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QUALITY OF LIFE AMONG CROHN'S DISEASE PATIENTS IN MOROCCO: A CROSS-SECTIONAL STUDY

Aicha Hanae Ait El Kounnini [1], Zhor Zeghari[1], Jihane Belayachi[12], Redouane Abouqal[1, 2], Fatima Zohra Ajana[3].

[1] Laboratory of Biostatistics, Clinical Research, and Epidemiology, Faculty of Medicine & Pharmacy, university Mohammed V of Rabat, Morocco.
[2] Department of Emergency Internal Medicine, Ibn Sina University Hospital, Rabat, Morocco.
[3] Department of Gastroenterology C, Ibn Sina Hospital, Rabat, Morocco.

***Corresponding Address**: Aicha Hanae Ait El Kounnini, Laboratory of Biostatistics, Clinical Research & Epidemiology, Faculty of Medicine & Pharmacy, University Mohammed Vth of Rabat , Morocco*
***E-mail**:aichahanae_aitelkounnini@um5.ac.ma ; **ORCID ID:** 0009-0001-0765-0247*

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Abstract

Background: Crohn's disease is a chronic inflammatory bowel disease characterized by alternating periods of flare-ups and remission, with symptoms that can significantly impair patients' health-related quality of life. The aim of this study was to evaluate the quality of life of Moroccan patients and to identify factors associated with it. **Materials & Methods:** Between November 2024 and April 2025, a cross-sectional study was carried out at the Ibn Sina Hospital's Hepato-Gastroenterology department "C" in Rabat. The SF-12 and SIBDQ scores, as well as the sociodemographic and clinical traits of the patients, were among the data gathered. **Results:** The mean age of the 159 patients who met the inclusion criteria was 42.4 ± 13.4 years, 38.7% had a high risk of malnutrition, 47.7% had an active or very aggressive illness, and 37.1% were male. 38.3% of the population had no disability in the physical component of the SF-12, 27.9% had severe disability in the mental component, and over half of the population had significantly impaired quality of life based on the SIBDQ score. Female gender, recent hospitalization, disease activity, and risk of malnutrition were all found to be important factors by multivariable analysis. **Conclusion:** These results emphasize how crucial it is to evaluate patients' quality of life and how Crohn's disease affects it in order to provide thorough multidisciplinary care.

Keywords: Crohn's disease, inflammatory bowel disease, Morocco, quality of life, risk of malnutrition, SF-12, SIBDQ.

Introduction

Any area of the gastrointestinal system, from the mouth to the rectum, may be affected by Crohn's disease (CD), a chronic inflammatory illness. Although its exact cause is unknown, a combination of genetic, environmental, and immunological factors is believed to be at play [1-3].CD primarily affects the digestive system through symptoms such as glairy bloody diarrhea, and stomach discomfort [4].However, extraintestinal symptoms that affect the musculoskeletal system, hepatobiliary tract, eyes, and skin can also happen [5].Its frequency varies by area and is rising internationally, especially in developed nations [6].

In Western Europe, it ranges from 1.85 to 10.40 per 100,000 inhabitants, while in Africa; it is estimated at 5.87 per 100,000 inhabitants [6], with a predominance among males [7]. Regarding the Moroccan population, epidemiological data from the Hassan II[d] University Hospital of Fez showed that during the period from February 2021 to April 2024, 101 patients with chronic inflammatory bowel disease were diagnosed and followed-up, with a slight female predominance (sex ratio F/M =1.3) and a mean age of 40 years old [8].

CD is a disabling condition, often leading to fatigue, sleep disturbances especially daytime sleepiness gastrointestinal issues, and dietary restrictions imposed by the disease itself [9–11]. The disease's relapsing-remitting pattern makes management difficult. The health-related quality of life (HRQoL) is adversely affected by these variations [12,13]. In Morocco, there are no research results measuring quality of life (QoL) in people with CD. The aim of our study was to measure QoL of these patients, and to investigate the factors associated with it.

