

Geriatric Inflammatory Bowel Disease: A Prospective Assessment of Disease Characteristics, Frailty, Comorbidity and Hospital Outcomes

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Abstract

Background: Inflammatory bowel disease (IBD), mainly ulcerative colitis (UC) and Crohn's disease (CD), poses substantial challenges in older adults due to frailty, multimorbidity, functional decline, and complex medication regimens. This study evaluated the clinical profile, frailty, comorbidity burden, treatment patterns, nutritional support, and short-term hospital outcomes in older adults with IBD.

Methods: A prospective, hospital-based cross-sectional observational study was conducted among 81 consecutive hospitalized patients aged ≥ 60 years with confirmed IBD at a tertiary care teaching hospital. Demographic and clinical characteristics, IBD subtype, comorbidities, functional status, Clinical Frailty Scale (CFS), treatment, nutritional supplementation, and hospitalization outcomes were systematically recorded. Data were analyzed using descriptive statistics, Chi-square or Fisher's exact tests, with $p < 0.05$ considered significant.

Results: Among 81 patients, UC accounted for 85.2% of cases. Patients aged 70–79 years comprised 56.8%, and 56.8% were female. Diabetes mellitus (64.2%) and hypertension (60.5%) were the most common comorbidities, followed by anaemia (49.4%), cardiovascular disease (35.8%), chronic kidney disease (32.1%), and malnutrition (32.1%). Frailty was present in 63.0%, while only 35.8% remained functionally independent. Nutritional supplementation was provided to 56.8%. Mean hospitalization duration was 11.47 days; ICU admission occurred in 7.4% and 30-day readmission in 16.0%. No in-hospital deaths were recorded. Major complications included gastrointestinal bleeding, cardiovascular complications, and acute kidney injury.

Conclusion: Older adults with IBD demonstrate substantial frailty, multimorbidity, functional dependence, and nutritional vulnerability, highlighting the need for integrated geriatric assessment and individualized, multidisciplinary IBD management.

Keywords: Inflammatory Bowel Disease; Older Adults; Ulcerative Colitis; Frailty; Multimorbidity; Comorbidities; Functional Status; Hospital Outcomes; Geriatric Care.

Introduction

Inflammatory bowel disease (IBD) is a chronic, relapsing inflammatory disorder of the gastrointestinal tract, primarily comprising ulcerative colitis (UC) and Crohn's disease (CD). Although traditionally associated with younger populations, its clinical significance among older adults is increasingly recognized. Improved life expectancy, advances in diagnosis and treatment, and the emergence of late-onset disease have contributed to a growing population of older individuals living with IBD. Management in later life is complicated by age-related physiological vulnerability and a greater burden of chronic illness. (1,2)

The global burden of IBD has increased substantially, with more than seven million people estimated to be affected worldwide. Rising incidence in developing and newly industrialized regions has further increased its public health significance. (3) India has also experienced increasing rates of UC and CD, associated with urbanization, lifestyle changes, environmental influences, improved healthcare access, diagnostic facilities, and disease recognition. (4) Consequently, healthcare systems are managing an expanding population of older patients requiring prolonged treatment, often complicated by disease exacerbations and hospitalization.

IBD in older adults differs from that in younger patients because disease-related factors coexist with age-associated physiological changes. Immunosenescence, altered renal and hepatic function, changes in pharmacokinetics, and reduced physiological reserve can affect disease presentation and treatment response. Common age-related conditions, including diabetes, hypertension, cardiovascular disease, chronic kidney disease, osteoporosis, anaemia, and nutritional deficiencies, further increase clinical complexity. Polypharmacy also increases the risk of drug interactions, adverse drug reactions, therapeutic complications, and adherence difficulties. (5) Frailty, characterized by reduced physiological reserve and limited ability to withstand acute stress, represents an additional vulnerability. It may coexist with functional dependence and nutritional deterioration and can influence treatment tolerance, hospitalization recovery, complications, hospital stay, and healthcare utilization. However, frailty, functional capacity, and nutritional status are not consistently incorporated into routine IBD assessment.

