Results

Patients' demographic data (Table 9):

- Thirty-one patients were enrolled in the study; 18 males (58.1%) and 13 females (41.9%).
- Mean age of studied patients was 38.2±10.9; range: 19-52 years. Mean age of male patients was 38.4±11.4; range: 19-52 years, while mean age of female patients was 37.9±10.7; range: 21-52 years. Female patients were non-significantly (p.0.05) younger than male patients, (Fig. 1).
- Mean body weight of patients was 83.5±2.8; range: 79-88 Kg. Mean body weight of male patients was 82.8±2.3; range: 79-86 Kg, while mean body weight of female patients was 84.6±3.1; range: 79-88 Kg.
- Mean height of patients was 164.1±3.5; range: 155-171 cm. Mean height of male patients was 165.1±2.9; range: 161-171 Kg, while mean height of female patients was 162.8±3.8; range: 155-168 cm.
- Mean body mass index of enrolled patients was 31.1±1.4; range: 27.3-32.9 Kg/m^2. Mean body mass index of male patients was 30.4±1.5; range: 27.3-32.8 Kg/m^2, while mean body mass index of female patients was 31.9±0.6; range: 30.9-32.9 Kg/m^2. Female patients had a significantly (Z=2.329, p=0.02) higher body mass index compared to male patients, (Fig. 2).

Table (9): Patients' demographic data

	Total	*Males*	*Females*
Number	31	18 (58.1%)	13 (41.9%)
Age (years)	38.2±10.9 (19-52)	38.4±11.4 (19-52)	37.9±10.7 (21-52)
Weight (Kg)	83.5±2.8 (79-88)	82.8±2.3 (79-86)	84.6±3.1 (79-88)
Height (cm)	164.1±3.5 (155-171)	165.1±2.9 (161-171)	162.8±3.8 (155-168)
BMI (Kg/m^2)	31.1±1.4 (27.3-32.9)	30.4±1.5 (27.3-32.8)	31.9±0.6 (30.9-32.9)*

*: significant versus males

Fig. (1): Mean (±SD) age of studied patients categorized according to gender

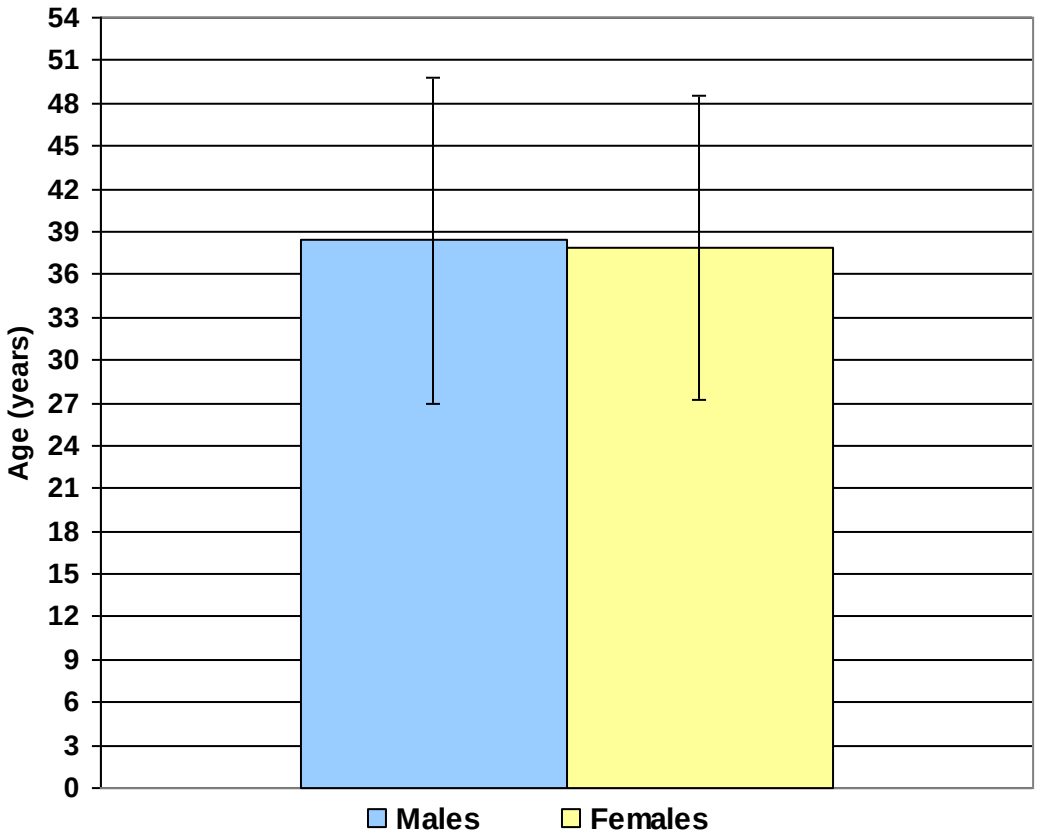
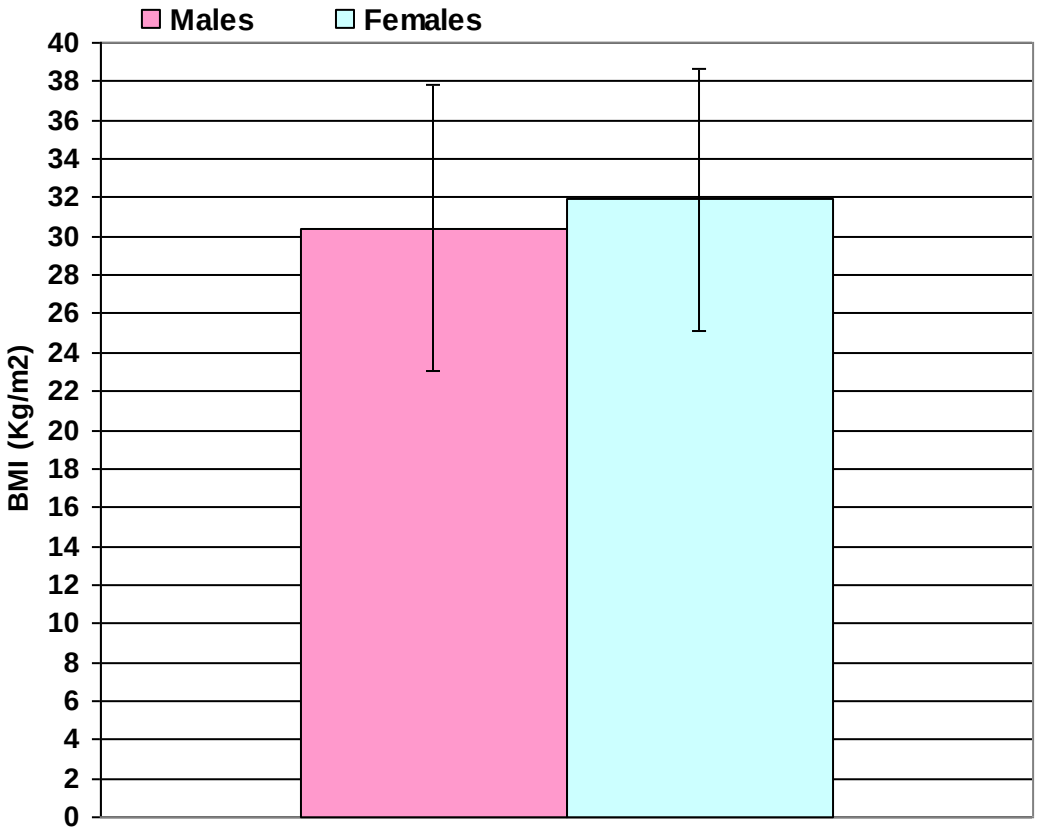


Fig. (2): Mean (±SD) BMI of studied patients categorized according to gender



Disease Severity Evaluation:

- Seven (22.6%) patients had CD, while the other 24 (76.4%) patients had UC, (Fig. 3).
- Mean total disease activity (Table 10)
  - Mean total disease activity score was 4.42±2.1; range: 2-10. Mean total disease activity score in UC patients was 4.3±1.9; range: 2-7, while mean total disease activity score in CD patients was 5.43±2.8; range: 3-10. (Fig. 4). There was a non-significant ($p>0.05$) difference between reported disease activity scores in patients with UC and CD.
  - Fourteen (45.2%) patients had active disease; 12 had UC (50%) and 2 patients (28.6%) had CD.
  - Mean total disease activity score in active UC patients was 6.1±0.8; range: 5-7, while in quiescent UC patients was 2.5±0.5; range: 2-3. Mean total disease activity score in active CD patients was 9.5±0.7; range: 9-10, while mean total disease activity score in quiescent CD patients was 3.8±0.44; range: 3-4, (Fig. 5).
  - There was a significant ($Z=2.765$, $p=0.011$) increase of activity score in patients with active CD compared to patients with active UC.
  - Also, patients with active CD had a significantly higher disease activity score ($Z=3.098$, $p=0.005$) compared to those with quiescent CD.
  - Moreover, patients with active UC had a significantly higher disease activity score ($Z=2.846$, $p=0.012$) compared to those with quiescent UC.

