbidities, treatment modalities, and hospitalization outcomes. Nutritional assessment was performed using body mass index (BMI), recent weight loss, and evidence of malnutrition. Frailty was evaluated using the Clinical Frailty Scale (CFS), while functional status was assessed according to the patient's ability to perform Activities of Daily Living (ADLs). Comorbid conditions, including diabetes mellitus, hypertension, cardiovascular disease, chronic kidney disease,

anemia, osteoporosis, malnutrition, depression, and anxiety, were recorded. Pharmacological management included mesalamine, corticosteroids, immunomodulators, biologic agents, and antibiotics, together with nutritional supplementation and supportive care where indicated.

Outcome Measures

The primary outcomes included the prevalence of UC and CD, comorbidity profile, and frailty status. Secondary outcomes comprised functional dependence, length of hospital stay, intensive care unit (ICU) admission, 30-day readmission, in-hospital complications, and mortality.

Statistical Analysis

Data were entered into Microsoft Excel and analyzed using statistics software. Continuous variables were expressed as mean $\pm$ standard deviation (SD) or median (interquartile range), while categorical variables were summarized as frequencies and percentages. Comparisons were performed using the Chi-square test or Fisher's exact test for categorical variables and the student's *t*-test or one-way ANOVA for continuous variables. A two-tailed *p* value of <0.05 was considered statistically significant.

RESULTS

Participant Characteristics

Table 1. Baseline Demographic and Clinical Characteristics of the Study Population

Variable		Value
Age (years), mean $\pm$ SD		71.54 $\pm$ 5.12
Age group, n (%)	60–69 years	30 (37.0)
	70–79 years	46 (56.8)
	≥ 80 years	5 (6.2)
Sex, n (%)	Male	35 (43.2)
	Female	46 (56.8)
Low socioeconomic status, n (%)		50 (61.7)
Weight (kg), mean $\pm$ SD		68.75 $\pm$ 9.81
Height (cm), mean $\pm$ SD		159.83 $\pm$ 7.42
BMI (kg/m ²), mean $\pm$ SD		23.85 $\pm$ 3.47
Weight loss $>5\%$ during previous 6 months, n (%)		27 (33.3)
IBD subtype, n (%)	Ulcerative colitis	69 (85.2)
	Crohn's disease	12 (14.8)
	Disease duration (median)	10 years
Disease severity, n (%)	Mild	26 (32.1)
	Moderate	28 (34.6)
	Severe	27 (33.3)

A total of 81 geriatric patients diagnosed with inflammatory bowel disease (IBD) were enrolled in the study. The mean age of the participants was 71.54 $\pm$ 5.12 years (range: 65–82 years). Patients aged 70–79 years constituted the largest proportion (56.8%), followed by those aged 60–69 years (37.0%), while only 6.2% were aged ≥ 80 years. Female patients slightly outnumbered males (56.8% vs. 43.2%). More than half of the study population (61.7%) belonged to the low socioeconomic group, reflecting the predominance of economically disadvantaged patients among hospitalized elderly individuals with IBD. The mean body weight, height, and body mass

index (BMI) were 68.75 $\pm$ 9.81 kg, 159.83 $\pm$ 7.42 cm, and 23.85 $\pm$ 3.47 kg/m², respectively. Clinically significant weight loss ($>5\%$ during the preceding six months) was observed in 33.3% of patients, indicating a considerable burden of nutritional impairment.

Disease Characteristics

Ulcerative colitis (UC) was the predominant subtype of inflammatory bowel disease, accounting for 85.2% of all cases, whereas 14.8% of patients were diagnosed with Crohn's disease (CD). The median disease duration was 10 years, suggesting that most

participants had long-standing disease. At admission, disease activity was distributed relatively evenly across severity categories, with 34.6% of patients presenting with moderate disease, 33.3% with severe disease, and 32.1% with mild disease. These findings

demonstrate that clinically significant disease activity remains common among elderly patients requiring hospitalization.