Despite the increasing burden of IBD in India, evidence regarding the multidimensional health status of older hospitalized patients remains limited. (6) The present prospective cross-sectional observational study therefore evaluated demographic and clinical characteristics, frailty, functional and nutritional status, comorbidities, treatment patterns, and short-term hospitalization outcomes among geriatric IBD patients admitted to a tertiary care teaching hospital in South India. The study aims to provide broader insight into their healthcare needs and emphasize individualized, multidisciplinary management.

Materials and Methods

Study Design and Setting

A prospective, hospital-based, cross-sectional observational study was undertaken to comprehensively assess the clinical profile, frailty, comorbidity burden, treatment patterns, and short-term hospitalization outcomes of older adults with inflammatory bowel disease (IBD). The investigation was conducted in the Departments of Gastroenterology and General Medicine of a tertiary care teaching hospital in Erode, Tamil Nadu, India. The study was planned and reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) recommendations.

Study Participants

The study population comprised 81 consecutive hospitalized patients aged 60 years or older with a confirmed diagnosis of IBD. Patients were classified as having ulcerative colitis (UC) or Crohn's disease (CD) based on an integrated assessment of clinical presentation and relevant endoscopic, histopathological, and radiological findings. Patients were excluded if the diagnosis was infectious, ischemic, radiation-induced, microscopic, or indeterminate colitis. Individuals with terminal illness and an anticipated survival of less than one month, incomplete medical documentation, or unwillingness to participate were also excluded.

Ethical Approval

Prior to initiation, the study protocol received approval from the Institutional Ethics Committee. Written informed consent was obtained from each participant or, when appropriate, from an authorized representative. All study procedures were performed in accordance with the ethical principles outlined in the Declaration of Helsinki. Participant privacy, confidentiality, and anonymity were maintained throughout data collection, analysis, and reporting.

Data Collection and Clinical Assessment

Patient information was prospectively recorded using a structured, prevalidated Case Record Form (CRF). Data collected included demographic characteristics, IBD subtype and duration, presenting clinical features, history of previous hospital admissions, nutritional status, frailty, functional capacity, coexisting illnesses, pharmacological treatment, and hospitalization-related outcomes.

Nutritional status was evaluated using body mass index (BMI), recent unintentional weight loss, and clinical evidence of malnutrition. Frailty was assessed using the Clinical Frailty Scale (CFS). Functional capacity was determined according to the patient's ability to independently perform Activities of Daily Living (ADLs).

The comorbidity profile included diabetes mellitus, hypertension, cardiovascular disease, chronic kidney disease, anaemia, osteoporosis, malnutrition, depression, and anxiety. Details of IBD-directed and supportive treatment were also documented. Pharmacological therapies evaluated included mesalamine, corticosteroids, immunomodulators, biological agents, and antibiotics. The use of nutritional supplements and other supportive interventions was recorded whenever clinically indicated.

Study Outcomes

The principal study outcomes were the distribution of IBD subtypes, prevalence of major comorbidities, and degree of frailty among the study participants. Secondary outcomes included functional dependence, duration of hospitalization, requirement for intensive care unit (ICU) admission, 30-day hospital readmission, occurrence of in-hospital complications, and in-hospital mortality.

Statistical Analysis

Collected data were entered into Microsoft Excel and subsequently analyzed using statistical software. Continuous variables were summarized as mean $\pm$ standard deviation (SD) or median with interquartile range (IQR), as appropriate. Categorical variables were presented as frequencies and percentages. Associations between categorical variables were evaluated using the Chi-square test or Fisher's exact test,

depending on the expected cell frequencies. For continuous variables, comparisons were performed using Student's *t*-test or one-way analysis of variance (ANOVA), as appropriate.

