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Clinical and sociodemographic aspects of inflammatory bowel disease patients

Meenakshi Gururani[1], Joshi SC[2], Arun Joshi[3], Aishwary Bajpai[4]

[1]Postgraduate Resident, [2,3]Professor, [4]Senior Resident, Department of Medicine, Government Medical College, Haldwani, Uttarakhand, India

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ABSTRACT

Background: Inflammatory bowel disease (IBD), including ulcerative colitis (UC) and Crohn's disease (CD), is a chronic gastrointestinal condition with rising prevalence in India. The Kumaon region of Uttarakhand faces an increasing burden of IBD, yet data on its clinical and sociodemographic characteristics remain scarce. This study aims to explore these aspects to improve diagnosis, treatment, and outcomes in this under-researched population. **Aims and Objectives:** The study aimed to investigate the clinical and sociodemographic characteristics of IBD patients in the Kumaon region. Key objectives included identifying disease patterns, clinical features, complications, and treatment practices to enhance understanding and management of IBD. **Materials and Methods:** This cross-sectional, observational study was conducted from December 2022 to June 2023 at a tertiary care center. Fifty histologically confirmed IBD patients were included. Data on demographic details, clinical presentation, laboratory findings, and treatment were collected and analyzed using SPSS. **Results:** A slight female predominance (52%) was observed, with a mean age of 39.38 years. UC was the predominant subtype (86%), with CD accounting for 12%. Key symptoms included diarrhea (98%), rectal bleeding (52%), and abdominal pain (48%). Anemia was prevalent in 70%, and 36% had extraintestinal manifestations. Treatment was mainly mesalamine (96%) and glucocorticoids (52%), with limited use of biologics (2%). **Conclusion:** IBD poses a significant health burden in Kumaon, with UC being the predominant subtype. Early diagnosis, comprehensive treatment, and improved access to advanced therapies are essential to address this growing concern.

Key words: Inflammatory bowel disease; Ulcerative colitis; Crohn's disease; Kumaon region

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INTRODUCTION

Inflammatory bowel disease (IBD) is a chronic, systemic autoimmune condition characterized by relapsing and remitting inflammation of the gastrointestinal (GI) tract. It primarily comprises two major subtypes: Ulcerative colitis (UC), which involves diffuse inflammation of the colonic mucosa, and Crohn's disease (CD), marked by transmural inflammation that can affect any part of the GI tract but most commonly impacts the terminal ileum and colon. A third category, IBD undifferentiated or indeterminate colitis, is also recognized.[1] These conditions manifest with symptoms such as abdominal pain, diarrhea, bloody stools, weight loss, and systemic inflammation driven by cytokines, proteolytic enzymes, and free radicals.

IBD has a bimodal distribution, with peak onset between the ages of 15–30 years and a second smaller peak after age 60. While traditionally more prevalent in Western countries, the incidence of IBD has been accelerating in newly industrialized nations, including India, where it poses a growing public health challenge.[2] The Kumaon region of

Address for Correspondence:
Dr. Meenakshi Gururani, Postgraduate Resident, Department of Medicine, Government Medical College, Haldwani, Uttarakhand, India.
Mobile: +91-9760683395. **E-mail:** mgururani2395@gmail.com

Uttarakhand, India, has seen a significant burden of IBD; however, comprehensive data on its clinical presentation and sociodemographic distribution are lacking.

The etiology of IBD involves a complex interplay of genetic predisposition, environmental factors, and a dysregulated immune response to intestinal microbiota.[3] These mechanisms lead to the disruption of intestinal barrier integrity, facilitating chronic inflammation and extraintestinal manifestations such as arthritis, uveitis, erythema nodosum, and ankylosing spondyloarthropathy. Diagnosis is typically made through a combination of clinical presentation, laboratory markers (e.g., C-reactive protein [CRP], fecal calprotectin), imaging, endoscopic findings, and histopathological confirmation.

Management of IBD focuses on controlling inflammation and achieving mucosal healing through pharmacotherapy, including aminosalicylates, corticosteroids, immunomodulators, and biologics, alongside surgical intervention in severe cases. Despite these advancements, many patients fail to achieve long-term remission, necessitating newer therapeutic strategies and tailored approaches. IBD represents a multifactorial disease influenced by genetic susceptibility, environmental triggers, and immune dysregulation, making its diagnosis and management particularly complex.