Material & Methods

Context

This was a cross-sectional, descriptive and analytical study conducted on patients with Crohn's Disease (CD) followed-up at the Hepato-Gastroenterology Department "C" at Ibn Sina

University Hospital in Rabat-Morocco, between November 2024 and April 2025. the department specializes in the diagnosis, management and follow-up of patients with liver and digestive diseases. Consultations for inflammatory bowel diseases (IBD) are held once a week. To date, 1.217 patients with CD have been followed-up in the department since its establishment in the 1980s.

Study Population

Inclusion criteria: Patients aged from 18 to 70 years, with a confirmed diagnosis of CD for at least six months, whether in an active phase or in remission, with or without a history of surgery related to CD. The diagnosis of CD was established based on clinical signs, radiological imaging, laboratory tests, and histopathological findings [14, 15]. Remission was defined by the absence of clinical symptoms, endoscopic mucosal healing, and normalization of inflammatory markers [16]. In our study, clinical remission was defined by the absence of clinical symptoms, endoscopic mucosal healing, and normalization of both C-reactive protein (CRP) and fecal calprotectin levels**.** An active phase was characterized by the return of clinical symptoms in a patient who had previously achieved remission, with confirmation through objective measures such as elevated inflammatory biomarkers (including C-reactive protein and fecal calprotectin), evidence of mucosal inflammation or ulceration detected via endoscopic examination, or radiological findings from imaging techniques like magnetic resonance enterography or intestinal ultrasound that reveal ongoing intestinal inflammation or complications [17**].**

Exclusion criteria: Were excluded: Patients with conditions or health states affecting nutritional status such as pregnancy, cancer, celiac disease, HIV infection, renal or cardiac failure. Patients with severe psychiatric disorders, chronic diseases including chronic hepatitis B and C, dermatological diseases, those with digestive small bowel stomas and patients who refused to participate in the study.

Intervention

Each enrolled patient underwent a standardized consultation conducted by the principal investigator, lasting between 20 and 30 minutes. This consultation included a structured interview and anthropometric measurements. The interview collected sociodemographic data (age, gender, and socioeconomic status). Socioeconomic status was determined according to household income. Participants were classified as having a low status if they had no personal income or if the total household income was less than or equal to the guaranteed minimum wage. Those were considered medium status if both partners had earnings above this threshold, while high status corresponded to households with incomes significantly exceeding it [18]. Clinical data included recent hospitalization (within the past six months), disease duration, disease activity, presence of bloating, diarrhea, dietary restrictions (assessed by asking patients if they had limited the consumption of certain foods or food groups), and malnutrition risk. Quality of life (QoL) was assessed using the SF-12 and SIBDQ questionnaires. All patients included in the study underwent endoscopy as part of the diagnostic workup.

Measurement instruments:

Anthropometric Data: Height was measured using a wall-mounted stadiometer, and weight was measured with an electronic scale, with the patient in a fasting state. Body Mass Index (BMI) was determined using bioelectrical impedance analysis. According to the World Health Organization (WHO), BMI was classified as follows: underweight (<18.5 kg/m²), normal weight (18.5–24.9 kg/m²), overweight (25–29.9 kg/m²), and obesity (≥30 kg/m²).

Disease Activity: The Crohn's Disease Activity Index (CDAI) was used to assess disease activity, a validated tool scoring from 0 to 600 points. A score <150 indicated inactive disease, 150–450 indicated active disease, and >450 indicated severe disease activity [19,20].

Quality of Life Assessment:

Generic QoL (SF-12):

The Short Form-12 Health Survey Questionnaire (SF-12) Health Survey assesses health-related QoL across physical and mental components using 12 items [21]. The Moroccan Arabic dialect version was used. The total SF-12 score ranges from 0 to 100 and was categorized as follows [22, 23]:

- Severe disability :<30
- Moderate disability: 30–39
- Mild disability: 40–50
- Greater disability>50

Disease-specific QoL (SIBDQ):

The Short IBD Questionnaire (SIBDQ) was used in its Arabic version, licensed from McMaster University, Hamilton, Canada. This validated, reliable instrument consists of 10 items with 7 response options each, ranging from 1 (worst health status) to 7 (best health status). The total score ranges from 10 to 70, classified as follows [24]

- Severe QoL impairment: 10–45
- Moderate QoL impairment: 45–60
- Mild QoL impairment: 60–70

Nutritional Risk:

The Saskatchewan Inflammatory Bowel Disease-Nutrition Risk (Sask IBD-NR) tool was used to assess the risk of malnutrition. This validated, simple screening tool includes questions on gastrointestinal symptoms, weight loss, appetite,

and dietary restrictions. Scores were interpreted as following [25–27]:
- Low risk: 0–2
- Moderate risk: 3–4
- High risk: 5–7

All the collected data for each patient were recorded on individual case report forms, compiled into Excel using Epi Info software version 7.2.6.0, and later analyzed statistically.