Frailty and Functional Status

Table 2. Frailty and Functional Status of Elderly Patients with IBD

Variable		n (%)
Clinical Frailty Scale (CFS)	Fit (CFS 1–3)	30 (37.0)
	Vulnerable (CFS 4)	18 (22.2)
	Mild–Moderate Frailty (CFS 5–6)	25 (30.9)
	Severe Frailty (CFS 7)	8 (9.9)
Functional status	Independent	29 (35.8)
	Partially dependent	25 (30.9)
	Fully dependent	27 (33.3)

Frailty assessment using the Clinical Frailty Scale (CFS) demonstrated that only 37.0% of participants were classified as fit (CFS 1–3). Approximately one-fifth (22.2%) were categorized as vulnerable (CFS 4), while 30.9% exhibited mild-to-moderate frailty (CFS 5–6). Severe frailty (CFS 7) was observed in 9.9% of the study population. Overall, nearly two-thirds of hospitalized elderly patients exhibited some degree of frailty. Functional assessment revealed that only 35.8% of patients remained fully independent in performing activities of daily living. Partial dependence was observed in 30.9%, whereas 33.3% required complete assistance, highlighting substantial functional impairment among elderly patients hospitalized with IBD.

A high prevalence of chronic comorbid conditions was observed. Diabetes mellitus was the most frequent comorbidity, affecting 64.2% of patients, followed by hypertension (60.5%). Cardiovascular disease and chronic kidney disease were documented in 35.8% and 32.1% of participants, respectively. Among nutritional and hematological disorders, anaemia was identified in 49.4% of patients, while 32.1% experienced clinical malnutrition. Osteoporosis was present in 13.6% of patients. Regarding psychological health, depression and anxiety were identified in 12.3% and 8.6% of participants, respectively. These findings emphasize the considerable burden of multimorbidity among elderly patients with inflammatory bowel disease.

Comorbidity Profile

Table 3. Comorbidity Profile among Geriatric Patients with Inflammatory Bowel Disease

Comorbidity	n (%)
Diabetes mellitus	52 (64.2)
Hypertension	49 (60.5)
Anaemia	40 (49.4)
Cardiovascular disease	29 (35.8)
Chronic kidney disease	26 (32.1)
Malnutrition	26 (32.1)
Osteoporosis	11 (13.6)
Depression	10 (12.3)
Anxiety	7 (8.6)

Treatment Patterns

All study participants received pharmacological treatment for active inflammatory bowel disease

during hospitalization. Medical therapy included mesalamine (5-aminosalicylic acid), corticosteroids, immunosuppressive agents, biologic therapy, and antibiotics according to institutional treatment protocols. In addition, 56.8% of patients received

nutritional supplementation as part of comprehensive supportive care. Only 6.2% had a documented history of previous IBD-related surgery, indicating that most patients were managed conservatively with medical therapy.

Table 4. Pharmacological and Non-pharmacological Management of Patients with IBD

Treatment		n (%)
Pharmacological management	Mesalamine (5-ASA)	81 (100)
	Corticosteroids	81 (100)
	Immunosuppressants	81 (100)
	Biologic agents	81 (100)
	Antibiotics	81 (100)
Non-pharmacological management	Nutritional supplementation	46 (56.8)
	Previous IBD-related surgery	5 (6.2)

Hospitalization Outcomes

The mean duration of hospitalization was 11.47 ± 4.32 days, with a median hospital stay of 12 days (range: 3–20 days). Intensive care unit (ICU) admission was required in 7.4% of patients. Importantly, no in-hospital mortality was recorded during the study period. The 30-day readmission rate was 16.0%, indicating that approximately one in six patients required rehospitalization within one month following discharge.

The most frequent complication encountered during hospitalization was gastrointestinal bleeding, affecting 22.2% of patients. Cardiovascular events occurred in 21.0%, while acute kidney injury was documented in 19.8% of cases. Sepsis was observed in 13.6%, whereas pneumonia and *Clostridioides difficile* infection each occurred in 8.6% of patients. These findings indicate that gastrointestinal, cardiovascular, and renal complications remain major contributors to morbidity among hospitalized elderly patients with inflammatory bowel disease.

