Original Article

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Nutritional Status by MNA-SF Scoring and Its Association with Extraintestinal Manifestations of Crohn's Disease: A Cross-Sectional Study in Bangladesh

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Abstract

Background: Malnutrition and extraintestinal manifestations (EIMs) are frequent complications in Crohn's disease (CD) that significantly impair quality of life. The Mini Nutritional Assessment-Short Form (MNA-SF) is a practical tool for nutritional screening and assessment. However, data on the link between nutritional status and EIMs in Bangladeshi patients with CD are limited.

Objective: This study aimed to evaluate nutritional status using the MNA-SF and explore its association with the presence of EIMs.

Methods: A cross-sectional study was carried out on 127 CD patients at a tertiary care university hospital in Dhaka, Bangladesh, from January to December 2024. Nutritional status was evaluated using the MNA-SF questionnaire, and EIMs were assessed via a comprehensive clinical examination and questionnaire.

Results: The study found that 42.5% of patients were malnourished, and 10.2% were at risk of malnutrition. EIMs were observed in 44.9% of patients and were significantly more common in active disease compared to remission (63.5% vs. 26.6%, $p<0.001$). Although patients with EIMs had higher rates of malnutrition (49.1% vs. 37.1%), this difference was not statistically significant ($p=0.210$).

Conclusion: This study highlights a high prevalence of both malnutrition and EIMs in Bangladeshi patients with CD. The considerable overlap between nutritional deficiency and systemic inflammatory complications, especially during active disease, emphasises the importance of integrated patient care. Routine nutritional screening and management should be included in CD management to address deficiencies that increase the overall disease burden.

Keywords: Crohn's Disease, Nutritional Status, Malnutrition, Mini Nutritional Assessment, Extraintestinal Manifestations

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Introduction:

Crohn's disease (CD) is a chronic inflammatory bowel condition marked by episodes of intestinal inflammation that flare up and subside, along with systemic effects. Malnutrition often coexists, affecting 20–80% of patients, and is linked to increased morbidity, weakened immunity, and lower quality of life. It negatively impacts clinical course, immune function and prognosis, with causes including reduced dietary intake, malabsorption, increased nutrient requirements and medication side effects.[1,2] Alongside nutritional deficits, patients with CD frequently develop extraintestinal manifestations (EIMs)—inflammatory conditions affecting organs outside the gastrointestinal tract (e.g., joints, skin, eyes). EIMs contribute significantly to CD morbidity, impacting up to 40% of patients and adding complexity to management.[3] Since both malnutrition and EIMs are driven by underlying systemic inflammation, examining their potential link is clinically essential. Nutritional assessment is a critical first step in addressing deficiencies.

The Mini Nutritional Assessment-Short Form (MNA-SF) is a validated, widely used screening tool. However, limited data from Bangladesh exist regarding the nutritional status of CD patients and its association with EIMs. Therefore, this study aimed to evaluate nutritional status using the MNA-SF and examine its connection with EIMs and disease activity in Bangladeshi CD patients.

Methods:

A cross-sectional study was conducted at the inpatient and outpatient Gastroenterology Department of Bangladesh Medical University (BMU), a tertiary care hospital in Dhaka, from January to December 2024. The study received approval from the BMU Institutional Review Board (IRB). Ethical aspect was maintained in every step of the study.

A total of 127 patients aged 18 years or older with a confirmed diagnosis of CD were enrolled through consecutive sampling. Informed written consent was obtained from all participants. Patients were excluded if they were pregnant or had other significant causes of malnutrition (e.g., chronic liver/kidney disease, malignancy or uncontrolled diabetes). Disease activity was classified as "active" or "remission" based on clinical symptoms and endoscopic findings.

Nutritional status was assessed using the MNA-SF tool, which evaluated food intake, weight loss, mobility, psychological stress and BMI. Patients were categorized as having normal nutritional status (12–14 points), at risk of malnutrition (8–11 points) or malnourished (0–7 points). The presence of EIMs was documented through a comprehensive clinical history and physical examination, and included arthropathy, oral ulcers, erythema nodosum, pyoderma gangrenosum, uveitis, episcleritis and perianal disease.

