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Clinical profile, course and outcomes of adults with inflammatory bowel disease over a decade: a single center experience

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BACKGROUND: Inflammatory bowel disease (IBD) is an important cause of morbidity in Saudi Arabia.

OBJECTIVES: Determine the incidence, clinical profile, course and outcomes of IBD in Riyadh, Saudi Arabia.

DESIGN: Medical record review

SETTING: Tertiary care center

PATIENTS AND METHODS: Data were extracted from the medical records of all patients with IBD admitted to King Abdulaziz Medical City, Riyadh, from 1 January 2009 to 31 December 2019. The complications of IBD were classified as gastrointestinal or extraintestinal. Comorbidities were classified as either systemic diseases or gastrointestinal diseases.

MAIN OUTCOME MEASURES: Epidemiology, clinical manifestations and complications of IBD.

SAMPLE SIZE AND CHARACTERISTICS: 435 patients with IBD, median (IQR) age at presentation 24.0 (14.0) years, 242 males (55.6%)

RESULTS: The study population consisted of 249 patients with Crohn's disease (CD) (57.2%) and 186 with ulcerative colitis (UC) (42.8%). Nearly half were either overweight or obese. Abdominal pain, diarrhea and vomiting were the most common presenting symptoms. The most common extraintestinal manifestations were musculoskeletal (e.g., arthritis and arthralgia). Colorectal cancer was diagnosed in 3.2%. Patients with other gastrointestinal (GI) comorbidities were at higher risk of developing GI complications of IBD ($P \leq .05$). Biological agents were used to treat 212 patients (87%) with CD and 102 patients (57%) with UC.

CONCLUSIONS: The number of patients diagnosed with IBD and their body mass index increased each year over the period of interest. However, the rate of surgical intervention and number of serious complications fell. This improvement in outcomes was associated with a higher percentage of patients receiving biological therapy.

LIMITATIONS: Incomplete data. Some patients diagnosed and/or followed up at other hospitals.

CONFLICT OF INTEREST: None.

nflammatory bowel disease (IBD) is a chronic inflammatory process that primarily damages the gastrointestinal (GI) tract but may involve other organs. The most common forms of IBD are ulcerative colitis (UC) and Crohn's disease (CD).[1,2] The prevalence of IBD is highest in Western countries, specifically North America and Northern Europe.[3,4] It is estimated that the prevalence of IBD in American adults is 1.3% (approximately 3 million people).[5]

There is little data on IBD in the Middle East. However, some data suggest that the disease is common.[6,7] A retrospective study of colonic biopsies performed from January 2002 to July 2007 at a tertiary center in Jeddah, Saudi Arabia, reported that 136 (19.1%) of 711 biopsies were diagnostic of IBD.[8] Another retrospective study of 312 cases managed at a tertiary center in Riyadh between 1970 and 2008 concluded that the incidence of IBD is increasing in Saudi Arabia.[9] Yet, there is no data on the epidemiology and outcomes of patients with IBD in Saudi Arabia from the last decade. The present study investigated the epidemiology, clinical profile and course of patients with IBD admitted to our institution from 2009 to 2019. The study also aimed to identify the patient characteristics that are associated with a higher risk of GI complications and a need for surgical intervention.

PATIENTS AND METHODS

This study was conducted at King Abdullah International Medical Research Center, Riyadh, Saudi Arabia (KAMC-R). The medical records of all adult patients admitted to KAMC-R with a diagnosis of either CD or UC, between 2009 and 2019 were reviewed. Patients under 14 years of age were excluded. The study protocol was approved by the Institutional Review Board of the King Abdullah International Medical Research Center, Riyadh, Saudi Arabia [RC20/112/R, 2/5/2020]. Data extracted from medical records included the demographics, risk factors for IBD, presenting symptoms, comorbidities, anatomical involvement, medications, surgical interventions, and the complications of IBD. Comorbidities were differentiated from complications. Some comorbidities may or may not be associated with IBD. The complications of IBD are closely related to the course of the disease.

Comorbidities were classified as either systemic diseases or gastrointestinal diseases. Gastrointestinal comorbidities included liver disease (hepatitis), GI infections (*Clostridium difficile*, *Helicobacter pylori*, Intestinal tuberculosis), pancreatobiliary complications, GI autoimmune disease, GERD, celiac disease, GI malignancy, and IBS. While systemic comorbidities

included endocrine (e.g. diabetes), cardiovascular (e.g. hypertension), respiratory, musculoskeletal, and other conditions.

The complications of IBD were classified into one of two groups (i.e. gastrointestinal and extraintestinal complications). Gastrointestinal complications included fistulas, strictures, abscesses, intestinal obstruction, perforation, polyps, adhesions, anal fissures, toxic megacolon, cysts and gastrointestinal cancers (gastric and colorectal cancer). Extraintestinal manifestations were further subdivided into hepatobiliary (e.g. primary sclerosing cholangitis), ocular (e.g. episcleritis, conjunctivitis), dermatological (e.g. erythema nodosum), musculoskeletal (e.g. arthralgia, arthritis, back pain) and other manifestations (e.g. unspecified ulcer, periodontitis, bronchiolitis).

The sample size was calculated using the formula $n=z2*p(1-p)/d2$. Z is the level of confidence and we used 95%, the value of z corresponding to this is 1.96. P is the expected prevalence of IBD (2% based on a published study). The effect size, d, is equal to 0.02. Based on the above parameter, we estimated a need for at least 188 patients in our sample.

