

## ORIGINAL ARTICLE

## To evaluate severity among IBD (Inflammatory Bowel Disease) patients presenting at a Tertiary Care Hospital of Karachi, Pakistan.

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**ABSTRACT... Objective:** To determine the disease severity and associated factors among patients having inflammatory bowel disease (IBD). **Study Design:** Cross-sectional study. **Setting:** Department of Gastroenterology, Liaquat National Hospital, Karachi, Pakistan. **Period:** February 2024 to July 2024. **Methods:** A total of 146 patients aged 18-65 years with a confirmed IBD diagnosis for  $\geq 6$  months were analyzed. Data on demographics, disease characteristics, and IBD type were recorded. Crohn's disease (CD) severity was assessed using the Harvey-Bradshaw Index. Ulcerative colitis (UC) severity was evaluated with the Mayo Score. Statistical analysis was done using SPSS v26.0, applying chi-square or Fisher's exact test with significance set at  $p < 0.05$ . **Results:** Among 146 study subjects, 66 (45.2%) were males, and 80 (54.8%) females, with a mean age of  $39.64 \pm 14.79$  years. The study revealed that 20 (13.7%) patients had CD, out of which 12 (60.0%) had moderate disease severity. Among IBD patients, 126 (86.3%) were having UC, out of which, 74 (58.7%) had moderate disease severity. Level of education ( $p=0.009$ ), occupation ( $p=0.011$ ), length of the disease ( $p=0.003$ ), and marital status ( $p=0.012$ ) had significant association with CD severity. Gender ( $p=0.757$ ), age groups ( $p=0.340$ ), and socio-economic status ( $p=0.189$ ) were not having significant association with CD severity. **Conclusion:** Moderate disease severity is the most prevalent category among IBD patients attending a tertiary care center in Karachi, Pakistan. Disease severity in CD was significantly associated with education, occupation, disease duration, and marital status, while UC severity correlated with age, education, occupation, and socioeconomic status.

**Key words:** Crohn's Disease, Harvey-Bradshaw Index, Inflammatory Bowel Disease, Mayo Score, Ulcerative Colitis.

### INTRODUCTION

Inflammatory bowel disease (IBD) is a chronic and progressive intestinal illness that includes Crohn's disease (CD) and ulcerative colitis (UC).<sup>1</sup> The progression of the illness might vary greatly from a relatively slow progression of the sickness to a considerable morbidity, needing hospitalization and surgery.<sup>2,3</sup> Those who suffer from IBD also have greater rates of stress, anxiety, and depression.<sup>4,5</sup> The course of IBD is marked by symptoms such as diarrhea, stomach discomfort, rectal bleeding, fecal urgency, and incontinence or lethargy. This condition is characterized by a heterogeneous, relapsing, and remitting form of the disease. Anemia, perianal fistulae, colorectal cancer, and intestinal failure are some of the other diseases that may be caused by IBS.<sup>6,7</sup>

Although the prevalence of IBD differs from country to country, CD and UC have both become illnesses that are prevalent all over the globe.<sup>8</sup> Sedentary lifestyle, greater exposure to ultra-processed food, tobacco, stress, and air pollution could be some of the factors behind IBD.<sup>9,10</sup> Montgomery et al suggested that environmental factors play a role in revealing the genetic predisposition to the disease.<sup>11</sup> The current approaches for assessing IBD, the primary emphasis, are on assessing the inflammatory activity of the gut by means of endoscopic and radiographic indices and biomarkers.<sup>12,13</sup> On the other hand, in order to determine the total severity of the illness, holistic and patient-centered therapy necessitates the incorporation of a multitude of indicators.<sup>14</sup> In the field of IBD, there is a deficiency in the availability of validated methods that can accurately predict

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the future course of the illness by taking into account both disease-related variables and patient-related factors.<sup>2</sup> This study was planned with the objective of determining the disease severity among patients having IBD at a tertiary care hospital.