Results

The study included 81 geriatric patients with inflammatory bowel disease (IBD), with a mean age of 71.54 ± 5.12 years. Among the participants, 30 (37.0%) were aged 60–69 years, 46 (56.8%) were aged 70–79 years, and 5 (6.2%) were aged ≥ 80 years. Females constituted the majority of the study population, with 46 (56.8%) participants, while 35 (43.2%) were males. A low socioeconomic status was observed in 50 (61.7%) participants. The mean body weight of the participants was 68.75 ± 9.81 kg, while the mean height was 159.83 ± 7.42 cm. The mean body mass index (BMI) was 23.85 ± 3.47 kg/m². Weight loss of more than 5% during the preceding six months was reported in 27 (33.3%) participants.

Regarding IBD subtypes, ulcerative colitis was the predominant condition, affecting 69 (85.2%) participants, whereas Crohn's disease was observed in 12 (14.8%) participants. The median duration of disease was 10 years. In terms of disease severity, 26 (32.1%) participants had mild disease, 28 (34.6%) had moderate disease, and 27 (33.3%) had severe disease.

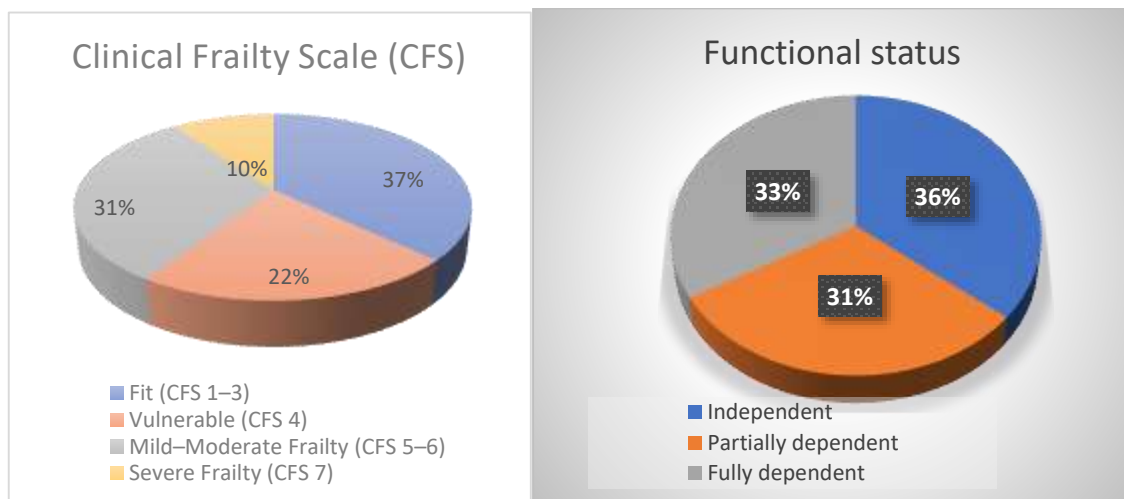


Fig 1. Frailty and Functional Status of Elderly Patients with IBD

Frailty assessment based on the Clinical Frailty Scale (CFS) indicated that 37.0% of participants were classified as fit (CFS 1–3). A further 22.2% were considered vulnerable (CFS 4), while 30.9% demonstrated mild-to-moderate frailty (CFS 5–6). Severe frailty (CFS 7) was identified in 9.9% of the study population. Overall, approximately two-thirds of the hospitalized older adults exhibited some degree of frailty.

Functional status assessment showed that only 35.8% of participants were completely independent in activities of daily living. Partial dependence was observed in 30.9% of patients, while 33.3% required complete assistance. These findings indicate a considerable burden of functional dependence among older adults hospitalized with inflammatory bowel disease (IBD).