Statistical analysis:

Descriptive Statistics:
Counts and percentages were used to summarize the qualitative characteristics. The distribution of quantitative variables was characterized using either the median (interquartile range) or mean ± standard deviation.

Analytical Statistics:
- Spearman's correlation coefficients were used to evaluate score correlations.
- To identify factors associated with QoL scores, univariable and multivariable linear regression analyses were performed.
- All analyses were conducted using Jamovi software version 2.6.44.

Ethical Considerations:

The study data were collected with respect to the dignity, privacy and confidentiality of patients information, in accordance with the Declaration of Helsinki. The Biomedical Research Ethics Committee of Mohammed V University in Rabat granted approval for the study under reference number 149/24.

Results

During the study period, 184 patients with CD were recruited, of whom 159 met the eligibility criteria. Among them, 12.58% (20) patients were hospitalized, 39.62% (63) were seen in outpatient consultation, and 47.8% (56) attended the day hospital during their treatment administration. Of the hospitalized patients, 63% were admitted due to disease exacerbation.

The mean age was 42.4 ± 13.4 years, and the sex ratio (male/female) was 0.59. The socioeconomic level was low in 58.6% (92) patients, middle in 38.9% (61), and high in 2.5% (4). The mean weight was 63 ± 13.5 kg, and the median height was 1.66 meters (1.60–1.73). Regarding BMI, 48.1% (76) patients had normal weight, 20.9% (33) were underweight, 22.8% (36) were overweight, and 8.2% (13) were obese. More details about the patients' sociodemographic and anthropometric characteristics are presented in **Table I**.

The median disease duration was 7 years (4–13). The disease was inactive in 52.3% (81) patients, active in 44.5% (69), and severely active in 3.2% (5). Bloating symptoms were reported by 36.3% (57) patients.

According to the Sask IBD-NR tool, 43.2% (67) patients had a low risk of malnutrition, 18.1% (28) had a moderate risk, and 38.7% (60) had a high risk. Additional clinical characteristics are detailed in **Table II**.

Concerning QoL assessments: based on the SIBDQ, QoL was mildly impaired in 22.4% (35) patients, moderately impaired in 32.1% (50), and severely impaired in 45.5% (71). According to the SF-12 physical component, 9.7% (15) patients showed severe disability, 21.4% (33) had a moderate disability, 30.5% (47) had mild disability, and 38.3% (59) reported no disability.

For the SF-12 mental component, 27.9% (43) patients showed severe disability, 26% (40) had a moderate disability, 22.1% (34) had mild disability, and 24% (37) reported no disability. All these findings are summarized in **Table III**.

Table I: Sociodemographic and anthropometric characteristics (n = 159):

Variables	n = 159
Age (years)*	42.4 ± 13.4
Gender**	
Male	59 (37.1%)
Female	100 (62.9%)
Socioeconomic status**	
Low	92 (58.6%)
Middle	61 (38.9%)
High	4 (2.5%)
Weight (kg)*	63.0 ± 13.5
Height (m) ***	1.66 (1.60–1.73)
Body Mass Index (BMI) (kg/m²)**	22.7 ± 5.0
BMI category**	
Underweight	33 (20.9%)
Normal weight	76 (48.1%)
Overweight	36 (22.8%)
Obesity	13 (8.2%)

***** Expressed as mean ± standard deviation
****** Expressed as number (percentage)
******* Expressed as median (interquartile range)

Table II: Clinical characteristics (n = 159):