Data were analyzed with SPSS version 25. Descriptive statistics summarized patient characteristics, while group differences were tested using Student's t-test, the Mann-Whitney U test or the chi-square test. Univariate and multivariate logistic regression analyses identified predictors of low BMI (<18.5 kg/m²). Results with a p-value ≤0.05 were deemed statistically significant.

Results:

Demographics and Clinical Characteristics

The study included 127 Crohn's disease patients (median age 32 years, IQR 24–43; 55.9% female). No significant differences were observed in age, residence or smoking status between active disease (n = 63) and remission (n = 64) groups. Ileocolonic involvement was the most common site (38.6% overall). (Table I)

Prevalence of Extraintestinal Manifestations (EIMs)

EIMs were considerably more common in active disease compared to remission (63.5% vs. 26.6%, p<0.001). Overall, 44.9% of patients experienced at least one EIM. (Table II)

Nutritional Status Assessment

The MNA-SF evaluation revealed that 42.5% (n = 54) were malnourished, 10.2% (n = 13) were at risk of malnutrition, and 47.2% (n = 60) had a normal nutritional status. Mean MNA-SF scores did not differ significantly between patients with and without EIMs (19.9 ± 4.9 vs. 21.2 ± 5.1, p = 0.524). (Table III)

Association Between Nutritional Status and EIMs

Among patients with EIMs, 49.1% were malnourished, compared to 37.1% of those without EIMs. Although there was a numerical difference, the overall comparison of nutritional categories between the groups was not statistically significant (p = 0.210). In multivariate analysis, EIMs showed a trend toward being associated with low BMI, but this was not statistically significant (OR 1.7, 95% CI 0.8–3.9, p = 0.178). (Table IV)

Table I: Demographic profile of study participants (n=127)

Characteristics		Active (n= 63)	Remission (n=64)	p-value
Age (years)	Mean± SD	35.41± 12.53	33.7± 12.91	0.446[a]
Sex				
Male		41(65.1%)	30 (46.9%)	**0.039[b]**
Female		22 (34.9%)	34 (53.1%)	
Residence				
Rural		37 (58.7%)	39 (60.9%)	0.8[b]
Urban		26 (41.3%)	25 (39.1%)	
Smoking status				
Smoker		11 (17.5%)	8 (12.5%)	0.433[b]
Non-smoker		52 (82.5%)	56 (87.5%)	

[a]p-value calculated by Student t-test
[b]p-value calculated by chi-square test
(Within parentheses are percentages over column total)

Table I compares the various variables of CD patients during the active and remission phases. The ages of the patients in both groups were identical. The age in years in the active group was 35.41 ± 12.53, compared to 33.7 ± 12.91 in the remission group, showing no significant difference (mean ± SD; p = 0.446). There were 65.1% (n = 41) males in the active group and 34.9% (n = 30) males in the remission group. Still, regarding females, the active group had 34.9% (n = 22) versus 53.1% (n = 34) in the remission group, showing a statistically significant difference (p = 0.039). In a rural setting, the percentage of residents was 58.7% (n=37) compared to 60.9% (n=39), while in an urban setting, it was 41.3% (n=26) versus 39.1% (n=25), between the active and remission groups, respectively, indicating an insignificant difference (p=0.8). Smoking status did not also show a significant difference between the two groups; in the active group, current smoker was 17.5% (n=11) vs. 12.5 % (n=8) in the remission group and nonsmokers (including previous smokers) were 82.5 % (n=52) in the active group vs. 87.5% (n=56) in the remission group (p=0.433).