Table (10): Total disease activity scores

	Total	UC	CD
Total	4.42±2.1 (2-10)	4.3±1.9 (2-7)	5.43±2.8 (3-10)
Active	6.4±1.5 (5-10)	6.1±0.8 (5-7)†	9.5±0.7 (9-10)*†
Quiescent	2.9±0.8 (2-4)	2.5±0.5 (2-3)	3.8±0.44 (3-4)*

*: significant versus UC patients

†: significant versus quiescent disease

Fig. (3): Patients' distribution according to type of IBD

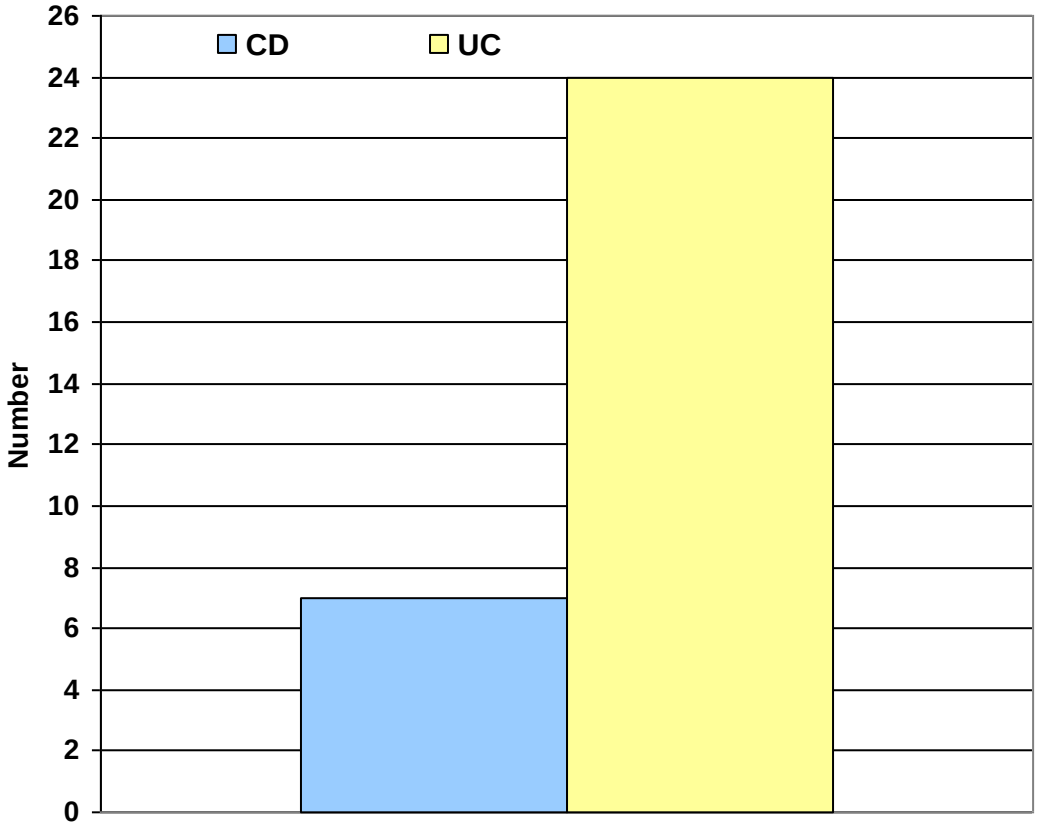


Fig. (4): Mean (±SD) total disease activity score detected in studied patients categorized according to type of IBD

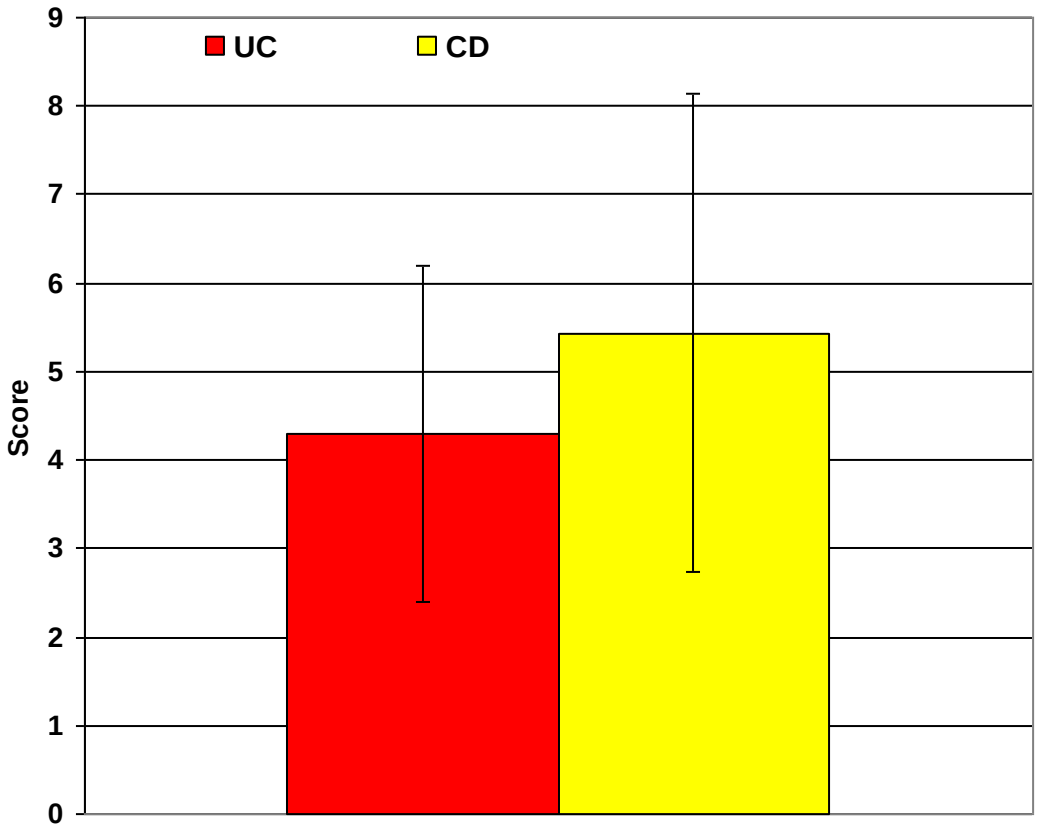
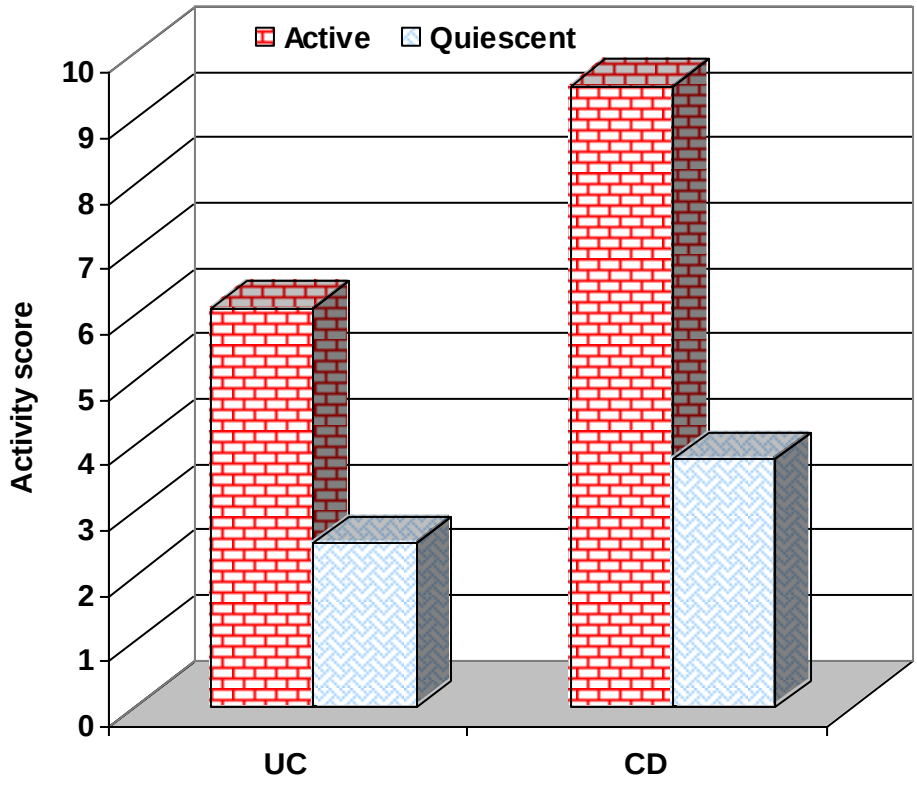


Fig. (5): Mean disease activity score detected in studied patients categorized according to type of IBD and activity status



Mean differential disease activity (Table 11)

1. Frequency of bowel motions

- All patients had increased frequency of bowel motions with a mean score of 1.77±0.72; range: 1-3.
- Patients with active disease had a significantly (Z=2.968, p=0.003) higher frequency of bowel motions compared to those with quiescent disease.
- Five patients with active disease (3 UC & 2 CD) had scored 3 (8 times/day).
- Fourteen patients (11 UC & 3 CD) had scored 2 (about 8 times/day); 8 patients had active disease, while the other 6 patients had quiescent disease.
- Twelve patients (10 UC & 2 CD) had scored 1 (6 times/day); 11 patients had quiescent disease, while only one patient had active disease, (Fig. 6).

2. Abdominal Pain

- All patients complained of abdominal pain with a mean score of 1.61±0.67; range: 1-3.
- Patients with active disease had a significantly (Z=2.804, p=0.005) higher frequency and severity of abdominal pain compared to those with quiescent disease.
- Only 3 patients with active disease (2 UC & 1 CD) had sever frequent pain scored 3.
- Thirteen patients (12 UC & 1 CD) had pain that was moderate both in severity and frequency and was scored 2; 10 patients had active disease, while the other 3 patients had quiescent disease.
- Fifteen patients (10 UC & 5 CD) had pain that was mild both in severity and frequency and was scored 2; 14 patients had quiescent disease, while only one patient had active disease, (Fig. 7).