Variables	n = 159
Hospitalization in the past 6 months **	
Yes	30 (20.83)
No	114 (79.17)
Disease duration (years)***	7 (4 – 13)
Disease activity **	
Inactive Crohn's disease	81 (52.3)
Active Crohn's disease	69 (44.5)
Severely active Crohn's disease	5 (3.2)
Bloating sensation **	
Yes	84 (53.85)
No	72 (46.15)
Presence of diarrhea or loose stools	28 (17.8)
Food restriction **	
Yes	104 (65.4)
No	55 (34.6)
Saskatchewan score total*	3 (2 – 6)
Saskatchewan IBD Test **	
Low risk of malnutrition	67 (43.2)
Moderate risk of malnutrition	28 (18.1)
High risk of malnutrition	60 (38.7)

****** Expressed as number (%).
******* Expressed as median (interquartile range)

Table III: Characteristics related to quality of life (n = 159):

Variables	n = 159
SIBDQ Test*	46 (36–58.3)
SIBDQ Test	
Slightly impaired QoL	35 (22.4)
Moderately impaired QoL	50 (32.1)
Severely impaired QoL	71 (45.5)
SF-12 Test*	
Physical component	46.4 (36.3–54)
Mental component	37.8 (29.8–49.6)
SF-12 Test – Physical Component	
No disability	59 (38.3)
Mild disability	47 (30.5)
Moderate disability	33 (21.4)
Severe disability	15 (9.7)
SF-12 Test – Mental Component	
No disability	37 (24)
Mild disability	34 (22.1)
Moderate disability	40 (26)
Severe disability	43 (27.9)

****** Expressed as number (%).
******* Expressed as median (interquartile range).

A significant correlation was found between the SIBDQ score and the components of the SF-12. The correlation was moderately strong with the physical component (r = 0.562; $p< 0.001$) and even stronger with the mental component (r = 0.718; $p< 0.001$). These relationships are visually represented in **Figure 1**.

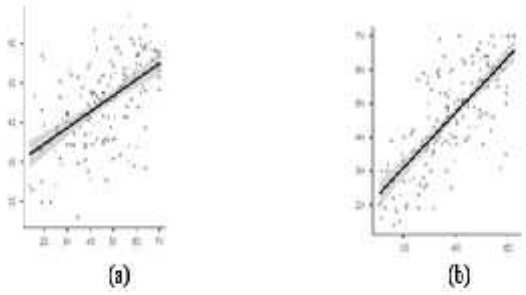

Figure 1: Correlations between the different quality of life assessment tools

(a): Correlation between the SIBDQ score and the physical component of the SF-12
(b): Correlation between the SIBDQ score and the mental component of the SF-12

Univariable and multivariable analyses:

SIBDQ:

In univariable linear regression analysis, several factors were significantly associated with a decrease in the SIBDQ score. A high (β = -17.66; $p< 0.001$) or moderate (β = -7.40; $p = 0.009$) nutritional risk, active (β = -16.33; $p< 0.001$) or severe (β = -32.89; $p< 0.001$) CD, recent hospitalization within the past six months (β = -13.93; $p< 0.001$), and the presence of bloating (β = -8.65; $p< 0.001$) were all significantly associated with poorer QoL.

In addition, the presence of diarrhea was strongly associated with a substantial reduction in the SIBDQ score (β = -15.56; 95% CI (-21.11; -10.00); $p< 0.001$), reflecting its considerable impact on patients' perceived QoL.

To identify independent determinants of this impairment, a multivariable analysis was conducted. This analysis revealed several factors independently associated with the SIBDQ score. A high nutritional risk (β = -12.31; 95% CI (-17.67; -6.95); $p< 0.001$), and to a lesser extent a moderate risk (β = -4.91; 95% CI (-10.01; 0.20); $p= 0.059$), were linked to a decrease in the score. Disease activity, as measured by the CDAI, remained a major determinant: patients with active (β = -10.58; $p< 0.001$) or severe (β = -22.91; $p< 0.001$) disease had significantly lower scores compared to those in remission. Recent hospitalization was also independently associated with lower SIBDQ scores (β = -5.25; $p = 0.035$). In contrast, age, gender, socioeconomic level, disease duration, and BMI were not significantly associated with QoL in the adjusted model. However, trends nearing statistical significance were observed for female gender (β = -3.84; $p = 0.053$) and BMI (β = -0.39; $p = 0.061$) (**table IV**).