IBDs encompass a group of chronic inflammatory disorders affecting the GI tract, with CD and UC being the two most common forms.[4] These conditions are characterized by relapsing and remitting inflammation that can result in significant morbidity and reduced quality of life. While CD predominantly affects the terminal ileum and colon, it can involve any part of the digestive tract, from the mouth to the anus, with inflammation extending through the entire bowel wall. UC, in contrast, is confined to the mucosal layer of the colon and rectum, causing diffuse inflammation and ulceration.

The clinical manifestations of CD and UC vary by disease location and severity. CD often presents with right lower quadrant abdominal pain, diarrhea, low-grade fever, and weight loss. Over time, persistent inflammation can lead to complications such as fibrostenotic strictures or penetrating fistulas, requiring distinct treatment strategies. In UC, symptoms include diarrhea, rectal bleeding, tenesmus, and abdominal pain, with disease severity correlating to the extent of colonic involvement. Unlike CD, UC is commonly associated with bloody stools and rectal bleeding.

Both diseases share systemic effects such as malnutrition and weight loss, arising from impaired nutrient absorption or reduced dietary intake. CD frequently leads to folate and Vitamin D deficiencies due to small intestinal involvement, whereas iron deficiency anemia is common in UC patients due to chronic blood loss. These nutritional deficiencies highlight the systemic impact of IBD on patient health.

Despite similarities in clinical presentation, CD and UC have distinct pathophysiological and anatomical characteristics, which necessitate different approaches to management and prognosis. This study aims to further explore the clinical patterns, complications, and sociodemographic aspects of IBD to enhance diagnostic accuracy and guide effective treatment strategies.

Aims

To investigate the clinical and sociodemographic characteristics of inflammatory bowel disease (IBD) patients in the Kumaon region to enhance understanding, diagnosis, and management of the disease.

Objectives

- To analyze the clinical presentation, including predominant symptoms and disease severity.
- To identify common complications and extraintestinal manifestations associated with IBD.

Table 1: Distribution of study participants based on clinical features

Clinical features	Number	Percentage
Pain abdomen	24	48
Diarrhea	49	98
Fever	5	10
Weight loss	15	30
Bleeding per rectum	26	52
Loss of appetite	14	28

Table 2: Distribution of Crohn's disease patients based on CDAI score

CDAI score	Severity	Number
<150	Remission	0
150–219	Mildly active disease	0
220–450	Moderately active disease	4
450	Severe disease	2

CDAI: Crohn's disease activity index

Table 3: Distribution of patients based on complications

Complications	Number	Percentage
Toxic megacolon	1	2
Perforation	1	2
Stricture	4	8
Anal fissure	0	0
Perianal disease	2	4
Pelvic abscess	0	0

- To evaluate the treatment patterns and response to different therapeutic strategies.

MATERIALS AND METHODS

This cross-sectional, observational, hospital-based study was conducted at the Government Medical College and associated with Dr. Susheela Tiwari Government Hospital, Haldwani, Uttarakhand, to analyze the clinical and sociodemographic aspects of IBD patients.

Inclusion criteria

Patients eligible for this study will include individuals diagnosed with IBD who are above 16 years of age. Both male and female patients will be considered for participation. Only those with a histologically confirmed diagnosis of IBD will qualify. In addition, participants must be willing to actively participate in the study and provide informed consent.

Exclusion criteria

Patients will be excluded from the study if they are unwilling to provide consent or are unable to comply with the study protocol. Individuals with a history of major psychotic illness will not be included. Furthermore, patients below the age of 16 years will be excluded from participation vide letter no 678/GMC/IEC/2022/Reg. No. 668 IEC/R-20-11-2022 dated January 12, 2023.

Data collection involved recording detailed information about sociodemographic variables such as age, gender, residence, education level, and socioeconomic status, as well as risk factors such as smoking, alcohol use, and dietary habits. Clinical data were documented, including the duration and severity of symptoms, disease classification, and associated complications. The Montreal classification system was employed to determine the extent and severity of UC, while both the Vienna and Montreal classifications were used for CD.