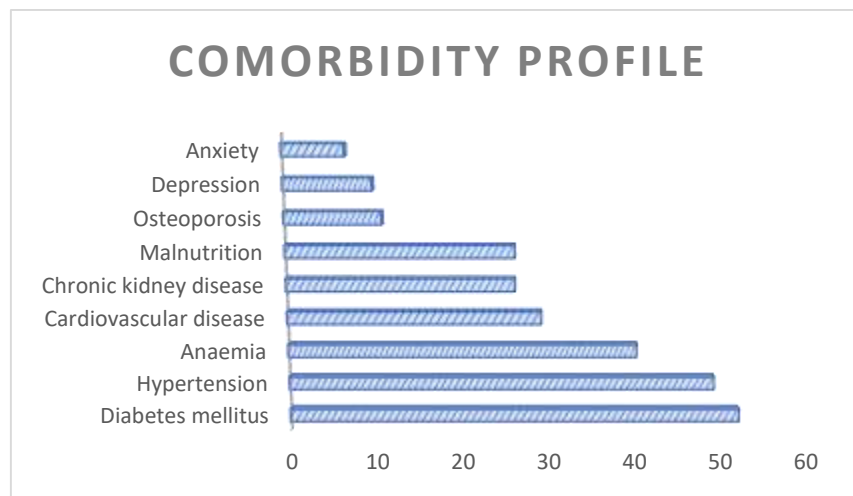


Fig 2. Comorbidity Profile among Geriatric Patients with Inflammatory Bowel Disease

A substantial burden of chronic comorbidities was observed among the study participants. Diabetes mellitus was the most commonly reported comorbidity, affecting 64.2% of patients, followed by hypertension in 60.5%. Cardiovascular disease and chronic kidney disease were present in 35.8% and 32.1% of participants, respectively. Among nutritional and hematological conditions, anaemia was identified in 49.4% of patients, while clinical malnutrition was observed in 32.1%. Osteoporosis was documented in 13.6% of the study population. With respect to psychological comorbidities, depression and anxiety were reported in 12.3% and 8.6% of participants, respectively. Overall, these findings demonstrate a considerable burden of multimorbidity among older adults with inflammatory bowel disease, underscoring the complex clinical needs of this population.

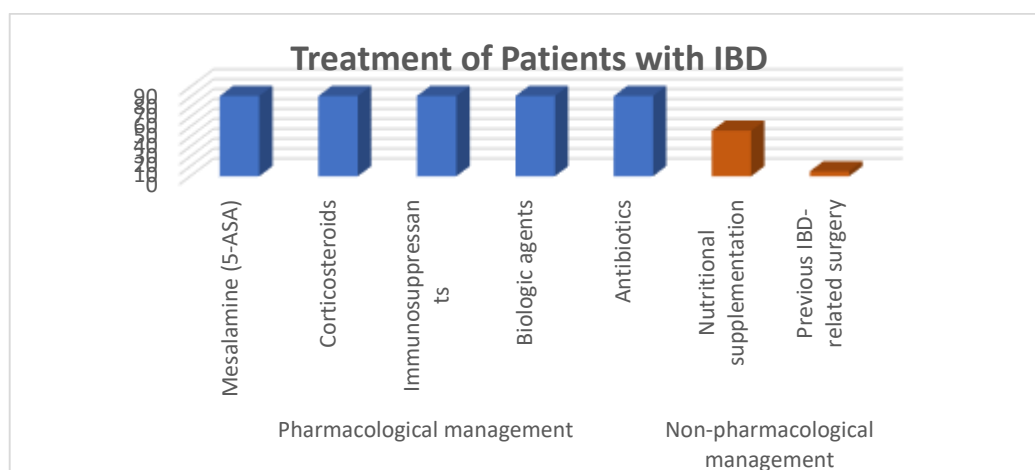


Fig.3: Pharmacological and Non-pharmacological Management of Patients with IBD

All participants received pharmacological treatment for active inflammatory bowel disease (IBD) during hospitalization. The therapeutic regimen comprised mesalamine (5-aminosalicylic acid), corticosteroids, immunosuppressive agents, biologic therapies, and antibiotics, as clinically indicated and in accordance with institutional treatment protocols. As part of comprehensive supportive management, 56.8% of patients also received nutritional supplementation. A history of previous IBD-related surgery was

documented in only 6.2% of participants, indicating that the majority of patients were managed conservatively through medical and supportive therapies during the study period.