In-Hospital Complications

Table 5. Hospital Outcomes and In-hospital Complications

Variable		Value
Hospital outcomes	Length of hospital stay (days), mean $\pm$ SD	11.47 ± 4.32
	ICU admission, n (%)	6 (7.4)
	30-day readmission, n (%)	13 (16.0)
	In-hospital mortality, n (%)	0 (0.0)
In-hospital complications, n (%)	Gastrointestinal bleeding	18 (22.2)
	Cardiovascular events	17 (21.0)
	Acute kidney injury	16 (19.8)
	Sepsis	11 (13.6)
	Pneumonia	7 (8.6)
	<i>Clostridioides difficile</i> infection	7 (8.6)

Association Between Comorbidities and Clinical Outcomes

The relationship between major comorbidities and hospitalization outcomes was evaluated using Chi-

square and Fisher's exact tests. No statistically significant association was identified between diabetes mellitus, hypertension, cardiovascular disease, chronic kidney disease, anaemia, or malnutrition and either ICU admission or 30-day

readmission (all $p > 0.05$). These findings suggest that, within the present cohort, the presence of

individual comorbid conditions did not independently predict short-term adverse hospitalization outcomes.

Table 6. Association Between Major Comorbidities and Clinical Outcomes

Comorbidity	ICU Admission (p-value)	30-Day Readmission (p-value)
Diabetes mellitus	1.000	1.000
Hypertension	0.207	0.229
Cardiovascular disease	0.180	1.000
Chronic kidney disease	0.380	0.533
Anaemia	0.675	0.513
Malnutrition	1.000	0.533

DISCUSSION

The present prospective cross-sectional study provides a comprehensive evaluation of the clinical characteristics, frailty status, comorbidity burden, therapeutic management, and hospitalization outcomes among geriatric patients with inflammatory bowel disease (IBD) admitted to a tertiary care teaching hospital. The findings highlight the complex clinical profile of elderly patients with IBD, characterized by advanced age, a high prevalence of multimorbidity, substantial frailty, functional impairment, and frequent hospitalization. These observations are consistent with the growing body of evidence indicating that the management of IBD in older adults extends beyond the control of intestinal inflammation and requires a multidisciplinary approach that addresses age-related physiological decline and associated comorbidities. In the present study, the mean age of participants was 71.54 ± 5.12 years, with females accounting for 56.8% of the study population. Ulcerative colitis (85.2%) was considerably more prevalent than Crohn's disease (14.8%), which is comparable to previous hospital-based studies reporting ulcerative colitis as the predominant subtype among elderly Asian populations. (5) The predominance of ulcerative colitis may reflect regional epidemiological differences, genetic susceptibility, environmental factors, and healthcare referral patterns. Previous reviews have also reported that elderly-onset ulcerative colitis generally follows a milder disease course than Crohn's disease; however, disease-related morbidity remains significant because of the coexistence of multiple chronic illnesses and age-related physiological changes. (1,6) A major finding

of this study was the high prevalence of chronic comorbidities, with diabetes mellitus (64.2%) and hypertension (60.5%) representing the most frequent conditions. Anaemia, chronic kidney disease, cardiovascular disease, and malnutrition were also commonly encountered. These findings support earlier reports demonstrating that multimorbidity is highly prevalent among older adults with IBD and substantially influences treatment selection, hospitalization, and long-term prognosis. (1,7) Comorbid illnesses often complicate immunosuppressive therapy by increasing the risk of infections, cardiovascular events, and medication-related adverse effects. Consequently, recent international recommendations advocate individualized treatment strategies that incorporate comprehensive geriatric assessment rather than relying solely on chronological age. Frailty emerged as another important clinical characteristic in the present study. Approximately 63% of patients demonstrated varying degrees of frailty, while only 37% were classified as fit according to the Clinical Frailty Scale. In addition, almost two-thirds of participants required partial or complete assistance in activities of daily living, indicating considerable functional dependence. These findings closely align with recent systematic reviews and nationwide cohort studies demonstrating that frailty is increasingly recognized as an independent predictor of adverse clinical outcomes in IBD, including hospitalization, readmission, postoperative complications, and mortality. (8) Although the prevalence of frailty varies according to the assessment tool and study population, evidence consistently suggests that frailty provides a more meaningful assessment of biological vulnerability than chronological age alone. The