Ethical approval for the study was obtained from the Institutional Ethical Committee of the Government Medical College, Haldwani, vide letter no 678/GMC/IEC/2022/Reg. No. 668 IEC/R-20-11-2022 dated January 12, 2023. Written informed consent was obtained from all participants before enrollment, ensuring that they were fully informed about the purpose, procedures, and potential risks of the study. Confidentiality was maintained throughout the research process, and all information was securely handled.

Statistical analysis was performed using SPSS, with data compiled in MS Excel. Categorical variables were analyzed using the Chi-square tests, whereas continuous variables were compared using t-tests and analysis of variance. Pearson's correlation coefficient was employed to assess relationships between variables. Results were considered statistically significant at a $P \leq 0.05$ and highly significant at a $P \leq 0.01$. This comprehensive methodology was designed to provide robust insights into the clinical and sociodemographic aspects of IBD in this patient population.

RESULTS

The study aimed to explore the sociodemographic profile, clinical features, and laboratory parameters of patients diagnosed with IBD at the Government Medical College and Dr. Susheela Tiwari Government Hospital, Haldwani, Uttarakhand, from December 2022 to June 2023. A total of 50 patients diagnosed with IBD were included in the study, consisting of 26 females (52%) and 24 males (48%), with a mean age of 39.38 ± 15.77 years. The age distribution revealed that the largest proportion of patients (28%) were in the >50 years age group, followed by 22% in the 21–30 and 31–40 years age groups. This suggests that IBD affects a wide range of age groups, including older individuals, which contrasts with the commonly known prevalence in the younger population. This is presented in Figure 1.

Regarding residence, 54% of the participants resided in urban areas, whereas 46% came from rural areas. This distribution highlights the urban–rural demographic mix of IBD cases in this region, with a slightly higher percentage of urban dwellers. Sociodemographically, a significant portion of patients had at least a high school education (66%), with 34% holding a graduate degree. This indicates that patients with higher educational levels may be more likely to seek medical care, as education is often associated with greater health awareness.

Regarding socioeconomic status, as depicted in Figure 2, the majority of participants belonged to middle (42%) or upper-middle (36%) socioeconomic groups, which aligns with previous studies suggesting a positive correlation