Fig. (6): Patients' distribution according to scores of frequency of bowel motions

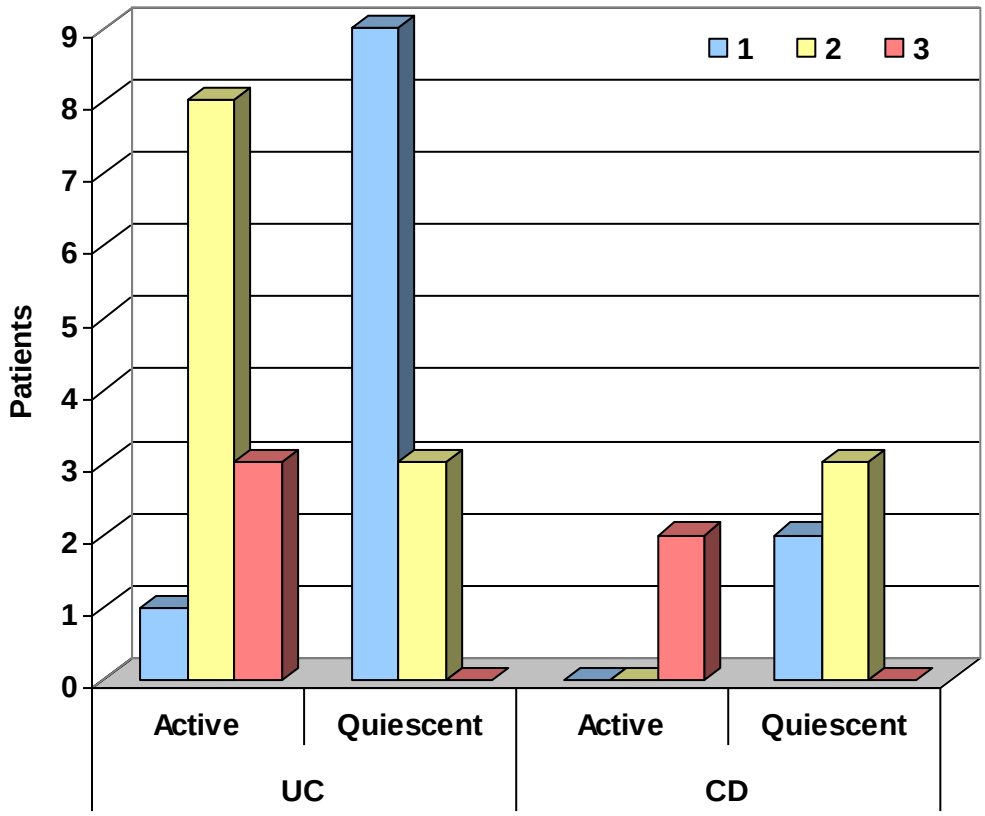
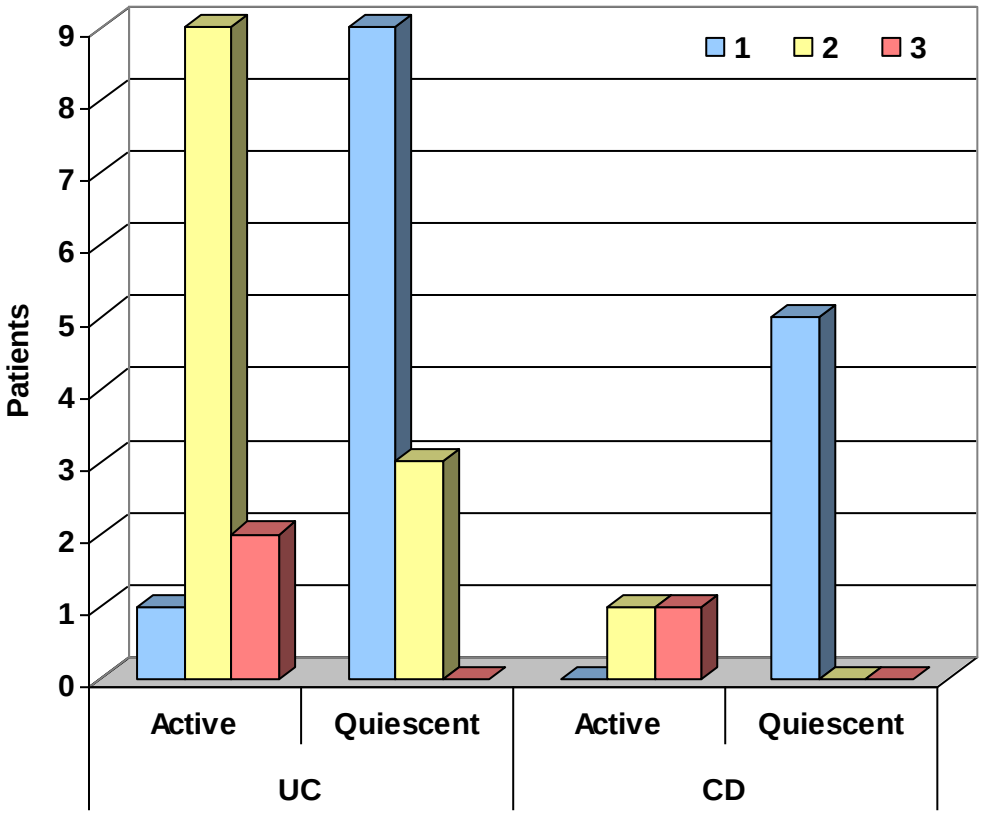


Fig. (7): Patients' distribution according to scores of abdominal pain



2. General well-being

- Mean well-being score was 0.77±0.76; range: 0-2.
- Patients with quiescent disease had a significantly (Z=3.416, p=0.001) higher general well-being status compared to those with active disease.
- Thirteen patients (12 UC & 1 CD) with quiescent disease had no complaint of affection of general condition and were well (score=0).
- Twelve patients (8 UC & 4 CD) were slightly well and were scored 1; 8 patients had active disease, while the other 4 patients had quiescent disease.
- Six patients (4 UC & 2 CD) with active disease had poor general condition and were scored 2, (Fig. 8).

3. Extra-intestinal Manifestations

- Only 4 patients with active disease had extra-intestinal manifestations and were scored 1; 3 (2 UC & 1 CD) had associated arthropathy and one patient with CD had uveitis.
- The other 27 patients were free of extra-abdominal manifestations of IBD, (Fig. 9).

4. Anal Complications

- Only 4 patients with CD (2 had active & 2 had quiescent disease) had anal complications; one patient had recurrent peri-anal abscess, 2 had chronic anal fissure that recurred twice in one patient and the 2nd had recurrent fissure for 3 times. Excision biopsy of the fissure confirmed the diagnosis. The 4th patient had high peri-anal fistula crossing the internal sphincter by 2 branches as defined on fistulogram, (Fig. 9).

Fig. (8): Patients' distribution according to scores of General well-being status

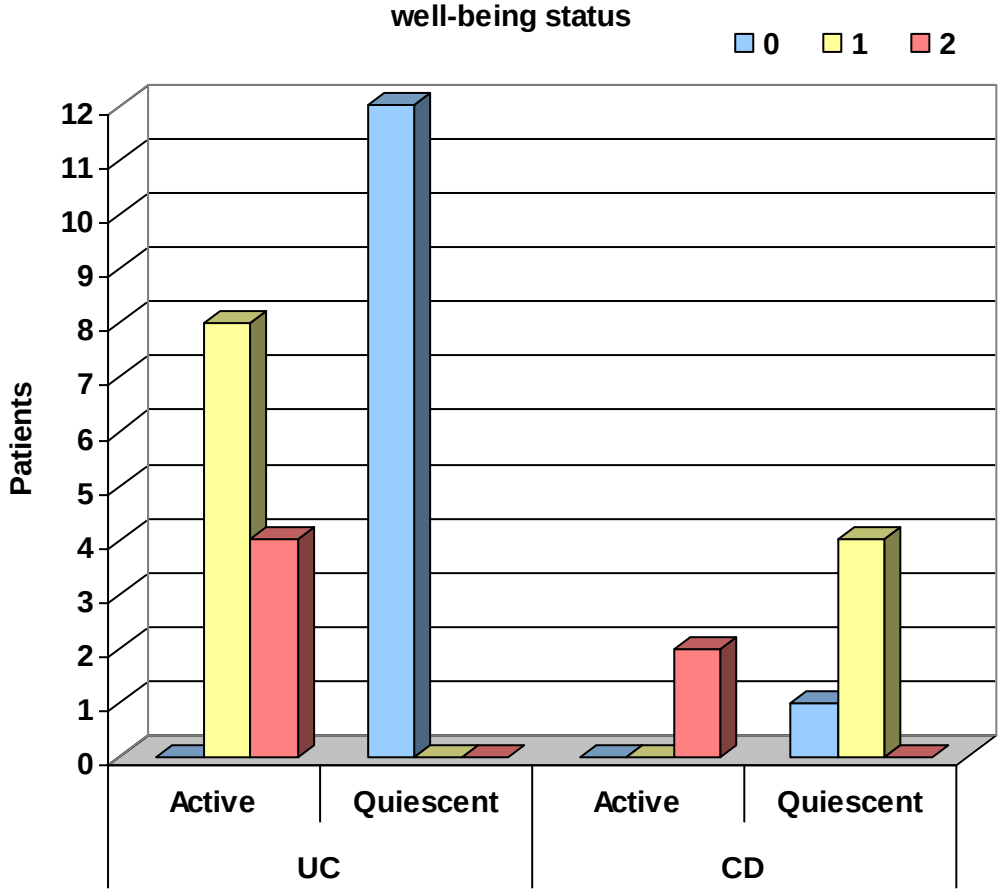


Fig. (9): Patients' distribution according to the frequency of extra-intestinal manifestations & anal complications