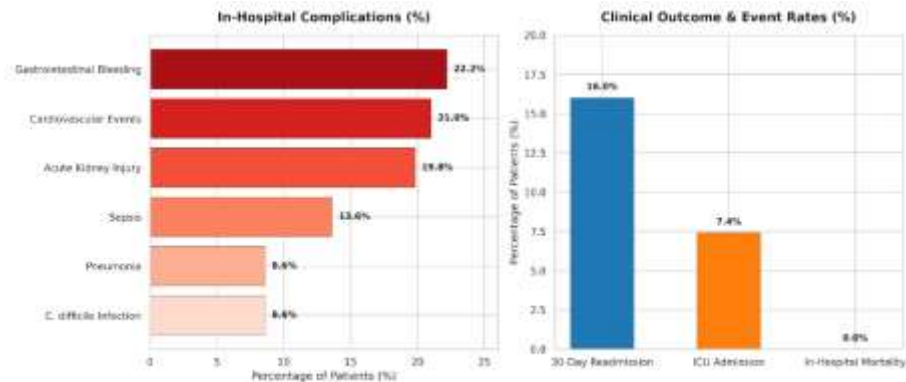


Fig 4. Hospital Outcomes and In-hospital Complications

The mean duration of hospitalization was 11.47 ± 4.32 days, with a median hospital stay of 12 days and a range of 3–20 days. ICU admission was required in 7.4% of patients. No in-hospital deaths were recorded during the study period. Following discharge, 16.0% of patients were readmitted within 30 days, indicating that approximately one in six patients experienced early rehospitalization. Gastrointestinal bleeding was the most frequently documented in-hospital complication, occurring in 22.2% of patients. Cardiovascular events were reported in 21.0% of patients, while acute kidney injury occurred in 19.8%. Sepsis was observed in 13.6% of the study population. Pneumonia and *Clostridioides difficile* infection were each reported in 8.6% of patients. Overall, the findings demonstrate a substantial burden of gastrointestinal, cardiovascular, and renal complications among hospitalized older adults with inflammatory bowel disease.