Table IV: Univariable and multivariable linear regression of the SIBDQ score according to sociodemographic and clinical characteristics

Factors	*Univariable linear regression*			*Multivariable linear regression*		
	β	**95% CI**	***p***	**β**	**95% CI**	***p***
Age (in years)	0.04	(-0.14, 0.21)	0.688	-0.03	(-0.18, 0.12)	0.705
Gender F/M	-4.60	(-9.36, 0.15)	0.058	-3.84	(-7.73, 0.05)	0.053
Socioeconomic level:						
High vs Low	22.23	(7.80, 36.67)	0.003	9.07	(-1.89, 20.03)	0.104
Medium vs Low	3.57	(-1.14, 8.28)	0.137	0.84	(-2.99, 4.68)	0.664
Disease duration (in years)	0.39	(0.08, 0.70)	0.015	0.08	(-0.18, 0.35)	0.530
BMI (in kg/m²)	0.39	(-0.07, 0.85)	0.093	-0.39	(-0.81, 0.02)	0.061
Saskatchewan score:						
High malnutrition risk vs Low	-17.66	(-22.05, -13.28)	<0.001	-12.31	(-17.67, -6.95)	< 0.001
Moderate malnutrition risk vs Low	-7.40	(-12.93, -1.88)	0.009	-4.91	(-10.01, 0.20)	0.059
CDAI score:						
Active disease vs Inactive	-16.33	(-20.11, -12.56)	<0.001	-10.58	(-15.09, -6.08)	< 0.001
Severe activity vs Inactive	-32.89	(-43.48, -22.30)	<0.001	-22.91	(-33.58, -12.24)	< 0.001
Hospitalization in the past 6 months	-13.93	(-19.56, -8.30)	<0.001	-5.25	(-10.12, -0.38)	0.035
Dietary restriction	-4.52	(-9.38, 0.35)	0.069	-	-	-
Bloating	-8.65	(-13.16, -4.13)	<0.001	-	-	-
Diarrhea	-15.56	(-21.11, -10.00)	<0.001	-	-	-

***BMI** : Body Mass Index*
***CDAI**: Crohn's Disease Activity Index*
***SIBDQ**: Short Inflammatory Bowel Disease Questionnaire*

SF-12 Physical Component Score :

The physical component of the SF-12 score was highly correlated with a number of parameters in univariate analysis. Compared to male gender, female gender was linked to a lower physical score (β = -3.83; 95% CI (-7.36; -0.30); *p* = 0.033). Similarly, a higher socioeconomic status was positively linked to a superior physical score (β = 12.88; 95% CI (2.01; 23.75); *p* = 0.021) when compared to a lower status. The physical SF- 12 score was significantly impacted by a number of factors, including a high nutritional risk (β = -9.67; 95% CI (-13.25; -6.08); *p* <0.001), moderate nutritional risk (β = -4.92; 95% CI (-9.40; -0.44); *p* = 0.031), active disease (β = -9.80; 95% CI (-12.87; -6.73); *p* <0.001), severe disease activity (β = -22.15; 95% CI (-30.69; -13.61); *p* < 0.001), recent hospitalization (β = -6.70; 95% CI (-11.07; -2.35); *p* = 0.003), dietary restrictions (β = -5.07; 95% CI (-8.64; -1.50); *p* = 0.006), and the presence of bloating (β = -4.73; 95% CI (-8.17; -1.28); *p* = 0.007). The functional impact of diarrhea was further highlighted by the fact that it was a significant factor, independently lowering the physical score (β = -6.44; 95% CI (-10.91; -1.96); *p* = 0.005). However, at this point in the research, no statistically significant correlations were found between other factors including age, BMI, or length of illness.