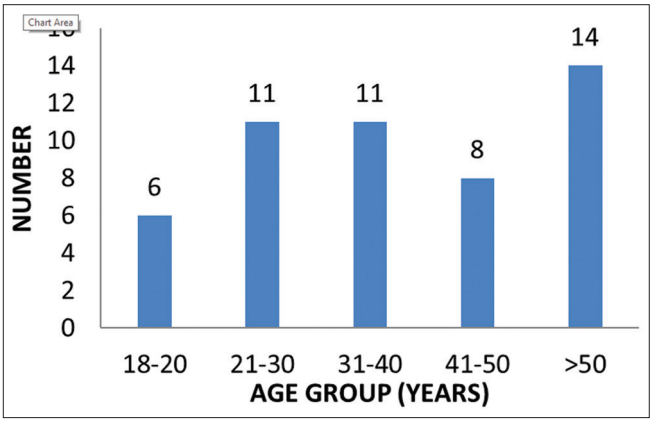

Figure 1: Age-distribution of study

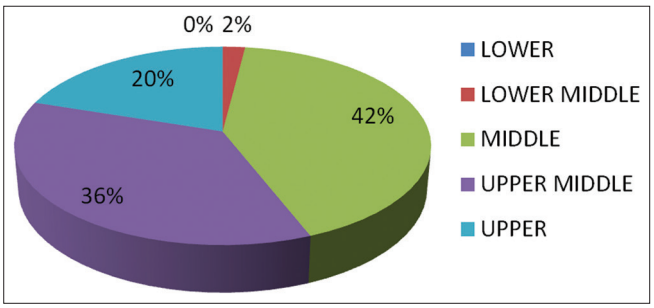

Figure 2: Distribution of study participants based on socioeconomic

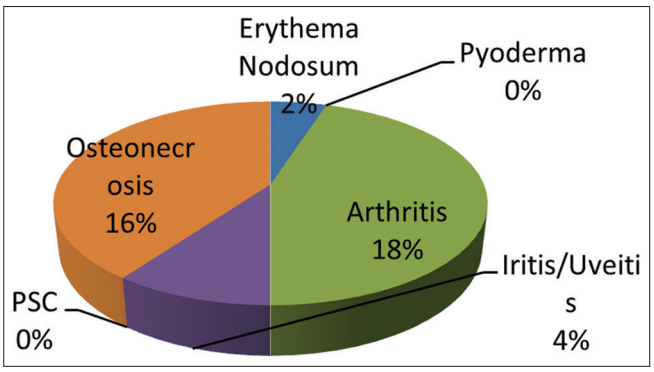

Figure 3: Distribution of patients based on extraintestinal manifestation

between socioeconomic status and IBD prevalence. Patients from middle and upper socioeconomic classes often have better access to specialized health-care services, including gastroenterology clinics where IBD is typically diagnosed and managed. This could lead to higher rates of diagnosis and follow-up in these groups.

Table 1 represents the clinical presentation of IBD was dominated by diarrhea, reported in 98% of patients, followed by rectal bleeding (52%) and abdominal pain (48%). These findings are consistent with the clinical features commonly seen in IBD, where diarrhea and rectal bleeding are hallmark symptoms. Weight loss (30%) and loss of appetite (28%) were also prevalent, which is typical of IBD due to malabsorption and nutritional deficiencies. The presence of fever (10%) was relatively low but still noteworthy, indicating a systemic inflammatory response in some patients. These results align with findings from other studies, such as those by Shamkh et al.,[5] where diarrhea and bleeding per rectum were the most frequent symptoms in UC and CD patients.

Table 2 which depicts distribution of Crohn's disease patients based on the Crohn's Disease Activity Index (CDAI) score, indicates that none of the patients were in remission or had mildly active disease. The majority (four patients) had moderately active disease, while two patients had severe disease with a CDAI score above 450. This suggests that Crohn's disease cases in the study population were predominantly in the moderate to severe range, highlighting the need for intensive disease management. The absence of patients in remission may indicate delayed diagnosis, inadequate treatment response, or limited access to advanced therapies such as biologics.

As represented in Figure 3, Extraintestinal manifestations were observed in 36% of patients, with arthritis (18%) and osteonecrosis (16%) being the most common. This emphasizes the systemic nature of IBD and its potential to affect joints and bones, as also noted by de Brito et al.[6] The incidence of extraintestinal manifestations in this study was lower than that seen in Western populations but still highlights the need for multidisciplinary management of IBD patients, addressing not only GI but also musculoskeletal and other systemic concerns.

In terms of laboratory findings, anemia was highly prevalent, with 32% of patients presenting with life-threatening anemia, 30% with moderate anemia, and 28% with severe anemia. This high prevalence of anemia is consistent with the findings of other studies, where IBD patients often suffer from iron deficiency due to chronic blood loss or malabsorption. Thrombocytosis was observed in 36% of cases, and all study participants had elevated CRP, indicating active inflammation in IBD patients. Elevated fecal calprotectin levels were found in 52% of participants (50–200 μg/mg range), which further supports the active nature of the disease in these patients. These laboratory markers are crucial for assessing disease activity and guiding treatment decisions, as suggested by recent literature on the role of inflammatory markers in IBD management.[7] These parameters are presented in four panels of Figure 4.

The majority of patients (86%) were diagnosed with UC, with the remaining 12% diagnosed with CD and 2% with unclassified IBD. The distribution of UC severity, based on the Montreal classification, showed that most patients had left-sided colitis (E2), followed by pancolitis (E3), which is a typical pattern in UC (Figure 5). Among the CD patients, the majority had moderately active disease, and 34% had severe disease, indicating that while CD cases were less frequent, they tended to be more severe in nature.