Table II: Clinical profile of study participants (n=127)

Characteristics	Active (n= 63)	Remission (n=64)	p-value
Disease duration in months			
(Median, IQR)	48 (24, 60)	36 (24, 60)	0.932[a]
Disease location			
Terminal ileum	15 (23.8 %)	27 (42.2 %)	
Colon	14 (22.2 %)	13 (20.3%)	
Ileo-colon	25 (39.7%)	24 (37.5%)	
Isolated upper-GI	9 (14.3 %)	0	
Nonstricturing, nonpenetrating Stricturing	44 (69.8%)	55 (85.9%)	
Fistulising	3 (4.8%)	2 (3.1%)	
Stricturing & fistulising	4 (6.3%)	1 (1.6%)	
Perianal disease			
Yes	17 (27%)	16 (25%)	0.799[b]
No	46 (73%)	48 (75%)	
Presence of any EIM			
Yes	40 (63.5%)	17 (26.6%)	**0.001[b]**
No	23 (36%)	47 (73.4%)	
Relapse			
Infrequent (≤1/year)	57 (90.5%)	57 (89.1%)	0.793[b]
Frequent (≥2/year)			

[a]p-value calculated by Mann Whitney U test
[b]p-value calculated by Chi-square test
(Within parentheses are percentages over column total)
EIM – Extraintestinal manifestation

Table II illustrates the comparisons of clinical variables, including disease duration in months, disease location, disease behavior, presence of perianal disease, extraintestinal manifestations and the number of frequent relapses. The disease duration in the active and remission groups was 48 (24, 60) and 36 (24, 60) days, respectively [median (IQR); p = 0.932]. Regarding disease location, terminal ileum was 23.8% (n= 15), colon 22.2% (n= 14), ileo-colon 39.7% (n=25), isolated upper-GI 14.3% (n=9) in active group, whereas in remission group terminal ileum was 42.2% (n= 27), colon 20.3% (n= 13), ileo-colon 37.5% (n=24), but no patient in isolated upper-GI group, p-value cannot be calculated as the assumption of the frequency of expected is violated. In terms of disease behavior, nonstricturing, nonpenetrating disease in active vs. remission was 19% (n=44) vs. 9.4% (n=6), stricturing was 19% (n=12) vs. 9.4% (n=6), fistulizing was 4.8% (n=3) vs. 3.1% (n=2), stricturing & fistulising was 6.3% (n=4) vs. 1.6% (n=1), the p-value cannot be calculated as the assumption of the frequency of expected is violated. The presence of perianal disease did not show any significant difference between the active and remission groups [27% (n=17) vs. 25% (n=16), p=0.799]. Still, the presence of extraintestinal manifestation was statistically significant in the active vs. remission group [63.5% (n=40) vs. 26.6% (n=17), p=0.001]. However, the proportion of frequent vs infrequent relapse doesn't show any statistically significant difference between the two groups. 95% (n=57) of the patients in the active group experienced infrequent relapse, whereas 89.1% (n=57) of patients in the remission group did. Only 9.5% (n = 6) in the active group experienced frequent relapse, whereas 10.9% (n = 7) experienced this type of disease course. No patient with a continued course without a relapse pattern was found in any group.

Table III: Nutritional category according to MNA score and its comparison with the presence of EIM (n=127)

	Extraintestinal involvement			p-value
	Yes (57)	No (70)		
MNA-SF score Mean± SD	19.9 ±4.9	21.2 ±5.1		0.524[a]
Normal nutritional status	22 (38.6%)	38 (54.3%)	60 (47.2%)	0.210[b]
At risk of malnutrition	7 (12.3%)	6 (8.6%)	13 (10.2%)	
Malnutrition	28 (49.1%)	26 (37.1%)	54 (42.5%)	

[a]p-value calculated by Mann-Whitney U test
[b]p-value calculated by Chi-square test
(Within parentheses are percentages over column total)
EIM – Extraintestinal manifestation

Table III presents the nutritional status of the study participants, categorized by the Mini Nutritional Assessment Short-Form (MNA-SF) score and compares these findings based on the presence or absence of extraintestinal manifestations (EIM). The mean MNA-SF score showed no significant difference between patients with EIM (19.9 ± 4.9) and those without (21.2 ± 5.1) with a p-value of 0.524.
An analysis of the nutritional categories revealed that among patients with EIM, 49.1% (n = 28) were malnourished, 12.3% (n = 7) were at risk of malnutrition and 38.6% (n = 22) had a normal nutritional status. In contrast, among patients without EIM, 37.1% (n = 26) were malnourished, 8.6% (n = 6) were at risk of malnutrition and 54.3% (n = 38) had a normal nutritional status. Despite the higher rate of malnutrition in the EIM group, the overall comparison of nutritional categories between the two groups did not reach statistical significance (p = 0.210).