A multivariable analysis was conducted to identify the factors independently associated with the physical component of the SF-12. It confirmed the impact of disease activity: whether moderate (β = -7.07; 95% CI (-15.09; -6.08); *p*< 0.001) or severe (β = -18.96; 95% CI (-33.58; -12.24); *p*< 0.001), it remained strongly correlated with a worsening of the physical score. Furthermore, a mild decline in the physical score remained strongly correlated with a high nutritional risk (β = -5.34; 95% CI (-17.67; -6.95); *p* = 0.027). Due to significantly lower physical scores than men (β = -3.43; 95% CI (-7.73; 0.05): *p* = 0.048), female gender also seemed to be a disadvantage. Conversely, no statistically significant associations were found for age, BMI, disease duration, socioeconomic status, or recent hospitalizations. However, some variables, such as disease duration (β = -0.21; 95% CI (-0.18; 0.35); *p* = 0.071) or a moderate nutritional risk (β = -3.45; 95% CI (-10.01; 0.2); *p* = 0.128), showed a trend toward association without reaching the threshold of statistical significance (**Table V**).

Table V: Univariable and Multivariable Linear Regression of the SF-12 Physical Component Score According to Sociodemographic and Clinical Characteristics

Factors	*Univariable linear regression*			*Multivariable linear regression*		
	β	***95% CI***	***p***	***β***	***95% CI***	***p***
Age (in years)	-0.02	(-0.15, 0.11)	0.807	0.02	(-0.18, 0.12)	0.740
GenderF/M	-3.83	(-7.36, -0.30)	0.033	-3.43	(-7.73, 0.05)	0.048
Socioeconomic level:						
High vs Low	12.88	(2.01, 23.75)	0.021	5.21	(-1.89, 20.03)	0.283
Medium vs Low	0.92	(-2.64, 4.50)	0.608	0.96	(-2.99, 4.68)	0.574
Disease duration (in years)	-0.02	(-0.25, 0.21)	0.893	-0.21	(-0.18, 0.35)	0.071
BMI (in kg/m²)	0.22	(-0.13, 0.56)	0.214	-0.13	(-0.81, 0.02)	0.468
Saskatchewan score:						
High malnutrition risk vs Low	-9.67	(-13.25, -6.08)	<0.001	-5.34	(-17.67, -6.95)	0.027
Moderate malnutrition risk vs Low	-4.92	(-9.40, -0.44)	0.031	-3.45	(-10.01, 0.20)	0.128
CDAI score:						
Active disease vs Inactive	-9.80	(-12.87, - 6.73)	<0.001	-7.07	(-15.09, -6.08)	< 0.001
Severe activity vs Inactive	-22.15	(-30.69, -13.61)	<0.001	-18.96	(-33.58,-12.24)	< 0.001
Hospitalization in the past 6 months	-6.70	(-11.07, - 2.35)	0.003	-1.54	(-10.12, -0.38)	0.479
Dietary restriction	-5.07	(-8.64, -1.50)	0.006	-	-	-
Bloating	-4.73	(-8.17, -1.28)	0.007	-	-	-
Diarrhea	-6.44	(-10.91, -1.28)	0.005	-	-	-

BMI : Body Mass Index
CDAI : Crohn's Disease Activity Index
SF-12: Short Form-12 Health Survey Questionnaire

SF-12 Mental Component Score:

The mental component of the SF-12 score had a significant association with a number of parameters in univariate analysis. A higher mental score had a positive association with a longer duration of the disease (β = 0.32; 95% CI (0.04; 0.60); p = 0.026). A lower mental score was substantially linked to both a moderate risk (β = - 6.71; 95% CI (-12.15; -1.28); p = 0.016) and a high nutritional risk (β = -11.94; 95% CI (-16.29; -7.59); p < 0.001).

The following factors were also noted: hospitalization within the last six months (β = -8.77; 95% CI (-14.14; -3.40); p = 0.002), severe disease activity (β = -14.03; 95% CI (-25.28; -2.79); p = 0.015), active disease (β = -10.26; 95% CI (-14.30; -6.22); p < 0.001), and a tendency toward lower scores among patients reporting dietary restrictions (β = -3.86; p = 0.087) or bloating (β = -3.26; p = 0.133).

With a coefficient β = -12.27 (95% CI: (-17.51; -7.04); p < 0.001), the presence of diarrhea was substantially linked to a decrease in the mental component score, demonstrating a statistically significant association.