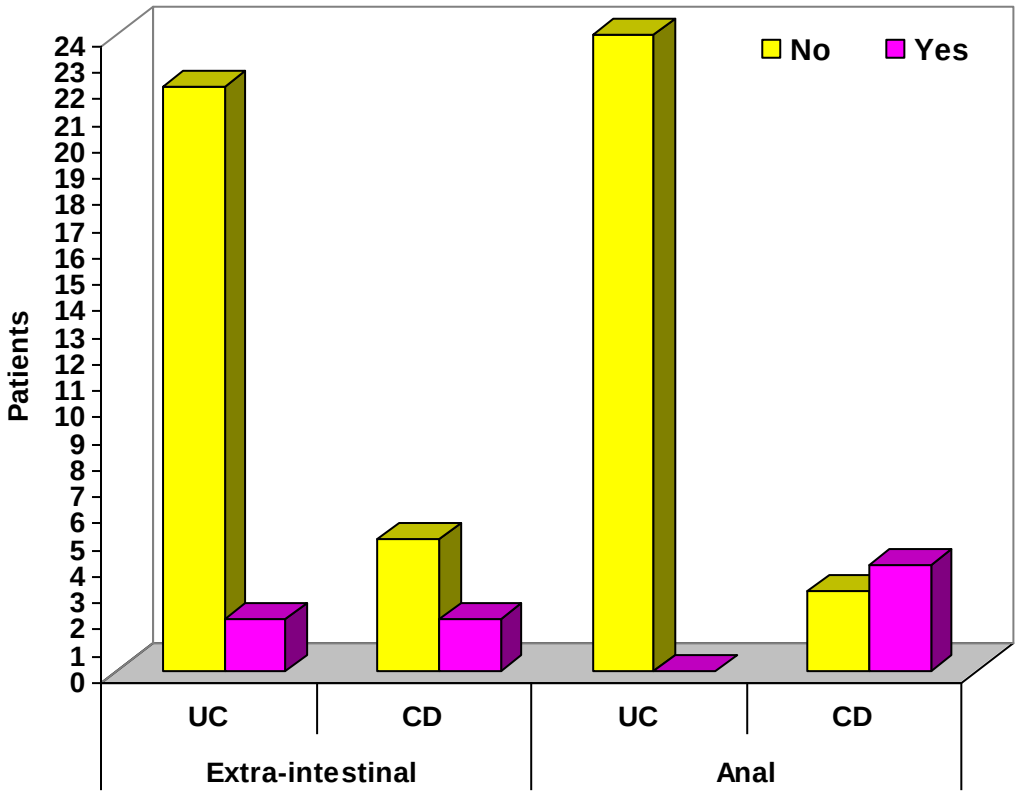


Table (11): Differential disease activity scores

		Motion/day	Abdominal pain	General well-being	Complications	
					Extra-intestinal	Anal
UC	Quiescent	1.25±0.45 (1-2)	1.25±0.45 (1-2)	0	0	0
	Active	2.17±0.58 (1-3)	2.08±0.51 (1-3)	1.33±0.49 (1-2)	0.5±0.52 (0-1)	0
	Total	1.71±0.7 (1-3)	1.67±0.6 (1-3)	0.67±0.76 (0-2)	0.25±0.44 (0-1)	0
CD	Quiescent	1.6±0.55 (1-2)	1	0.8±0.45 (0-1)	0.4±0.55 (0-1)	0
	Active	3	2.5±0.71	2	1	1
	Total	2±0.82 (1-3)	1.43±0.79 (1-3)	0.29±0.49 (0-1)	0.29±0.49 (0-1)	0.57±0.5 (0-1)
Total	Quiescent	1.4±0.5 (1-2)	1.2±0.4 (1-2)	0.2±0.4 (0-1)	0	0.12±0.3 (0-1)
	Active	2.3±0.6 (1-3)	2.2±0.4 (2-3)	1.4±0.5 (1-2)	0.3±0.5 (0-1)	0.14±0.4 (0-1)
	Total	1.8±0.7 (1-3)	1.6±0.7 (1-3)	0.8±0.8 (0-2)	0.13±0.3 (0-1)	0.13±0.3 (0-1)

❖ **Endoscopic Findings Grading (Table 12)**

1. Ulcerations (Fig. 10 & 11)

a) Occurrence

- The most frequent sign with a mean score of 1.45±0.51; range: 1-2.
- No patient was free of ulcerations; 17 patients (54.8%) had ulcers scored 1 and 14 patients (45.2%) had ulcers scored 2.
- All patients with clinically active disease (1.71±0.47; range: 1-2) had significantly (Z=3, p=0.003) higher score compared to those with clinically quiescent disease (1.24±0.44; range: 1-2).

b) Extent

- The mean total score extent was 1.5±0.78; range: 1-2.
- Sixteen patients (51.6%) had ulcers' extent scored 1 and 15 patients (48.4%) had ulcers' extent scored 2.
- All patients with clinically active disease (1.86±0.36; range: 1-2) had significantly (Z=3.162, p=0.002) higher extent score compared to those with clinically quiescent disease (1.18±0.39; range: 1-2).

c) Severity

- The mean total score extent was 0.58±0.57; range: 0-2.
- Fifteen patients (48.4%) had ulcers' severity scored 0, another 15 patients (48.4%) had ulcers' severity scored 1 and only one patient (3.2%) had ulcers' severity scored 2.
- All patients with clinically active disease (0.86±0.53; range: 0-2) had significantly (Z=2.496, p=0.013) higher extent score compared to those with clinically quiescent disease (0.29±0.47; range: 0-1).

Fig. (10): Patients' distribution according to scores of each of ulceration characters

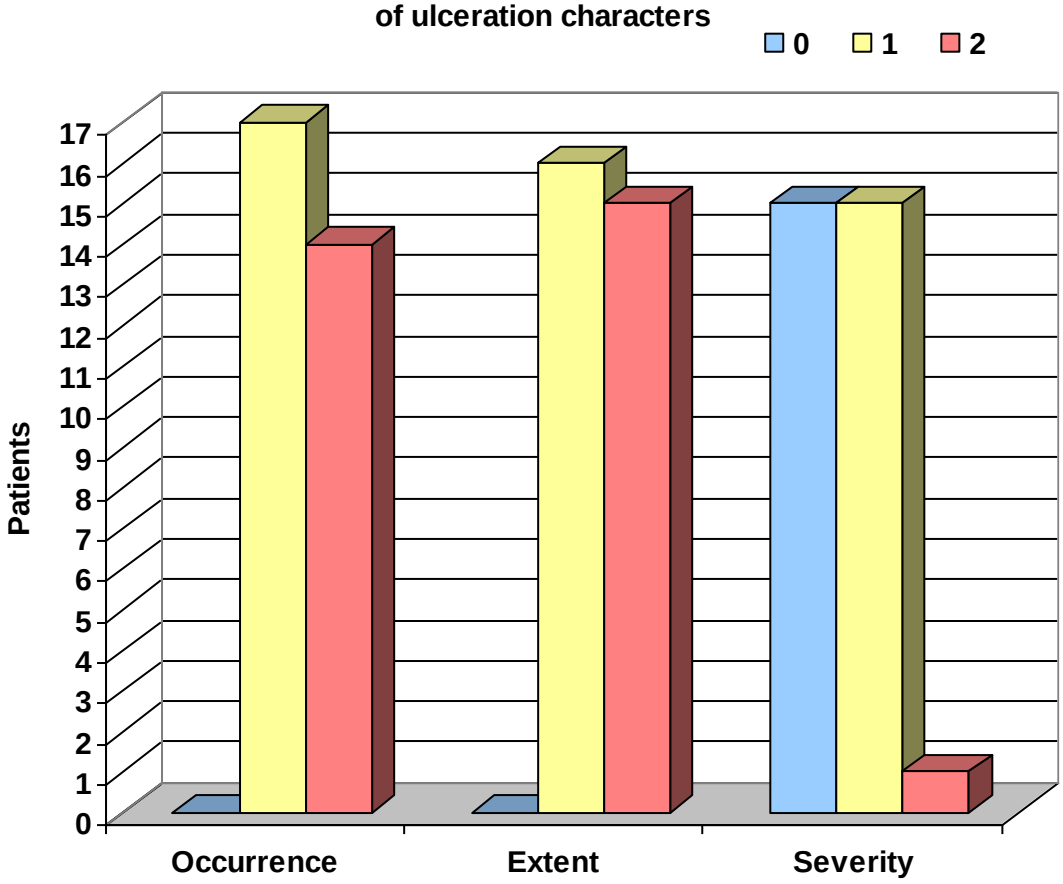
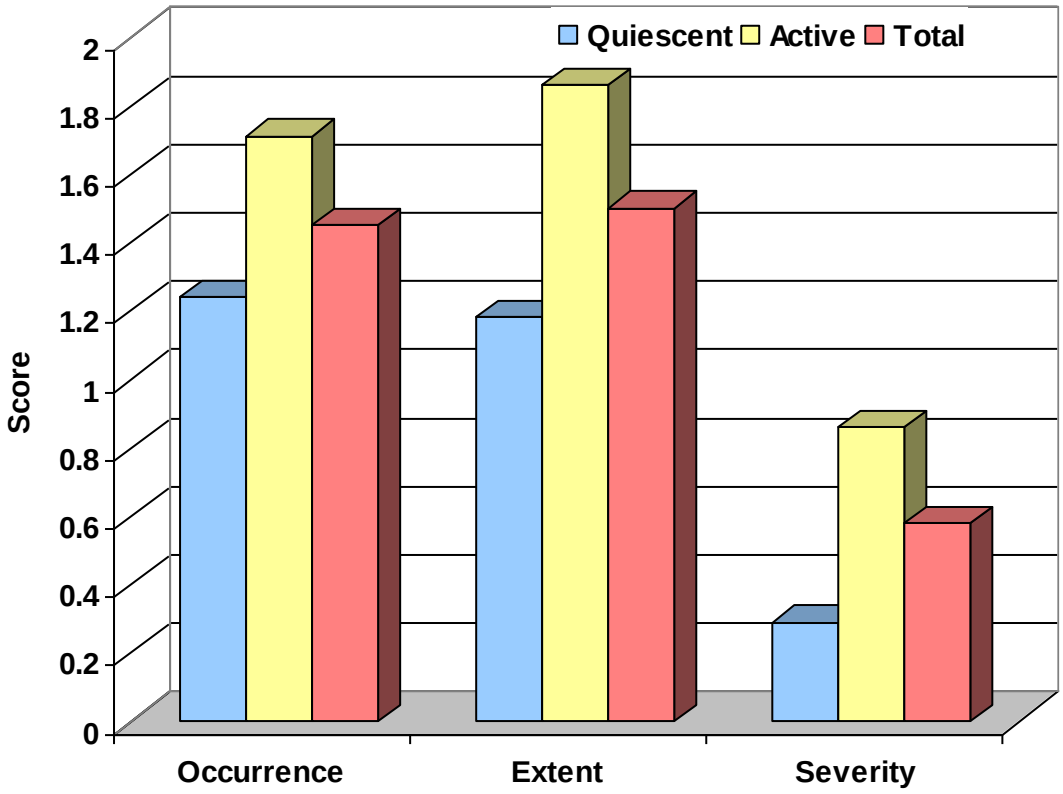


Fig. (11): Scores of each of ulceration characters determined in patients categorized according to activity status



2. <u>Mucosal Vascularity</u> (Fig. 12 & 13)

a) Erythema

- The second most frequent sign with a mean score of 1.32±0.65; range: 0-2.
- Only 3 patients (9.7%) were free of erythema (score=0), 16 patients (51.6%) had mild erythema (score=1) and 12 patients (38.7%) had moderate erythema (score=2).
- All patients with clinically active disease had erythematous mucosa with mean score of 1.79±0.43; range: 1-2 that was significantly (Z=2.762, p=0.006) higher compared to those with clinically quiescent disease (0.94±0.56; range: 0-2).

b) Vascular pattern

- Only 5 patients (16.1%) had mild mucosal vascularity (score=0), 19 patients (61.3%) had moderate vascularity (score=1) and 7 patients (22.6%) had extensive vascularity (score=2).
- The mean score of 1.06±0.63; range: 0-2.
- All patients with clinically active disease had vascular mucosa with mean score of 1.36±0.5; range: 1-2 that was significantly (Z=2.271, p=0.023) higher compared to those with clinically quiescent disease (0.82±0.64; range: 0-2).

c) Spontaneous bleeding

- Only 2 patients (6.5%) had spontaneously bleeding mucosa (score=2), 19 patients (61.3%) had mucosa that bleed on touch (score=1) and 10 patients (32.2%) had mucosa with no liability to bleed (score=0).
- The mean score of 0.74±0.58; range: 0-2.
- All patients with clinically active disease had spontaneously bleeding mucosa or easily bleeding mucosa on touch with mean score of 0.93±0.62; range: 0-2 that was non-significantly (Z=1.613, p>0.05) higher compared to those with clinically quiescent disease (0.59±0.51; range: 0-1), (Fig. 12).