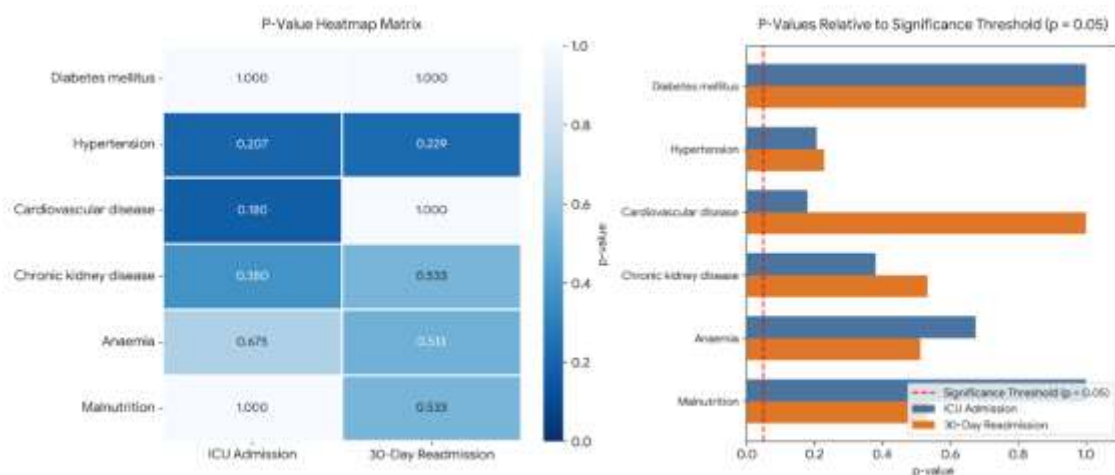


Fig 5. Association Between Major Comorbidities and Clinical Outcomes

The association between major comorbidities and hospitalization outcomes was assessed using the Chi-square test or Fisher's exact test, as appropriate. All evaluated p -values remain strictly above the standard significance threshold ($p > 0.05$), confirming no statistically significant association between any individual comorbidity and short-term clinical outcomes. Diabetes mellitus shows complete independence across both clinical endpoints ($p = 1.000$). Cardiovascular disease ($p = 1.000$) and malnutrition ($p =$

1.000) also demonstrate complete independence with 30-day readmission and ICU admission, respectively. These findings indicate that, within the present study cohort, none of the individual comorbid conditions examined was significantly associated with short-term adverse hospitalization outcomes.

Discussion

The present study provides a multidimensional assessment of inflammatory bowel disease (IBD) among hospitalized older adults, addressing disease characteristics, comorbidity burden, frailty, functional capacity, therapeutic management, nutritional support, and short-term hospital outcomes. The findings demonstrate substantial clinical complexity in geriatric IBD, where intestinal disease coexists with age-related vulnerability and multiple chronic conditions. The high prevalence of frailty and functional dependence emphasizes that chronological age alone may not adequately reflect the overall health status and healthcare needs of older patients with IBD. Management should therefore extend beyond suppression of intestinal inflammation to include broader geriatric and functional considerations.

The mean age of the cohort was 71.54 ± 5.12 years, with women comprising 56.8% of the study population. Ulcerative colitis (UC) was considerably more common than Crohn's disease (CD), accounting for 85.2% and 14.8% of cases, respectively. This distribution is consistent with observations from hospital-based studies involving older Asian populations, where UC has frequently been reported as the predominant IBD phenotype. (7) The predominance of UC may be influenced by regional epidemiological characteristics, environmental exposures, genetic factors, disease recognition, and healthcare referral patterns. Although UC in older adults may often follow a less aggressive course than CD, its clinical consequences remain important because of age-related physiological changes and coexisting medical conditions. (8)

A major finding was the extensive burden of multimorbidity. Diabetes mellitus was present in 64.2% of participants and hypertension in 60.5%, followed by anaemia (49.4%), cardiovascular disease (35.8%), chronic kidney disease (32.1%), and malnutrition (32.1%). This complex comorbidity profile creates challenges for IBD management by influencing treatment selection, dosing, tolerability, and susceptibility to adverse effects. 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. (9) Immunosuppressive treatment requires particular attention to infection risk, cardiovascular vulnerability, renal function, and potential drug interactions. Therefore, therapeutic decisions should be individualized according to overall health status, comorbidity burden, functional reserve, and anticipated treatment benefit rather than chronological age alone.

Frailty was another major component of vulnerability, with 63.0% of patients classified as frail and 37.0% as fit according to the Clinical Frailty Scale. Functional assessment also demonstrated reduced physiological and functional reserve, with a substantial proportion requiring partial or complete assistance with activities of daily living. Such impairment may affect treatment adherence, nutritional intake, rehabilitation, and recovery following acute illness. These findings are consistent with recent systematic reviews and nationwide cohort studies, which indicate that frailty is an increasingly recognized independent predictor of adverse clinical outcomes in patients with IBD, including hospitalization, readmission, postoperative complications, and mortality. (10) Frailty represents biological vulnerability rather than simply chronological ageing, meaning that individuals of the same age may have markedly different capacities to tolerate an IBD flare, infection, surgery, or intensive pharmacological treatment.

Routine frailty assessment may therefore improve risk stratification and identify patients requiring enhanced supportive and multidisciplinary care.