To identify independent determinants of the mental component, a multivariable linear regression was performed. The predominant factor remained nutritional risk: both high (β = -11.42; 95% CI (-17.55; -5.28); p< 0.001) and moderate (β = -6.71; 95% CI (-12.49; -0.93); p = 0.023) levels were significantly associated with reduced mental scores.

Moderate disease activity showed a borderline association with decreased mental score (β = -5.09; p = 0.051), whereas no clear effect was observed for the severe form (β = -5.53; p = 0.367). Other variables included in the model—such as age, gender, socioeconomic status, BMI, disease duration, and recent hospitalization were not significantly associated with the mental health component. However, a marginal trend was observed for BMI (β = -0.46; p = 0.054) (**Table VI**).

Table VI: Univariable and Multivariable Linear Regression of the SF-12 Mental Component Score According to Sociodemographic and Clinical Characteristics

Factors	*Univariable linear regression*			*Multivariable linear regression*		
	β	**95% CI**	***p***	**β**	**95% CI**	***p***
Age (in years)	0.09	(-0.07, 0.25)	0.279	0.04	(-0.13, 0.22)	0.633
Gender F/M	-2.49	(-6.83, 1.86)	0.260	-1.33	(-5.75, 3.09)	0.551
Socioeconomic level:						
High vs Low	10.33	(-2.97, 23.64)	0.127	1.67	(-10.74, 14.08)	0.791
Medium vs Low	3.08	(-1.29, 7.45)	0.165	2.68	(-1.68, 7.04)	0.226
Disease duration (in years)	0.32	(0.04, 0.60)	0.026	0.08	(-0.22, 0.38)	0.601
BMI (in kg/m²)	0.13	(-0.30, 0.55)	0.554	-0.46	(-0.93, 0.01)	0.054
Saskatchewan score:						
High malnutrition risk vs Low	-11.94	(-16.29, -7.59)	<0.001	-11.42	(-17.55, -5.28)	< 0.001
Moderate malnutrition risk vs Low	-6.71	(-12.15, -1.28)	0.016	-6.71	(-12.49, -0.93)	0.023
CDAI score:						
Active disease vs Inactive	-10.26	(-14.3, -6.22)	<0.001	-5.09	(-10.21, 0.03)	0.051
Severe activity vs Inactive	-14.03	(-25.28, -2.79)	0.015	-5.53	(-17.63, 6.56)	0.367
Hospitalization in the past 6 months	-8.77	(-14.14, -3.40)	0.002	-4.43	(-10.01, 1.16)	0.119
Dietary restriction	-3.86	(-8.28, 0.56)	0.087	-	-	-
Bloating	-3.26	(-7.53, 1.00)	0.133	-	-	-
Diarrhea	-12.27	(-17.51, 1.00)	<0.001	-	-	-

BMI : Body Mass Index
CDAI: Crohn's Disease Activity Index
SF-12: Short Form-12 Health Survey Questionnaire

Discussion

The present study evaluated the QoL of patients with CD using a generic tool (SF-12) and a disease-specific instrument (SIBDQ), while also exploring factors associated with QoL.

Results showed that about half of the patients exhibited severe QoL impairment according to the SIBDQ, whereas the mental component of the SF-12 revealed severe impairment in nearly one-fifth of patients, with the physical component being less affected.

The significance of effective psychological support for this patient population is underscored by the substantial association found between the SIBDQ and the mental component of the SF-12.

The most important factor influencing QoL, both in the disease-specific dimension and in the physical and mental components, was shown to be nutritional risk, regardless of how high it was. This correlation demonstrates that malnutrition has a substantial impact on patients' psychological health in addition to their physical health.

These results are consistent with research by Cao et al. [28] and Zhang et al. [29], which used the IBDQ to show that nutritional risk and malnutrition negatively affected QoL in patients with inflammatory bowel disease (IBD), and Vincenzo et al. [30], who connected nutritional status to lower QoL measured by the short form-36 health survey questionnaire (SF-36). Therefore, it seems that managing and assessing diet is essential to raising overall QoL in people with CD.