Fig. (12): Patients' distribution according to scores of mucosal vascularity

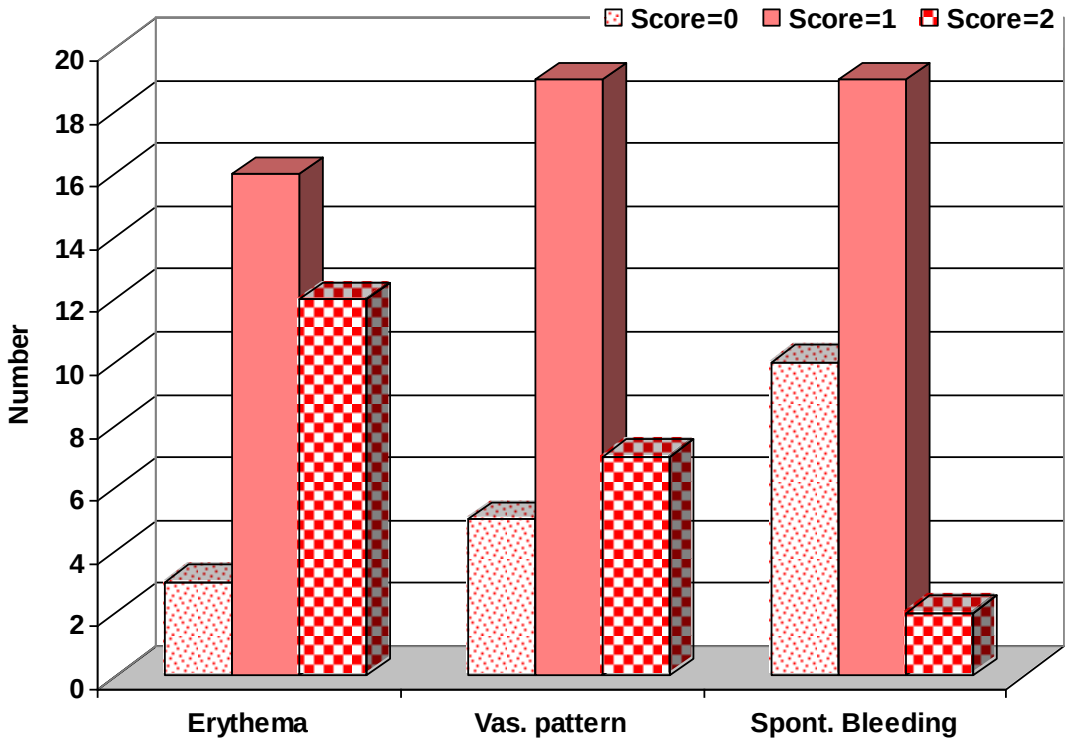
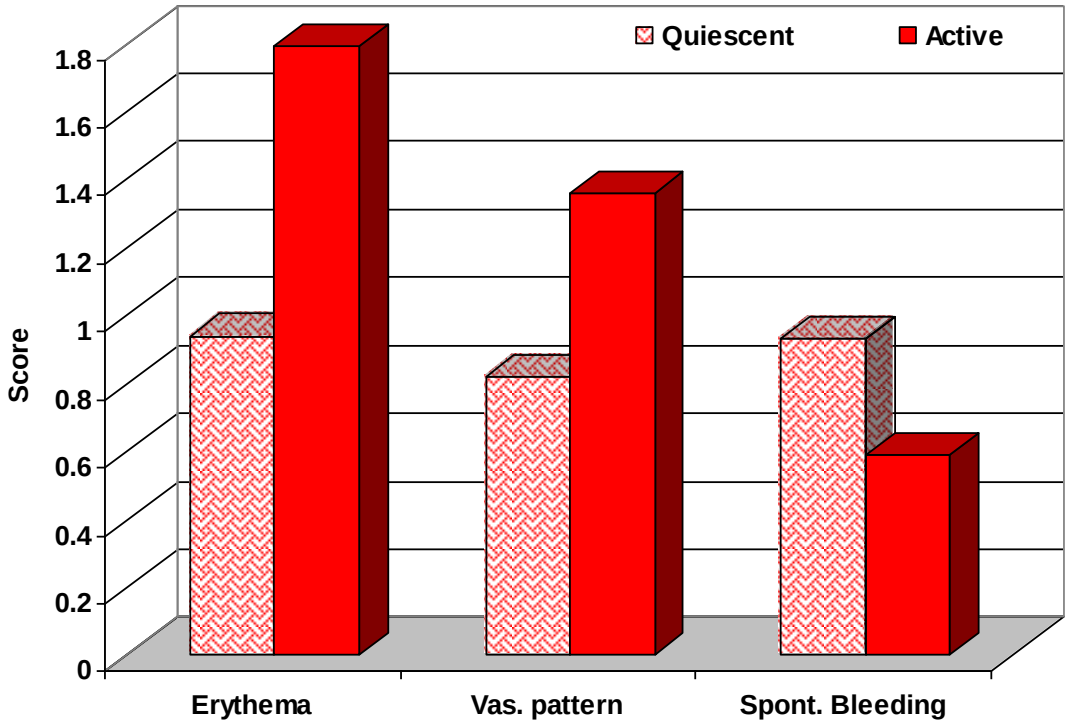


Fig. (13): Mean scores of mucosal vascularity reported in patients categorized according to activity status



3. Mucosal Texture (Fig. 14 & 15)

a) Friability

- Mucosal friability was reported in 24 patients (77.4%); 16 patients mucosa was scored 1 and in the other 8 patients was scored 2 as regards friability. Non-friable mucosa was reported in only 7 patients (22.6%) and was scored 0.
- The mean score of 1.03±0.71; range: 0-2.
- All patients with clinically active disease had friable with mean score of 1.21±0.58; range: 0-2 that was non-significantly ($Z=1.232$, $p>0.05$) higher compared to those with clinically quiescent disease (0.88±0.78; range: 0-2).

b) Granularity

- Only 2 patients (6.5%) had granular mucosa that scored 2, 14 patients (45.2%) had granular mucosa that scored 1, while in 15 patients (48.3%) mucosa showed no granularity (score=0).
- The mean score of 0.58±0.62; range: 0-2.
- Patients with clinically active disease had granular mucosa with a mean score of 0.79±0.7; range: 0-2 that was significantly ($Z=2.111$, $p=0.035$) higher compared to those with clinically quiescent disease (0.41±0.51; range: 0-1).

4. Mucopurulent discharge

- Twelve patients (38.7%) had mucopurulent discharge that scored 2, 15 patients (48.4%) had discharge that scored 1, while in 4 patients (12.9%) had no discharge could be detected (score=0).
- The mean score of 1.26±0.68; range: 0-2.
- Patients with clinically active disease had discharge that had a mean score of 1.29±0.61; range: 0-2 that was non-significantly ($Z=0.632$, $p>0.05$) higher compared to those with clinically quiescent disease (1.24±0.75; range: 0-2).

Fig. (14): Patients' distribution according to scores of mucosal fiability and granularity

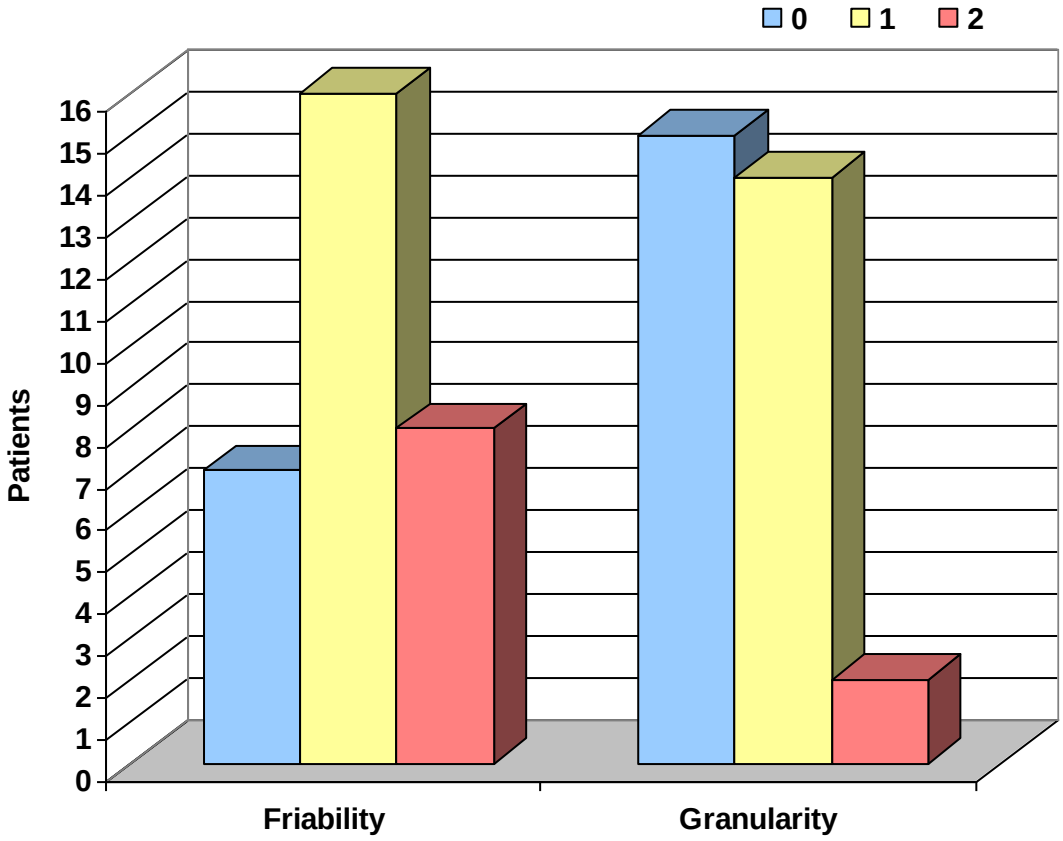


Fig. (15): Mean scores of mucosal integrity & surface reported in patients categorized according to activity status