Treatment patterns revealed that 96% of patients were treated with mesalamine (5-ASA), which is the first-line therapy for IBD. Glucocorticoids were used in 52% of patients, whereas azathioprine was used in 22% and antibiotics in 34%. Only a small proportion of patients received biological therapies (2%) or underwent surgery (2%), suggesting that these advanced treatment options are not yet widely utilized in this setting. This is reflective of the resource constraints in rural areas, where access to

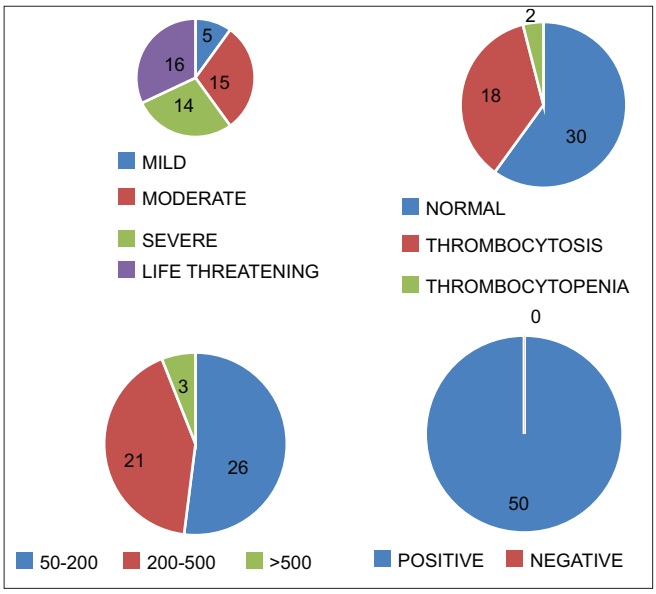

Figure 4: Distribution of study participants based on grade of anemia, AQ6 platelet count, fecal calprotectin, and C-reactive protein

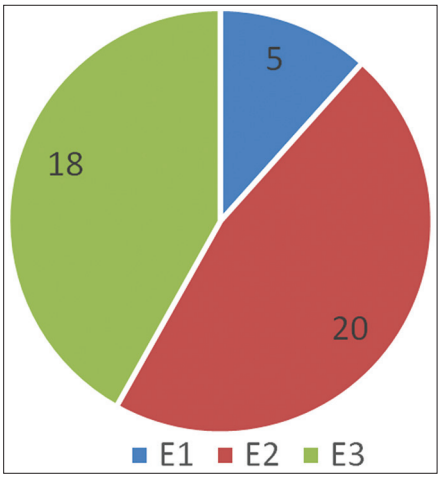

Figure 5: Distribution of ulcerative colitis patients based on Montreal classification

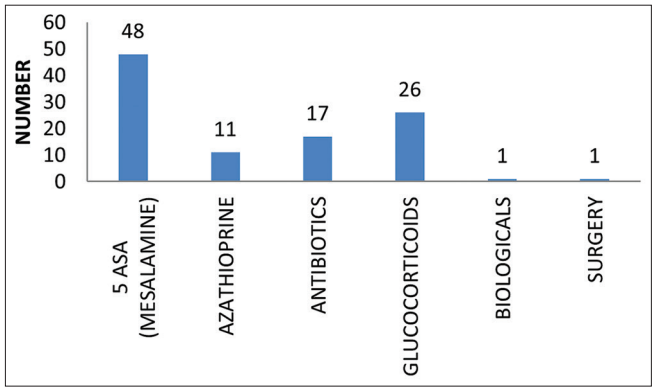

Figure 6: Distribution of patients based on treatment

newer biologics and surgical interventions may be limited. The predominance of mesalamine and corticosteroids aligns with global treatment practices for IBD, which often involve anti-inflammatory agents to control disease activity. This is depicted in Figure 6. Combination therapies, including mesalamine and glucocorticoids, were frequently employed to achieve better symptom control and reduce disease flares in moderate-to-severe cases. The limited use of biologics highlights the need for improved health-care infrastructure and access to advanced treatment modalities in resource-constrained settings.

In terms of complications as represented by Table 3, stricture was the most common (8%), followed by perianal disease (4%), which is consistent with the known complications of CD. Other complications, such as toxic megacolon and perforation, were rare but indicate the potential severity of untreated or poorly managed IBD cases.

Overall, the findings of this study align with global trends in IBD epidemiology, highlighting the significant impact of this chronic disease on both the GI and systemic health of patients. The higher prevalence of UC, the frequent presence of anemia, and the varied clinical manifestations underline the need for early diagnosis, effective treatment, and continuous monitoring of IBD patients.[8] Moreover, the observed sociodemographic characteristics, such as higher education levels and socioeconomic status, emphasize the role of awareness and health-care access in the diagnosis and management of IBD.