Another significant factor contributing to worse QoL scores was disease activity, whether mild or severe. This result is consistent with the findings of Van der Have et al. [31] and Almadani et al. [32], who found that disease activity was a major factor affecting QoL. A particularly difficult time is the flare-up phase, which is frequently linked to weight loss, a higher risk of malnutrition, and increased stress, particularly when there is little social support [33–36]. These elements underscore the critical importance of preventive strategies to maintain remission and preserve QoL.

Diarrhea was also found to be a major factor significantly impairing QoL in our study, particularly the mental component, corroborating findings by Ballester Ferré et al. [37]. This symptom results from both inflammatory and non-inflammatory mechanisms [38, 39], justifying its prioritization in management.

Recent hospitalization, an indirect marker of disease severity, was significantly associated with impaired QoL as measured by the SIBDQ, consistent with the results of Blondel-Kucharski et al. [11]. Preventing hospitalizations, notably by maintaining prolonged remission, could thus help limit QoL deterioration [40, 41]. Severe illness flare-ups [42] and clinical deterioration [43], particularly in surgical patients who frequently have extended hospital stays, are the main reasons for hospitalization [44].

Similar to findings from Stjernman et al. [45], Casellas et al. [46], and Moradkhani et al. [47], who reported that women perceive a more pronounced health deterioration and experience greater difficulty coping with the disease than men, female gender was significantly associated with greater

impairment in the physical component of the SF-12in our study.

Bloating was substantially associated with lower SIBDQ scores and the SF-12 physical component based on our results. Bloating and QoL impairment have been linked in a number of studies, albeit with different QoL measures [48–50], indicating that bloating may either directly or indirectly contribute to a drop in QoL.

In univariable analysis, dietary restriction—which is frequently self-imposed without medical supervision was also linked to a lower QoL, which is in line with findings by Varni and al. [51] and Day and al. [52]. Such behaviors can worsen the decline in QoL and cause nutritional deficits [53].

In univariable analysis, disease duration was positively correlated with QoL, which is consistent with Casellas and al. [54], indicating that patients gradually adjust to their condition over time.

Last but not least, a lower socioeconomic position was linked to lower QoL scores, supporting findings from Moradkhani et al. [47] and the Sainsbury and Heatley narrative review [55], underscoring the detrimental effects of social factors.

The strength of our study lies in the comparison between two health-related QoL measurement tools: a generic instrument and another specific to inflammatory bowel diseases. Despite the considerable number of participants included, this study is limited by its monocentric nature. Only the capital city was involved, and it would have been valuable to include other cities across the country, although this was hindered by logistical constraints.

This work has demonstrated the value of integrating two QoL measurement tools to achieve a more nuanced analysis. Further research aimed at improving the QoL of patients with CD is needed to implement appropriate management strategies and thereby reduce patient suffering. Ideally, QoL assessments should be incorporated into a cohort study to analyze the impact of the disease on QoL over time, whether in the context of complications or improvements.

Conclusion:

This study is the first in Morocco to simultaneously use two tools—a generic and a disease-specific instrument—to assess health-related QoL in patients with CD. It was demonstrated that these patients' QoL is considerably reduced by using both the SIBDQ and the SF-12. Female gender, recent hospitalization, disease activity, and nutritional risk were the primary factors that contributed to this impairment. These results emphasize how crucial it is to use a multifaceted approach that incorporates medical, dietary, and psychological care in order to improve patients' QoL over the long term.

Ethical approval: Favorable approval was obtained from the Biomedical Research Ethics Committee affiliated with Mohammed V University, Faculty of Medicine and Pharmacy of Rabat, Morocco, under reference number 149/24. This ethics committee is registered with the U.S. Department of Health and Human Services' Office for Human Research Protections (OHRP) under the registration number IORG0006594 (http://ohrp.cit.nih.gov/search/search.aspx).

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Abbreviations:

CDAI: Crohn's Disease Activity Index
IBDQ: Inflammatory Bowel Disease Questionnaire
BMI: Body Mass Index
IBD: Inflammatory Bowel Diseases
QoL: Quality of Life
Sask IBD-NR: Saskatchewan Inflammatory Bowel Disease – Nutrition Risk
SF-12: Short Form-12 Health Survey Questionnaire
SF-36: Short Form-36 Health Survey Questionnaire
SIBDQ: Short Inflammatory Bowel Disease Questionnaire

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