Treatment patterns reflected the multifaceted nature of inpatient IBD management. Patients received disease-directed therapies, including mesalamine, corticosteroids, immunosuppressive agents, biologics, and antibiotics, according to clinical requirements and institutional practices. Nutritional supplementation was also provided to more than half of the cohort. In geriatric IBD, pharmacotherapy should be complemented by nutritional optimization, medication reconciliation, monitoring for polypharmacy-related problems, rehabilitation, prevention of treatment-related complications, vaccination where appropriate, and coordinated multidisciplinary care.

Despite the considerable burden of frailty and multimorbidity, short-term hospitalization outcomes were relatively favourable. The mean hospital stay was 11.47 ± 4.32 days, ICU admission occurred in 7.4% of patients, and the 30-day readmission rate was 16.0%. No in-hospital deaths were recorded. Gastrointestinal bleeding, cardiovascular events, and acute kidney injury were the principal complications. These findings suggest that timely assessment and appropriate disease-directed and supportive management may help prevent progression to severe adverse outcomes. Previous studies have likewise demonstrated that optimized inpatient management can improve short-term clinical outcomes, despite the greater vulnerability of older adults with IBD. (11) The absence of in-hospital mortality may potentially reflect early recognition of complications, appropriate treatment, and multidisciplinary supportive care.

No statistically significant relationship was observed between individual major comorbidities and ICU admission or 30-day readmission. This does not indicate that comorbidities are clinically unimportant; rather, the small sample size and limited number of adverse outcomes may have reduced statistical power. Large multicentre cohort studies have similarly shown that frailty, overall comorbidity burden, and disease activity are stronger predictors of adverse outcomes than any individual chronic condition. (12) Moreover, cumulative multimorbidity, frailty, functional impairment, nutritional status, and disease severity may be more informative than individual comorbidities considered separately. A comprehensive assessment incorporating these domains may therefore provide better representation of patient vulnerability.

The study has several strengths, including its prospective design and systematic evaluation of disease characteristics, frailty, functional status, nutritional vulnerability, comorbidities, treatment patterns, and hospital outcomes. It also contributes real-world evidence from an Indian tertiary care setting, where multidimensional data on hospitalized older adults with IBD remain limited. However, the single-centre setting and relatively small sample size may limit generalizability and statistical power. The absence of long-term follow-up also prevented assessment of disease relapse, sustained treatment response, functional decline, and post-discharge mortality. Future multicentre studies with larger cohorts and longer follow-up are warranted to clarify the prognostic significance of frailty, multimorbidity, nutritional status, and functional impairment.

Overall, these findings reinforce that IBD in older adults should be approached as a complex geriatric condition rather than solely an inflammatory gastrointestinal disorder. Integrating geriatric assessment into routine IBD care may support individualized treatment decisions, identify high-risk patients, and potentially reduce complications and healthcare utilization. Further prospective multicentre research is needed to establish effective age-sensitive management strategies and determine their impact on long-term outcomes.

Conclusion

This prospective cross-sectional study demonstrates substantial clinical and geriatric complexity among hospitalized older adults with inflammatory bowel disease (IBD). Multimorbidity, particularly diabetes mellitus, hypertension, anaemia, cardiovascular disease, and chronic kidney disease, was common and accompanied by high rates of frailty, functional impairment, and nutritional vulnerability. Ulcerative colitis was the predominant IBD subtype. Despite this considerable burden, short-term hospital outcomes were generally favourable, with low ICU admission and no in-hospital mortality, potentially reflecting timely pharmacological treatment, nutritional support, and multidisciplinary care. Management of IBD in older adults should therefore extend beyond disease control to include systematic assessment of frailty, functional status, nutrition, and comorbidities. Comprehensive geriatric assessment may support individualized treatment, improve risk stratification, and reduce complications. Although limited by its single-centre design and small sample size, this study provides useful real-world evidence from India. Larger multicentre longitudinal studies are warranted to validate these findings and develop age-specific management strategies.

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