## METHODS

This cross-sectional study was conducted in the Department of Gastroenterology at Liaquat National Hospital, Karachi, Pakistan, from February 2024 to July 2024. Prior approval was obtained from “Institutional Ethical Review Committee” (letter no. 0987-2023-LNH-ERC, dated January 10, 2024). The sample size was calculated as 146 using the OpenEPI online calculator, based on an anticipated prevalence of IBD of 10.5%, with a 95% confidence level and 5% margin of error. A non-probability sequential sampling technique was used. Inclusion criteria were patients of any gender, aged 18-65 years, and diagnosis of IBD for at least six months. Exclusion criteria included patients with diagnosed psychiatric conditions (e.g., depression, bipolar disorder), those using antidepressants or antipsychotics, and individuals with a history of alcohol or illicit drug abuse. Written informed consent was obtained after participants were briefed about the study.

Demographic details collected included gender, age, categorized age groups, residence, educational level, occupation, socioeconomic status, and marital status. Information about disease duration, and IBD type (CD or UCs) were documented. The “Harvey-Bradshaw Index (HBI)” was used to assess CD activity. Patients were classified as in remission (HBI <5), having mild (5–7), moderate (8–16), or severe disease (>16). “Mayo Score” was used to assess UC severity, while score ranged between 0-12. Disease activity was classified as mild (3 to 5), and moderate to severe (6 and 12). Remission was defined as complete symptom resolution, including normal stool frequency, no rectal bleeding, a corticosteroid-free interval, and normal or healing mucosa on endoscopy. All data were collected by trained personnel using a structured, predesigned proforma.

Statistical analysis was performed using “IBM-SPSS Statistics version 26.0”. Qualitative variables were reported as frequencies and percentages, while quantitative variables were presented as means with standard deviation (SD). Stratified tables were constructed to evaluate the effect of modifiers on disease severity. Post-stratification chi-square or Fisher’s exact tests were applied, with  $p < 0.05$  considered statistically significant.

## RESULTS

Among 146 study subjects, 66 (45.2%) were males. The mean age was  $39.64 \pm 14.79$  years. Patients who belonged to the age group  $\leq 35$  years were 71 (48.6%). In terms of educational attainment, 55 (37.7%) held a bachelor’s degree, and 23 (15.8%) possessed a master’s degree. Regarding employment status, 46 (31.5%) were housewives, 28 (19.2%) were employed in the private sector, and 36 (24.7%) were business owners. From middle socioeconomic status, there were 116 (79.5%) patients. The marital status indicated that 73.3% of individuals were married (Table-I).

The study revealed that 20 (13.7%) patients had CD, out of which 12 (60.0%) had moderate disease severity. Among IBD patients, 126 (86.3%) were having UC, out of which, 74 (58.7%) had moderate disease severity (Figure-1).

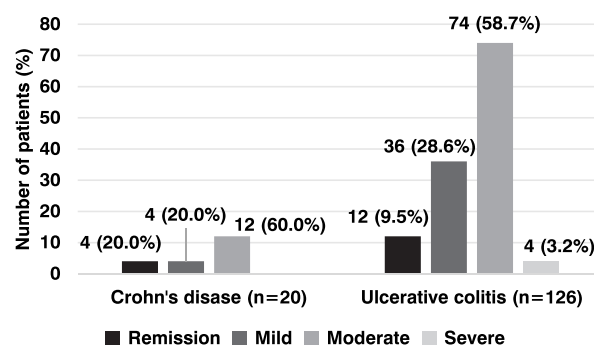


Figure-1. Disease severity in IBD patients (N=146)

Level of education ( $p=0.009$ ), occupation ( $p=0.011$ ), length of the disease ( $p=0.003$ ), and marital status ( $p=0.012$ ) had significant association with CD severity. Gender ( $p=0.757$ ), age groups ( $p=0.340$ ), and socio-economic status ( $p=0.189$ ) were not having significant

association with CD severity (Table-II).