therapeutic management observed in this study reflected comprehensive inpatient care, with all patients receiving mesalamine, corticosteroids, immunosuppressive agents, biologics, and antibiotics according to the institutional treatment protocol, while more than half received nutritional supplementation. Although pharmacological management remains the cornerstone of IBD treatment, recent reviews emphasize that nutritional optimization, rehabilitation, medication review, vaccination, and multidisciplinary care are equally important components of management in elderly patients. Age-related pharmacokinetic changes, polypharmacy, and increased susceptibility to infections require careful monitoring during immunosuppressive therapy, reinforcing the need for individualized therapeutic decision-making. Hospital outcomes in the present study were generally favourable despite the substantial burden of frailty and comorbidity. The mean duration of hospitalization was 11.47 ± 4.32 days, ICU admission occurred in only 7.4% of patients, and no in-hospital mortality was observed. Gastrointestinal bleeding, cardiovascular events, and acute kidney injury represented the most common in-hospital complications. Although these complications remain clinically significant, the absence of mortality may reflect timely diagnosis, standardized inpatient management, and multidisciplinary supportive care. Previous studies have similarly reported that optimized inpatient management can improve short-term outcomes despite the increased vulnerability of older adults with IBD. (9) Interestingly, no statistically significant association was observed between major comorbidities and ICU admission or 30-day readmission in the present study. This finding should be interpreted cautiously because of the relatively modest sample size, which may have limited statistical power to detect significant associations. Larger multicentre cohort studies have reported that frailty, cumulative comorbidity burden, and disease activity are stronger predictors of adverse outcomes than any single chronic disease. (10) Therefore, comprehensive risk stratification incorporating frailty assessment, nutritional evaluation, and functional status may provide greater prognostic value than the presence of isolated comorbid conditions. The strengths of the present study include its prospective design, comprehensive

evaluation of frailty, functional status, nutritional status, comorbidities, and hospitalization outcomes, and its focus on a relatively under-researched geriatric population in India. However, certain limitations should be acknowledged. The study was conducted at a single tertiary care centre with a relatively small sample size, which may limit the generalizability of the findings. Furthermore, long-term follow-up data were unavailable, precluding assessment of disease recurrence, long-term survival, and sustained treatment response. Nevertheless, the study provides valuable real-world evidence regarding the clinical profile of hospitalized elderly patients with IBD and underscores the importance of integrating comprehensive geriatric assessment into routine gastroenterology practice.

CONCLUSION

This prospective cross-sectional study provides valuable insights into the clinical characteristics, frailty status, comorbidity burden, therapeutic management, and short-term hospitalization outcomes of geriatric patients with inflammatory bowel disease (IBD) admitted to a tertiary care teaching hospital. The findings demonstrate that elderly patients with IBD are characterized by a high prevalence of multimorbidity, particularly diabetes mellitus, hypertension, anaemia, chronic kidney disease, and cardiovascular disease, accompanied by substantial frailty and functional dependence. Ulcerative colitis was the predominant disease subtype, highlighting the disease pattern observed in this cohort. Despite the considerable burden of age-related comorbidities and frailty, favourable short-term hospital outcomes, including low intensive care unit admission rates and the absence of in-hospital mortality, were achieved through comprehensive inpatient management involving pharmacological therapy, nutritional support, and multidisciplinary care. The study emphasizes that successful management of IBD in older adults requires an individualized, patient-centred approach that extends beyond disease control to include routine frailty assessment, optimization of comorbid conditions, nutritional rehabilitation, and functional evaluation. Incorporating comprehensive geriatric assessment into routine clinical practice may improve risk stratification, therapeutic decision-making, and

overall patient outcomes. Although the findings are limited by the single-centre design and relatively small sample size, they contribute important real-world evidence from the Indian setting. Future multicentre, longitudinal studies with larger cohorts are warranted to validate these findings and develop evidence-based, age-specific management strategies for the growing population of elderly patients with inflammatory bowel disease.

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