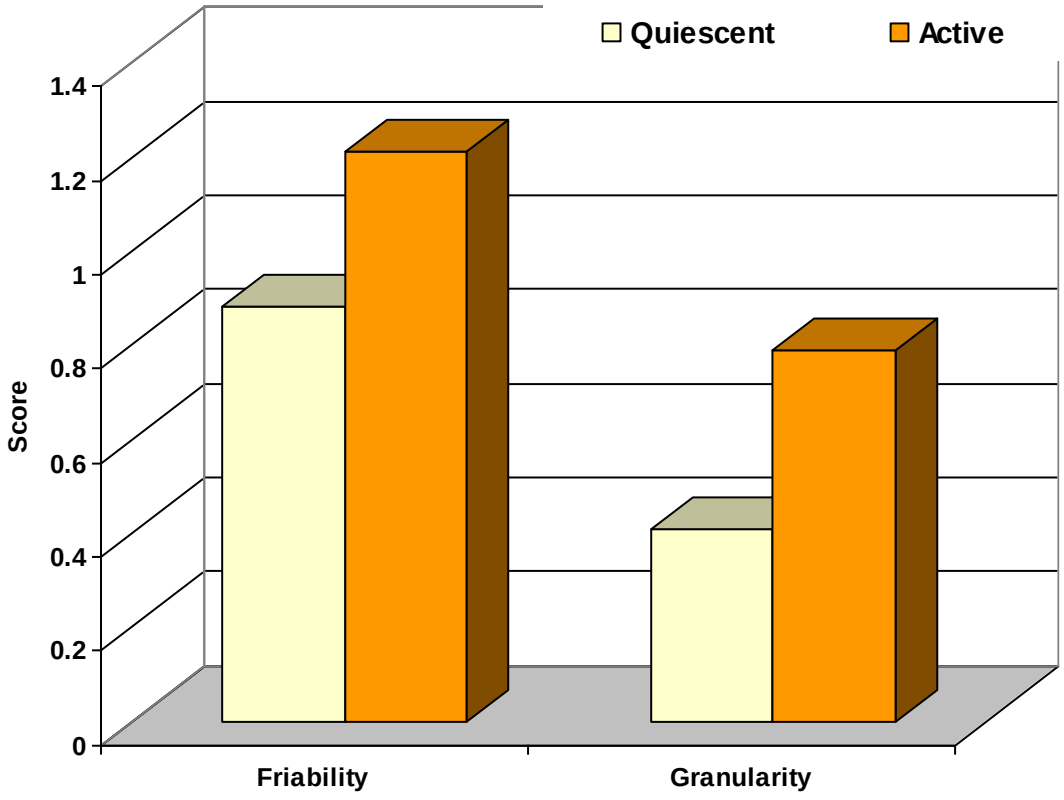


Table (12): Patients' distribution according to endoscopic findings and their scores

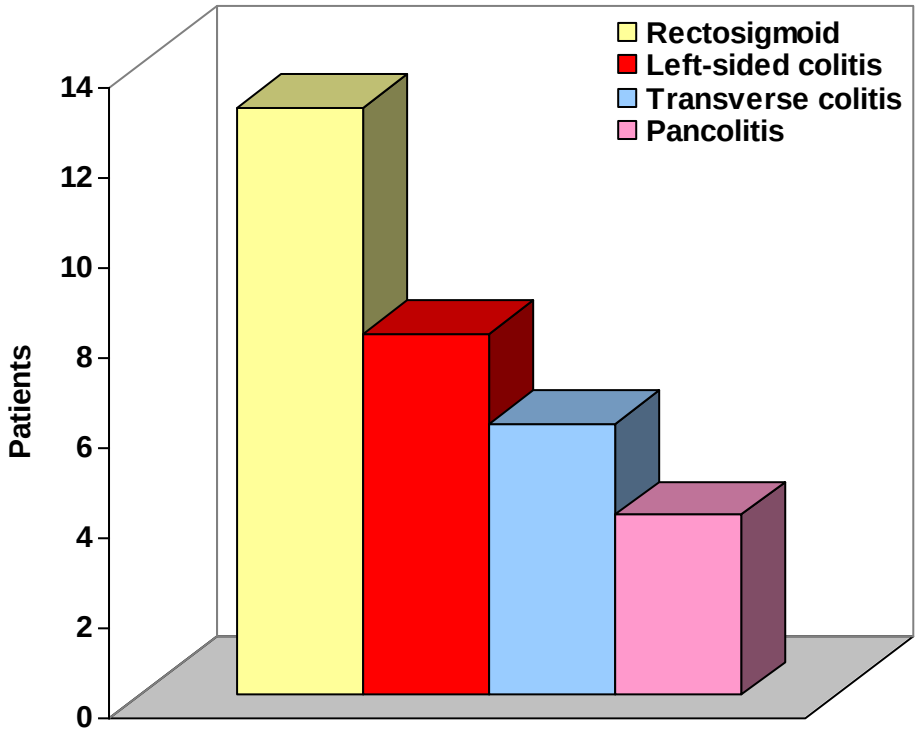
		Distribution among score grades			Score		
		0	1	2	Quiescent	Active	Total
Ulceration	Occurrence	0	17 (54.8%)	14 (45.2%)	1.24±0.44 (1-2)	1.71±0.47* (1-2)	1.45±0.5 (0-2)
	Extent	0	16 (51.6%)	15 (48.4%)	1.18±0.39 (1-2)	1.86±0.36* (1-2)	1.5±0.78 (1-2)
	Severity	15 (48.4%)	15 (48.4%)	1 (3.2%)	0.29±0.47 (0-1)	0.86±0.53* (0-2)	0.58±0.57 (0-2)
Erythema		3 (9.7%)	16 (51.6%)	12 (38.7%)	0.94±0.56 (0-2)	1.79±0.43* (1-2)	1.32±0.65 (0-2)
Vascular pattern		5 (16.1%)	19 (61.3%)	7 (22.6%)	0.82±0.64 (0-2)	1.36±0.5* (1-2)	1.06±0.63 (0-2)
Friability		7 (22.6%)	16 (51.6%)	8 (25.8%)	0.88±0.78 (0-2)	1.21±0.58 (0-2)	1.03±0.71 (0-2)
Spontaneous bleeding		10 (32.2%)	19 (61.3%)	2 (6.5%)	0.59±0.51 (0-1)	0.93±0.62 (0-2)	0.74±0.58 (0-2)
Granularity		12 (38.7%)	15 (48.4%)	4 (12.9%)	0.58±0.62 (0-2)	0.79±0.7 (0-2)	0.41±0.51 (0-2)
Mucopurulent discharge		10 (32.2%)	19 (61.3%)	2 (6.5%)	1.26±0.68 (0-2)	1.29±0.61 (0-2)	1.24±0.75 (0-2)

*: significant versus quiescent disease

❖ **<u>The extent of disease</u> (Fig. 16)**

1. Rectosigmoiditis was recorded in 13 patients (41.9%).
2. Left-sided colitis was recorded in 8 patients (25.6%).
3. Transverse colitis was recorded in 6 patients (19.4%).
4. Pancolitis was recorded in 4 patients (13.1%).

Fig. (16): Patients' distribution according to the extent of IBD in colon



Laboratory Findings

- There was a mosaic pattern of antibodies detection; 19 samples were pANCA+ and 14 samples were ASCA+, (Fig. 11).
  - Only 3 samples were pANCA-/ASCA-.
  - Only 5 samples were pANCA+/ASCA+
  - Nine samples were pANCA-/ASCA+
  - Fourteen samples were pANCA+/ASCA-.

- Distribution of patients with either UC or CD among antibody groups was as follows, (Fig. 12):

  A) UC (n=24)
  - Two samples were pANCA-/ASCA-.
  - Four samples were pANCA+/ASCA+
  - Four samples were pANCA-/ASCA+
  - Fourteen samples were pANCA+/ASCA-.

  B) CD (n=7)
  - One sample was pANCA-/ASCA-.
  - One sample was pANCA+/ASCA+
  - Five samples were pANCA-/ASCA+
  - No sample was pANCA+/ASCA-.