UC disease severity was noted to have significant with age groups ( $p=0.016$ ), education level ( $p=0.004$ ), occupation ( $p<0.001$ ), and socioeconomic status ( $p=0.043$ ), and the details are shown in Table-III.

| Characteristics          |                       | Frequency (%) |
|--------------------------|-----------------------|---------------|
| Gender                   | Male                  | 66 (45.2)     |
|                          | Female                | 80 (54.8)     |
| Age (years)              | ≤35 years             | 71 (48.6)     |
|                          | 36-50 years           | 35 (24.0)     |
|                          | >50 years             | 40 (27.4)     |
| Education level          | No formal education   | 6 (4.1)       |
|                          | Primary               | 2 (1.4)       |
|                          | Secondary             | 4 (2.7)       |
|                          | Matric/O levels       | 22 (15.1)     |
|                          | Intermediate/A levels | 34 (23.3)     |
|                          | Bachelors             | 55 (37.7)     |
|                          | Masters               | 23 (15.8)     |
| Occupation               | Unemployed            | 6 (4.1)       |
|                          | Student               | 18 (12.3)     |
|                          | House wife            | 46 (31.5)     |
|                          | Government job        | 10 (6.8)      |
|                          | Private job           | 28 (19.2)     |
|                          | Own business          | 36 (24.7)     |
|                          | Retired               | 2 (1.4)       |
| Socioeconomic status     | Lower                 | 24 (16.4)     |
|                          | Middle                | 116 (79.5)    |
|                          | Upper                 | 6 (4.1%)      |
| Marital status           | Married               | 107 (73.3)    |
|                          | Unmarried             | 39 (26.7)     |
| Disease duration (years) | ≤3 years              | 89 (61)       |
|                          | 4-10 years            | 45 (30.8)     |
|                          | >10 years             | 12 (8.2)      |

**Table-I. Demographic, socioeconomic, and clinical characteristics (n=146)**

## DISCUSSION

This study showed that 13.7% patients with IBD had CD, while UC was noted in 86.3% patients. Moderate disease severity was the most common in both CD (60%) and UC (58.7%) patients. The predominance of moderate disease severity in

both CD and UC in the present study mirrors the findings reported in the study by Zeeshan et al.<sup>16</sup>, where stress, dietary habits, and lifestyle factors were associated with symptom exacerbation in patients with gastrointestinal complaints. In the current study, disease severity in CD was significantly associated with education level ( $p=0.009$ ), occupation ( $p=0.011$ ), disease duration ( $p=0.003$ ), and marital status ( $p=0.012$ ). Similar associations with social determinants have been reported in the study by Wilson et al.<sup>15</sup>, which noted significant differences in symptom reporting and consultation patterns based on gender and psychosocial stressors in a large community-based cohort. The findings also align with those of Henriksen et al.<sup>17</sup>, who observed a high prevalence of IBS like symptoms in patients with UC even two decades after diagnosis. This supports the notion that persistent GI symptoms in IBD patients, particularly those in remission or with moderate activity, are influenced by both inflammatory and non-inflammatory factors. Muhammet et al.<sup>18</sup>, documented IBS like symptoms in 32% of UC and 35% of CD patients in remission, indicating that disease perception and symptom burden may not directly correspond with inflammatory markers, a notion further supported by the present findings where a significant portion of patients with moderate disease reported high symptom burden despite being under care.

The observed association between higher educational attainment and moderate CD severity in the current study might be attributed to increased health awareness and symptom reporting among educated individuals. A similar interpretation was proposed in the study by Mortensen et al.<sup>19</sup>, which utilized extracellular matrix (ECM) biomarkers and found that disease activity and tissue remodeling differed between UC and CD, suggesting that patient-reported outcomes must be interpreted alongside biochemical and histological markers. The increased reporting of symptoms among educated patients may reflect higher disease awareness or sensitivity to bodily changes.