DISCUSSION

The findings of this study provide valuable insights into the clinical and sociodemographic characteristics of IBD patients in the Kumaon region, highlighting both global patterns and regional distinctions. A slight female predominance (52%) and a mean patient age of 39.38 years align with the bimodal age distribution typically observed in IBD. Notably, the urban predominance (54%) suggests the influence of environmental and lifestyle factors or better health-care access in urban settings. Furthermore, the higher prevalence of IBD among middle and upper socioeconomic groups (78%) underscores the role of education and economic status in health-care-seeking behavior and disease recognition.

The clinical presentation of IBD patients was dominated by diarrhea (98%), rectal bleeding (52%), and abdominal pain (48%), consistent with hallmark symptoms of the disease. Extraintestinal manifestations, such as arthritis (18%) and osteonecrosis (16%), emphasize the systemic nature of IBD and the need for multidisciplinary care. Laboratory findings revealed anemia in 70% of patients, with 32%

suffering from life-threatening anemia, highlighting the burden of chronic inflammation and malabsorption. Universal elevation of CRP across participants confirmed active disease, with fecal calprotectin levels further supporting this finding.

Therapeutic strategies were largely consistent with standard practices, with mesalamine (96%) and glucocorticoids (52%) being the mainstay of treatment. However, the limited use of biologics (2%) points to significant resource constraints and limited access to advanced therapies, reflecting the challenges of health-care delivery in resource-constrained settings. Complications, including strictures (8%) and perianal disease (4%), were observed, reinforcing the importance of timely and comprehensive disease management to prevent severe outcomes.

The findings also highlight the influence of sociodemographic factors, such as urban residence, higher socioeconomic status, and education, on disease prevalence and health-care access. These insights call for targeted interventions to improve awareness, early diagnosis, and equitable access to advanced treatments. While the results align with global trends, unique regional aspects, such as the limited use of biologics and specific patterns of extraintestinal manifestations, underscore the need for region-specific strategies. Future research should focus on the genetic and environmental determinants of IBD in this population and assess the long-term efficacy of current treatment modalities to further improve patient outcomes.

Limitations of the study

The small sample size and single-center design may limit the generalizability of the findings. Its cross-sectional nature prevents assessment of disease progression and long-term outcomes. Recall bias may affect the accuracy of patient-reported data. The study also lacked extensive use of advanced genetic and molecular diagnostics and had limited data on biologic therapies.

CONCLUSION

This study highlights the clinical and sociodemographic characteristics of IBD patients in the Kumaon region of Uttarakhand. The findings confirm UC as the predominant subtype, with diarrhea, rectal bleeding, and abdominal pain being the most frequent clinical presentations. Extraintestinal manifestations, such as arthritis and osteonecrosis, and high rates of anemia further underline the systemic burden of IBD. Treatment patterns, dominated by mesalamine and glucocorticoids, reflect standard practices but also reveal limited access to biologics and advanced therapies in this region.

This study contributes region-specific data on the clinical features and sociodemographic profile of IBD patients in an under-researched population. It emphasizes the role of education and socioeconomic status in health-care access and disease management, highlights the systemic impact of IBD, and identifies critical gaps in advanced therapeutic availability. These insights can guide targeted interventions, resource allocation, and future research to improve patient outcomes and health-care delivery in similar settings.

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Authors' Contributions:
MG- Literature survey, prepared the first draft of the manuscript, implementation of the study protocol, data collection, data analysis, manuscript preparation and submission of the article; **JSC**- Design of study and review manuscript; **AJ**- Review manuscript; **AB-** Coordination and manuscript revision.

Work attributed to:
Department of Medicine, Government Medical College, Haldwani, Uttarakhand, India.

Orcid ID:
Meenakshi Gururani- https://orcid.org/0009-0005-2743-1462
Joshi SC- https://orcid.org/0009-0003-7192-0939
Arun Joshi- https://orcid.org/0009-0006-3281-3470
Aishwary Bajpai- https://orcid.org/0009-0001-1614-0599

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