Fig. (17): Patients' distribution according to the positivity of pANCA &/or ASCA

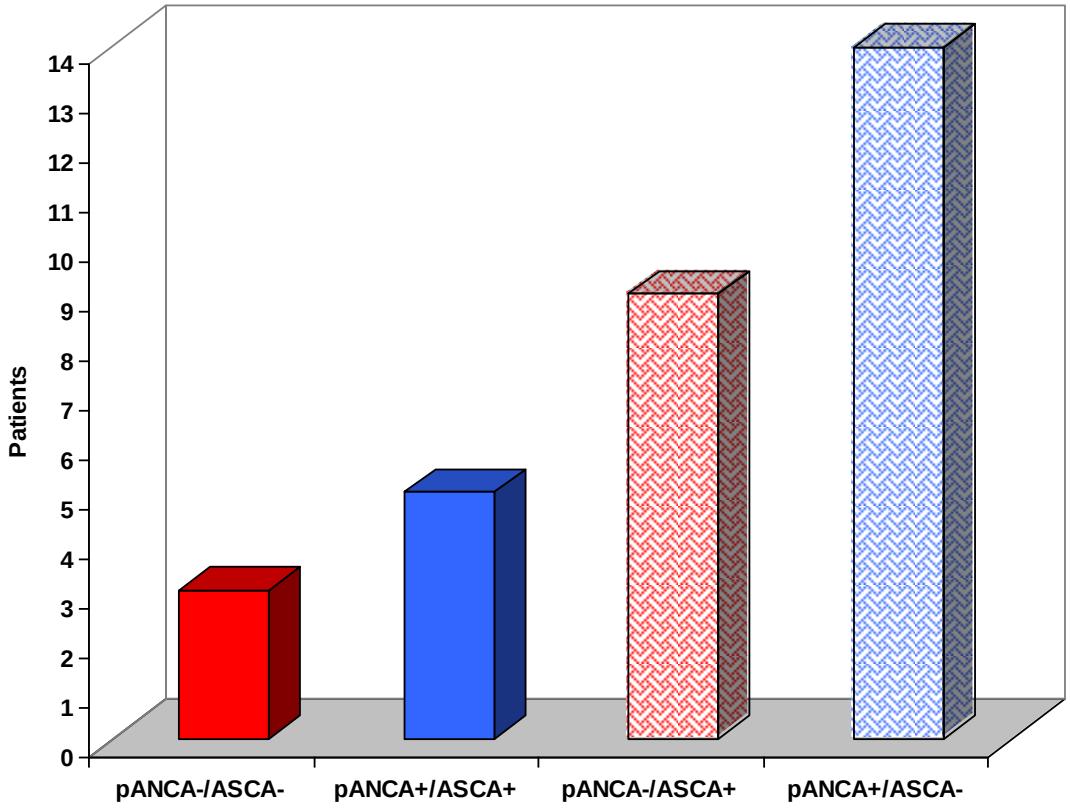
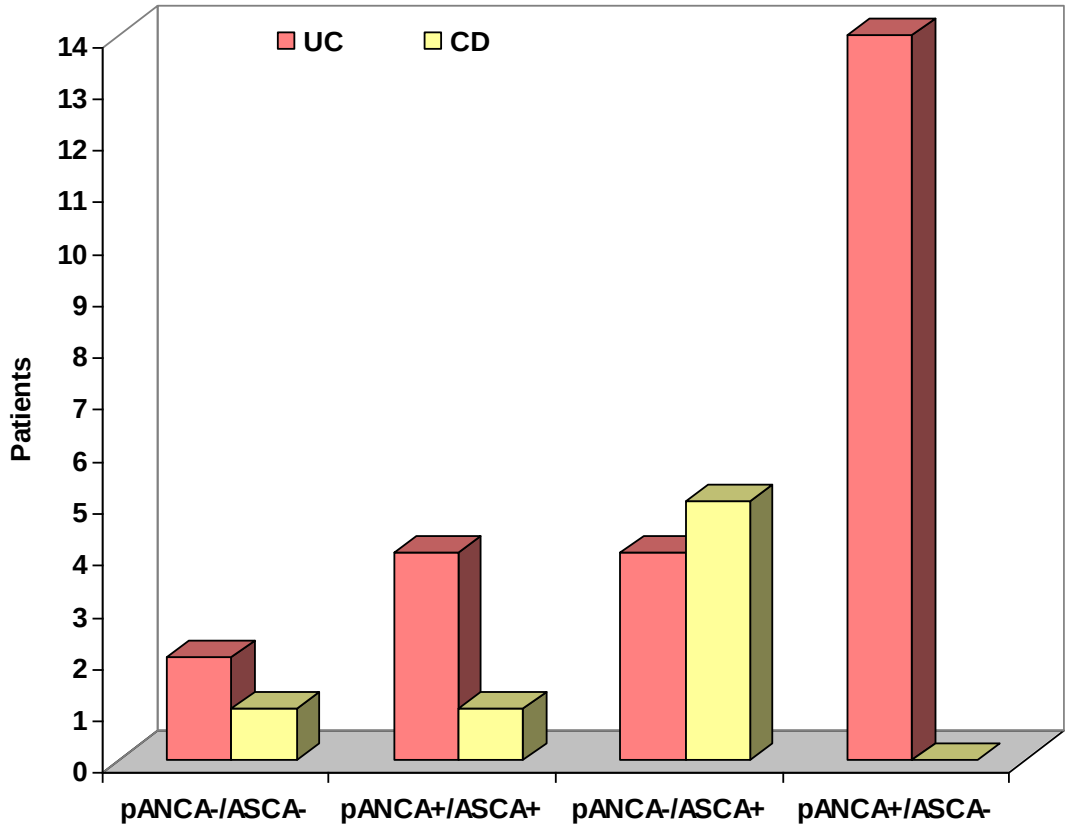


Fig. (18): Patients' distribution according to the positivity of pANCA &/or ASCA and type of IBD



❖ **Test Validity Characters of estimated parameters**

1. **For Diagnosis of IBD**

   - ***pANCA***: There were 12 false negative results with a sensitivity rate for diagnosis of IBD of 61.3%, irrespective of the type of IBD.
   - ***ASCA***: There were 17 false negative results with a sensitivity rate for diagnosis of IBD of 45.2%, irrespective of the type of IBD.
   - ***Both together***: There were 27 false negative results with a sensitivity rate for diagnosis of IBD of 14.3%, irrespective of the type of IBD.
   - There was a non-significant (X^2=0.229, p>0.05) difference between the diagnostic yield using either of the studied parameters

2. **For diagnosis of CD**

   - ***pANCA***: All cases with CD were missed if diagnosis relied on pANCA alone.
   - ***ASCA***: There were 5 true positive results and only 2 cases were missed with a sensitivity rate for diagnosis of CD of 71.4%, specificity rate of 83.3% and accuracy of diagnosis by a rate of 80.6%.
   - ***Both together***: There was only one true positive result and 6 patients were missed with a sensitivity rate for diagnosis of CD of 14.3%, specificity rate of 83.3% and accuracy of diagnosis by a rate of 67.7%.
   - There was a significant (X^2=12.227, p<0.001) increase of the diagnostic yield using ASCA for diagnosis of CD patients.

3. **For diagnosis of UC**

   - ***pANCA***: There were 14 true positive results with a sensitivity rate for diagnosis of UC of 56%, specificity rate of 85.7% and accuracy of diagnosis by a rate of 62.5%.
   - ***ASCA***: There were 4 true positive results with a sensitivity rate for diagnosis of UC of 22.2%, specificity rate of 16.7% and accuracy of diagnosis by a rate of 20.8%.

- ***Both together***: There were 4 true positive results with a sensitivity rate for diagnosis of UC of 16.7%, specificity rate of 85.7% and accuracy of diagnosis by a rate of 87.1%.
- There was a significant (X^2=8.616, $p<0.01$) increase of the diagnostic yield using pANCA for diagnosis of UC patients.

❖ **Correlations of estimated parameters**

A) pANCA

- There was a negative non-significant correlation between positivity for pANCA and age of patients with UC, (r=-0.194, p>0.05), (Fig. 19).
- There was a positive significant correlation between positivity for pANCA and endoscopic grading of UC, (r=0.573, p=0.003), (Fig. 20).
- There was a positive significant correlation between positivity for pANCA and clinical activity scores of patients with UC, (r=0.483, p=0.017), (Fig. 21).

B) ASCA

- There was a negative significant correlation between positivity for ASCA and age of patients with CD, (r=-0.794, p=0.033), (Fig. 22).
- There was a positive significant correlation between positivity for ASCA and endoscopic grading of CD, (r=0.798, p=0.031), (Fig. 23).
- There was a positive non-significant correlation between positivity for ASCA and clinical activity scores of patients with CD, (r=0.586, p>0.05), (Fig. 24).

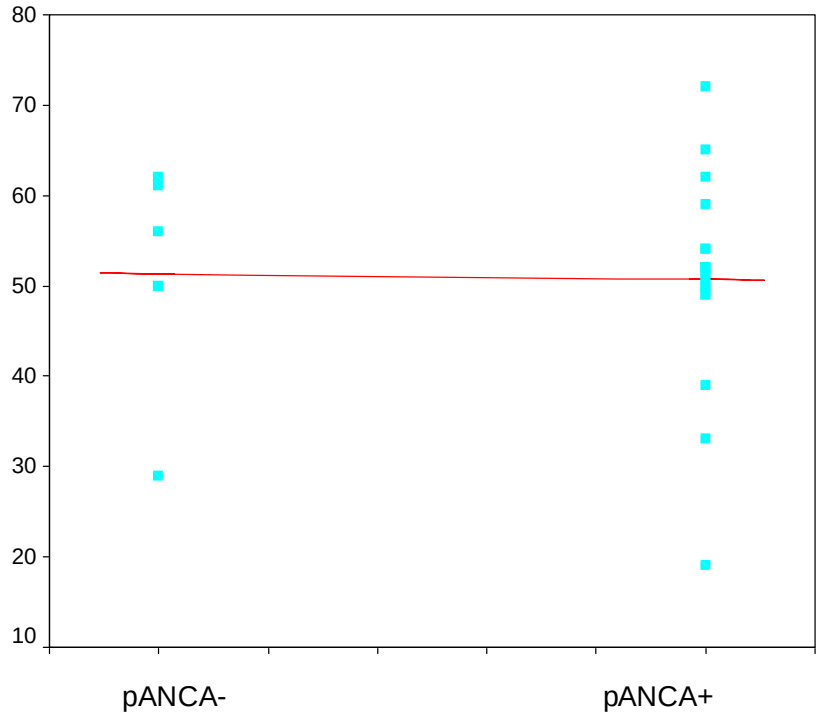


Fig. (19): Correlation between pANCA serum positivity and patients' age

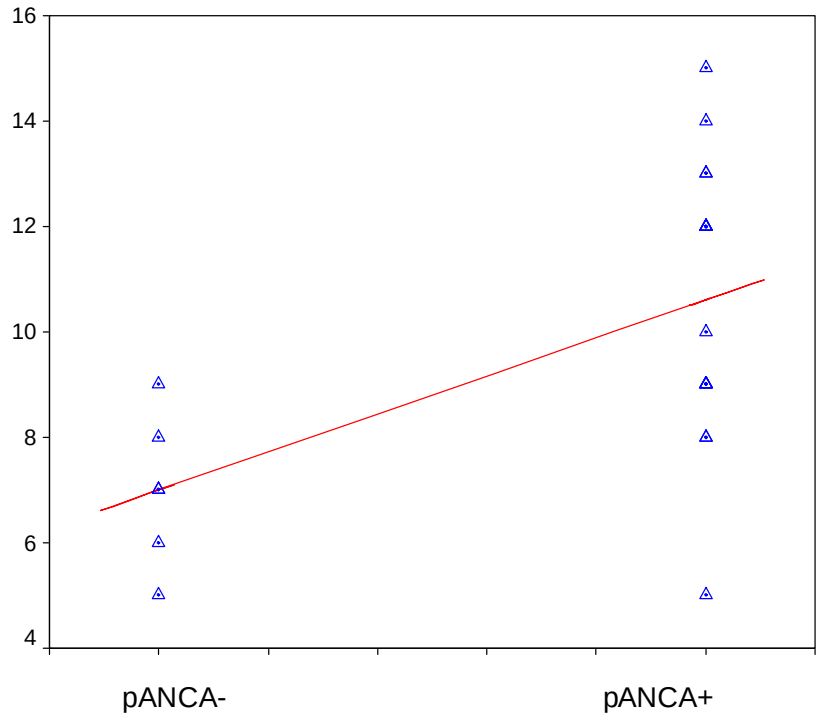


Fig. (20): Correlation between pANCA serum positivity and endoscopic activity score