| Characteristics      |             | Remission (n=4) | Mild (n=4) | Moderate (n=12) | P-Value |
|----------------------|-------------|-----------------|------------|-----------------|---------|
| Gender               | Male        | 2 (50.0%)       | 2 (50.0%)  | 4 (33.3%)       | 0.757   |
|                      | Female      | 2 (50.0%)       | 2 (50.0%)  | 8 (66.7%)       |         |
| Age (years)          | ≤35 years   | 2 (50.0%)       | 2 (50.0%)  | 3 (25.0%)       | 0.340   |
|                      | 36-50 years | 2 (50.0%)       | 2 (50.0%)  | 4 (33.3%)       |         |
|                      | >50 years   | -               | -          | 5 (41.7%)       |         |
| Education            | Matric      | 2 (50.0%)       | -          | -               | 0.009   |
|                      | Bachelors   | 2 (50.0%)       | -          | 5 (41.7%)       |         |
|                      | Masters     | -               | 4 (100%)   | 7 (58.3%)       |         |
| Occupation           | Student     | 2 (50.0%)       | -          | -               | 0.011   |
|                      | House wife  | 2 (50.0%)       | -          | 7 (58.3%)       |         |
|                      | Private Job | -               | 3 (75.0%)  | 2 (16.7%)       |         |
|                      | Business    | -               | 1 (25.0%)  | 3 (25.0%)       |         |
| Socioeconomic status | Middle      | 4 (100%)        | 4 (100%)   | 8 (66.7%)       | 0.189   |
|                      | Upper       | -               | -          | 4 (33.3%)       |         |
| Marital status       | Married     | 2 (50.0%)       | 4 (100%)   | 12 (100%)       | 0.012   |
|                      | Unmarried   | 2 (50.0%)       | -          | -               |         |
| Duration of disease  | ≤3 years    | 2 (50.0%)       | 4 (100%)   | 1 (8.3%)        | 0.003   |
|                      | 4-10 years  | -               | -          | 9 (75.0%)       |         |
|                      | >10 years   | 2 (50.0%)       | -          | 2 (16.7%)       |         |

**Table-II. Association of demographic and clinical variables with Crohn's disease severity (N=20)**

In UC patients, disease severity was significantly associated with age group ( $p=0.016$ ), educational level ( $p=0.004$ ), occupation ( $p<0.001$ ), and socioeconomic status ( $p=0.043$ ). These findings partially concur with Porter et al.<sup>20</sup>, who demonstrated that gastrointestinal episodes (IGE) in IBS patients significantly increased the risk of subsequent IBD diagnosis. The complex interplay between sociodemographic factors and IBD symptomatology, as seen in this study, highlights the need for comprehensive evaluation strategies that include psychosocial and environmental influences.<sup>21,22</sup>

The current findings further corroborate with the work of Ke et al.<sup>23</sup>, who utilized Mendelian randomization (MR) to suggest a genetic predisposition linking IBD to subsequent IBS, but not the reverse. This adds a genetic perspective to the current study's clinical and demographic analysis, reinforcing the hypothesis that persistent symptoms in IBD patients may be multifactorial, with inflammatory activity being one component of a broader symptom matrix.<sup>24</sup> Stratification of patients based on severity and sociodemographic

profile can help in personalizing treatment plans. Patients with moderate disease and longer disease duration may benefit from early biologic therapy or more intensive monitoring, while those with less severe disease might be candidates for step-down therapy.<sup>25</sup> There are limitations to this study. The cross-sectional design limits causal inference between sociodemographic factors and disease severity. The study also did not incorporate objective inflammatory markers which could have enriched the interpretation of disease activity. Multicenter studies with larger, more diverse populations are needed to validate these associations.

## CONCLUSION

Moderate disease severity is the most prevalent category among IBD patients attending a tertiary care center in Karachi, Pakistan. Disease severity in CD was significantly associated with education, occupation, disease duration, and marital status, while UC severity correlated with age, education, occupation, and socioeconomic status. Incorporating routine assessments of disease activity and addressing broader