Table IV: Univariate and multivariate logistic regression analysis of predictors to see the likelihood ratio of low (<18.5 kg/m2) BMI

	Univariate		Multivariate	
Independent variables	**Odds ratio (95% CI)**	**p-value**	**Odds ratio (95% CI)**	**p-value**
Disease location (Terminal ileum)	0.5 (0.2, 1)	0.069	0.5 (0.2, 1)	0.079
Disease behaviour (Nonstricturing, nonpenetrating)	3.7 (1.5, 9.2)	<0.01	0.3 (0.1, 1)	0.039
Relapse (Frequent)	1.5 (0.5, 4.8)	0.505	0.2 (0.03, 1)	0.056
Previous history of surgery	2.8 (0.8, 9.6)	0.105	3.2 (0.5, 21.4)	0.228
Perianal disease	1.2 (0.6, 2.8)	0.568	0.7 (0.3, 1.8)	0.499
EIM	1.9 (0.9, 3.9)	0.071	1.7 (0.8, 3.9)	0.178

EIM- Presence of any extraintestinal manifestation

Table IV illustrates the regression analysis used to predict the predictors associated with a low BMI (<18.5 kg/m²). In both univariate and multivariate models, non-stricturing, non-penetrating disease behavior was associated with a higher likelihood of having an abnormal BMI compared to other disease categories. In the univariate model, the odds of having a low BMI were 3.7 (1.5, 9.2) and in the multivariate model, they were 0.3 (0.1, 1).

Discussion:

This study highlights the dual burden of malnutrition and EIMs among Bangladeshi CD patients. Over half of participants were at nutritional risk or malnourished and nearly half experienced at least one EIM—findings consistent with global data showing high malnutrition rates in CD, particularly during active disease.[4] [5] A key finding is the strong link between EIMs and disease activity: patients with active CD were more than twice as likely to have EIMs as those in remission. This supports the concept that EIMs are a direct consequence of systemic inflammation, which characterizes active disease.[6] Contrary to our initial hypothesis, no significant statistical association was found between nutritional status (as measured by MNA-SF) and EIMs. This suggests that while both conditions are common in CD, systemic inflammation is likely the shared pathogenic factor contributing independently to poor nutritional status (via increased catabolism and anorexia) and the development of EIM[7]. Multivariate regression clarified these relationships: after accounting for disease location and behavior, EIMs were not an independent predictor of low BMI. This supports the idea that the severity of underlying inflammation mediates the connection between EIMs and weight loss.

Limitations:

The study's strengths include a real-world tertiary care sample and the use of standardized assessments. However, its cross-sectional design precludes causal inference and its single-center setting may limit generalizability. Furthermore, the reliance on MNA-SF rather than more comprehensive methods for diagnosing malnutrition is a limitation.

Conclusion:

Malnutrition (as measured by MNA-SF) and EIMs are highly prevalent in Bangladeshi CD patients, with EIMs being significantly enriched in active disease phases. While no direct statistical association was found between MNA-SF categories and EIM presence, their substantial overlap underscores the need for integrated nutritional screening and management in CD care. Routine nutrition screening should be integrated into CD management and longitudinal studies are warranted to determine whether improving nutritional status can modify the risk of low BMI and EIM burden.

Recommendations:

Future studies are needed:

- Longitudinal follow-up to clarify causality between disease activity, nutritional status and EIM development.
- Interventional studies to assess whether aggressive nutritional support, combined with anti-inflammatory therapy, reduces EIM incidence or severity.
- A multivariate model (adjusting for age, sex, disease duration, location and activity) would reinforce the findings.

Conflict of Interest: There is no conflict of interest.

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