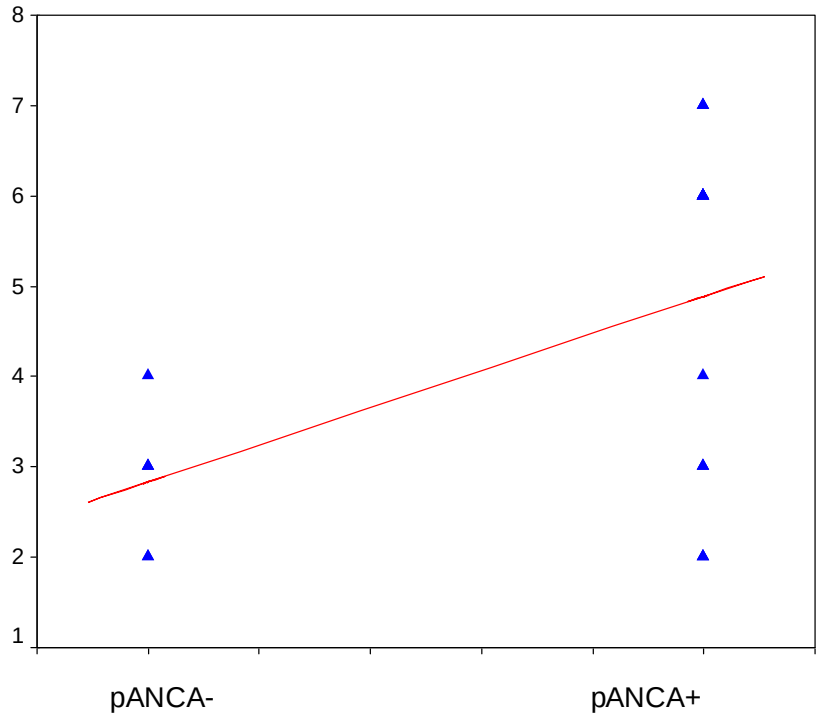


Fig. (21): Correlation between pANCA serum positivity and clinical activity scores

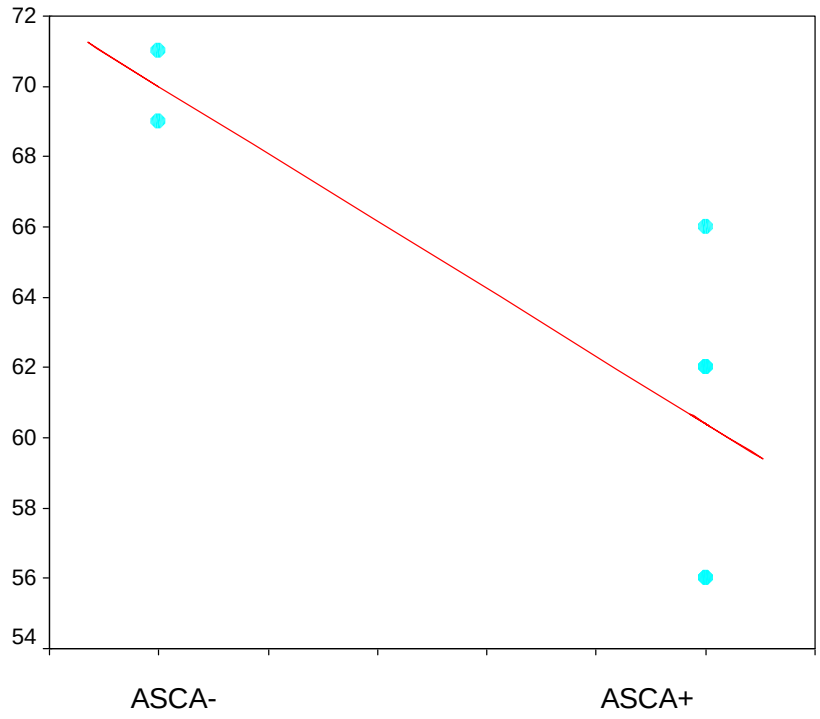


Fig. (22): Correlation between ASCA serum positivity and patients' age

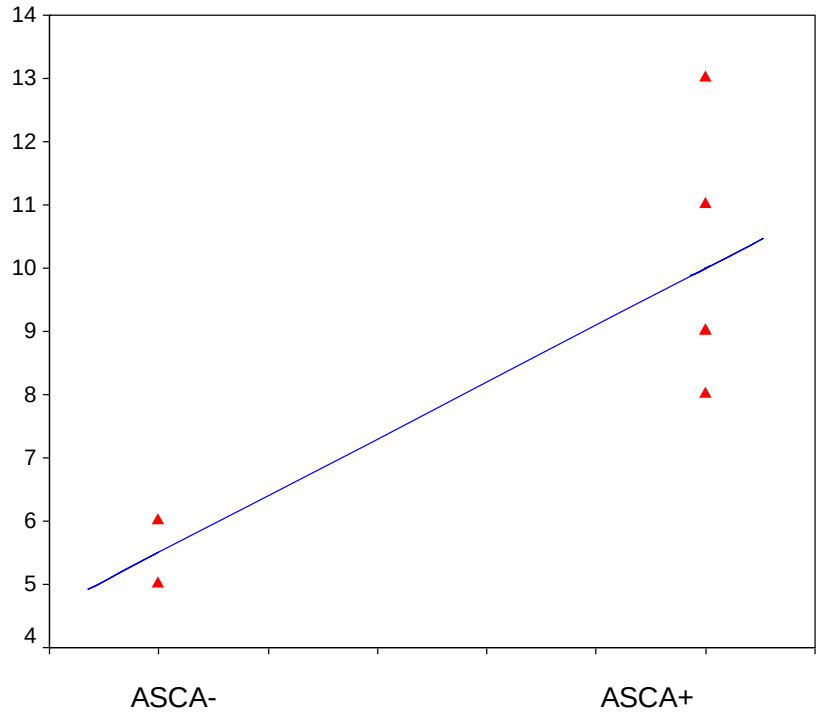


Fig. (23): Correlation between ASCA serum positivity and endoscopic activity score

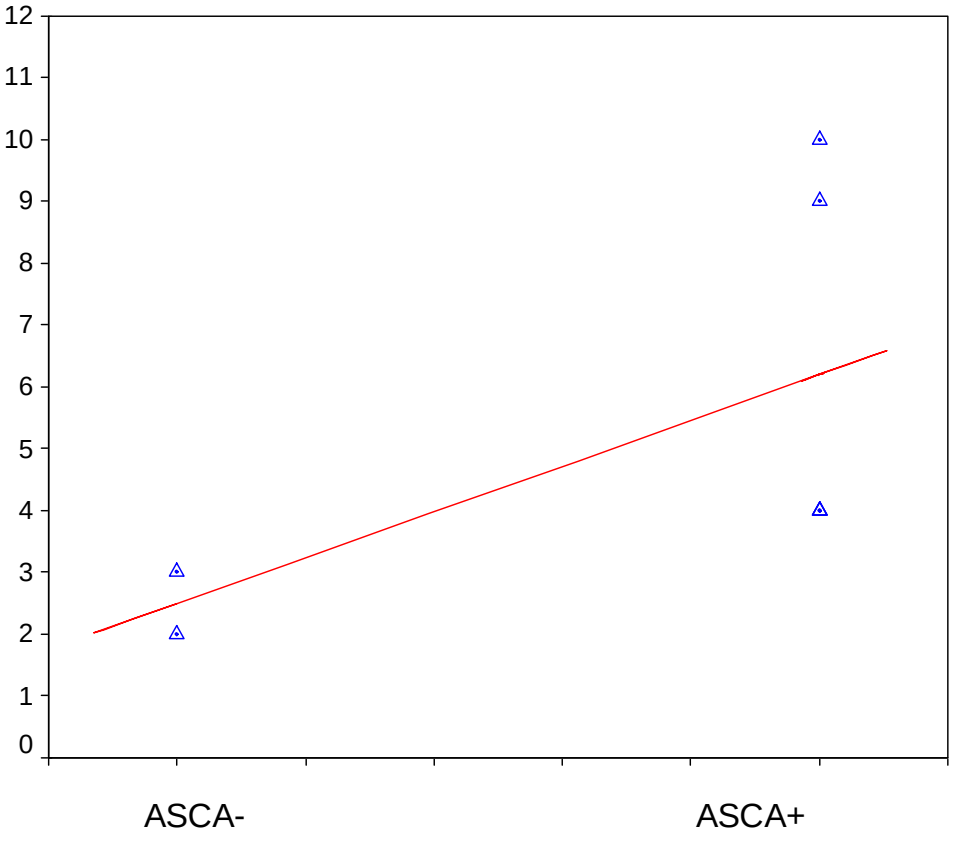


Fig. (24): Correlation between ASCA serum positivity and clinical activity scores