| Characteristics          |              | Remission (n=12) | Mild (n=36) | Moderate (n=74) | Severe (n=4) | P-Value |
|--------------------------|--------------|------------------|-------------|-----------------|--------------|---------|
| Gender                   | Male         | 4 (33.3%)        | 20 (55.6%)  | 36 (48.6%)      | 2 (50.0%)    | 0.597   |
|                          | Female       | 8 (66.7%)        | 16 (44.4%)  | 38 (51.4%)      | 2 (50.0%)    |         |
| Age groups (years)       | ≤35 years    | 2 (16.7%)        | 22 (61.1%)  | 38 (59.4%)      | 2 (50.0%)    | 0.016   |
|                          | 36-50 years  | 7 (58.3%)        | 4 (11.1%)   | 14 (51.9%)      | 2 (50.0%)    |         |
|                          | >50 years    | 3 (25.0%)        | 10 (27.85)  | 22 (29.7%)      | -            |         |
| Education level          | Illiterate   | 2 (16.7%)        | 2 (5.6%)    | 2 (2.7%)        | -            | 0.004   |
|                          | Primary      | -                | 2 (5.6%)    | -               | -            |         |
|                          | Secondary    | -                | -           | 4 (5.4%)        | -            |         |
|                          | Matric       | 2 (16.7%)        | -           | 18 (24.3%)      | -            |         |
|                          | Intermediate | 4 (33.3%)        | 4 (11.1%)   | 24 (32.4%)      | 2 (50.0%)    |         |
|                          | Bachelors    | 4(33.3%)         | 22 (61.1%)  | 20 (27.0%)      | 2 (50.0%)    |         |
|                          | Masters      | -                | 6 (16.7%)   | 8 (8.1%)        | -            |         |
| Occupation               | Unemployed   | -                | 2 (5.6%)    | 4 (5.4%)        | -            | <0.001  |
|                          | Student      | -                | 4 (11.1%)   | 12 (16.2%)      | -            |         |
|                          | House wife   | 6 (50.0%)        | 7 (19.4%)   | 22 (29.7%)      | 2 (50.0%)    |         |
|                          | Govt job     | 1 (8.3%)         | 3 (8.3%)    | 4 (5.4%)        | 2 (50.0%)    |         |
|                          | Private job  | 3 (25.0%)        | 14 (38.9%)  | 6 (8.1%)        | -            |         |
|                          | Business     | -                | 6 (16.7%)   | 26 (35.1%)      | -            |         |
|                          | Retired      | 2 (16.7%)        | -           | -               | -            |         |
| Socioeconomic status     | Lower        | -                | 4 (11.1%)   | 20 (27.0%)      | -            | 0.043   |
|                          | Middle       | 12 (100%)        | 30 (83.3%)  | 54 (73.0%)      | 4 (100%)     |         |
|                          | Upper        | -                | 2 (5.6%)    | -               | -            |         |
| Marital status           | Married      | 12 (100%)        | 23 (63.9%)  | 50 (67.6%)      | 4 (100%)     | 0.051   |
|                          | Un-married   | -                | 13 (36.1%)  | 24 (32.4%)      | -            |         |
| Disease duration (years) | ≤3 years     | 6 (50.0%)        | 26 (72.2%)  | 46 (62.2%)      | 4 (100%)     | 0.095   |
|                          | 4-10 years   | 4 (33.3%)        | 6 (16.7%)   | 26 (35.1%)      | -            |         |
|                          | >10 years    | 2 (16.7%)        | 4 (11.1%)   | 2 (2.7%)        | -            |         |

Table-III. Association of study variables with ulcerative colitis severity (N=20)

determinants of health may improve long-term outcomes in IBD patients. Future studies should integrate biomarkers, longitudinal data, and psychological assessments to better understand the full spectrum of disease impact and guide targeted interventions.

### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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| AUTHORSHIP AND CONTRIBUTION DECLARATION |                                                                                                             |
|-----------------------------------------|-------------------------------------------------------------------------------------------------------------|
| 1                                       | <b>Aisha Saleem:</b> Data collection, drafting, responsible for data's integrity, approved for publication. |
| 2                                       | <b>Lubna Kamani:</b> Conception design, critical revision, proof reading, approved for publication.         |
| 3                                       | <b>Farina Fahim Khan:</b> Drafting, responsible for data's integrity, approved for publication.             |