The Statistical Analysis System (SAS 2013, SAS Institute Inc., NC, USA) was used to perform all statistical analyses. Standard descriptive analyses were performed. Categorical data are presented as frequency and percentage. Continuous data are presented as mean standard deviation (SD) or median and interquartile range (IQR). The chi-square test and the Fisher exact test were used to compare categorical data. A P value of <.05 was considered statistically significant.

RESULTS

The present study included 435 patients with IBD including 249 with CD (57.2%) and 186 (42.8%) with UC (**Table 1**). Most were males (n= 242; 55.6%). While more men (149, 59.8%) were diagnosed with CD than women (100, 40.2%; *P*=.03), the sex distribution of UC was equivalent.

The age distribution was not normally distributed; the median (IQR) age at presentation of IBD was 24.0 (14.0) years. Over 60% presented between 17 and 40 years of age. Close to 20% of patients presented after 40 years of age. At presentation, the median age of the patients with UC was greater than that of the patients with CD (*P*=.0008).

Approximately 5% reported having a family history of the same form of IBD. Of the patients with CD, 42 (17.7%) reported smoking cigarettes. Fewer patients with UC reported smoking (20, 5.2%). Systemic

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comorbidities were present in 197 (45.5%) patients and other gastrointestinal comorbidities were diagnosed in 102 (23.5%) patients (**Table 1**). Despite a fluctuation in the total number of patients diagnosed each year, the overall incidence of IBD seemed to plateau throughout the period of interest (**Figure 1**).

While the BMI of 145 patients (35.4%) was normal (18.5-24.9), 79 (18%) were underweight (BMI <18.5) and 117 (30%) were overweight (BMI 25.0-29.9). Seventy-four (18%) patients were obese (BMI >30). The BMI of the patients with CD and UC was not significantly different (**Figure 2**).

Gastrointestinal complications were more common in CD than in UC (*P*<.0001) (**Table 2**). The colon was involved in 152 patients (64.4%) with CD. Joint manifestations (i.e., arthritis and arthralgia) developed in 55 (13%) patients with IBD; the association of IBD with arthralgia was significant (10.9%; *P*=.0034) (**Table 3**). Colorectal cancer (the most common malignancy) was

diagnosed in 14 (3.2%) patients with IBD. Of systemic comorbidities, endocrine disorders (mainly diabetes) were the most common (n=73, 16.8%) (**Tables 4 and 5**).

Gastrointestinal complications were higher in men (CD: P=.0251; UC: *P*=.0231), and patients with other GI comorbidities (CD: P=.0164; UC: *P*=.0015) (**Tables 6 and 7**). Patients with CD who had GI complications were more likely to be treated with biological agents than those who did not have GI complications (*P*=.0002). In CD, perianal symptoms were associated with an increased risk of surgical intervention (*P*=.0119). In UC, extraintestinal manifestations were associated with an increased risk of developing GI complications (*P*<.0001) and the need for surgical intervention (*P*=.0509) (**Table 7**). The higher operation rate in smokers with UC did not reach statistical significance (*P*=.0575). Corticosteroids were more frequently used to treat patients with UC (79, 45.4%) than CD (70, 29.0%) (**Table 8**). Biological agents were used to treat 212 patients (87%) with CD and 102

Table 1. Demographics and clinical characteristics of patients with inflammatory bowel disease (n=435).

Characterisitics	Overall	Crohn's disease	Ulcerative colitis	*P* value	Missing data
Age					
Median (IQR) age at presentation (years)	24.0 (14.0)	22.0 (10)	27.0 (18.8)	**<.001**	
Age at time of present study years mean (SD)	38.3 (16.2)	35.2 (13.5)	42.4 (18.5)		
Age group at presentation					
17-40 years	280 (64.4)	172 (69.1)	108 (58.1)	**.0008**	0
<17 years	97 (22.3)	57 (22.9)	40 (21.5)		
>40 years	58 (13.3)	20 (8.0)	38 (20.4)		
Sex					
Male	242 (55.6)	149 (59.8)	93 (50.0)	**.041**	0
Female	193 (44.4)	100 (40.2)	93 (50.0)		
Nationality					
Saudi	405 (94.4)	231 (93.9)	174 (95.1)	.599	6
Non-Saudi	24 (5.6)	15 (6.10)	9 (4.9)		
Risk factors					
Smoking	59 (14.5)	42 (17.7)	17 (10.0)	**.029**	28
Family history	20 (5.2)	9 (4.0)	11 (6.9)	.209	52
Comorbidities					
Systemic	197 (45.5)	105 (42.2)	92 (50.0)	.106	2
Gastrointestinal	102 (23.5)	41 (16.5)	61 (32.8)	**<.0001**	0

Data are n (%) unless noted otherwise.

patients (57%) with UC. Surgical interventions were more commonly required to treat the GI complications of CD (**Table 9**).

DISCUSSION

In the West, the incidences of UC and CD are thought to be plateauing.[10] The increasing incidence of IBD in the present cohort suggests that IBD may previously have been under diagnosed or misdiagnosed. However, the literature on the epidemiology of IBD in Saudi Arabia is inconsistent. The reported incidence has varied between 8 and 74 cases per year.[9] This may be because most of the data are derived from single center studies. A national registry would greatly increase the accuracy of the data on the epidemiology of IBD in Saudi Arabia.

Figure 1. The annual incidence of inflammatory bowel disease from 2009 to 2019 (black line=total cases).

Figure 2. Body mass index category of patients with inflammatory bowel disease (n=435, ulcerative colitis: black, Crohn's disease: blue).

The incidence of IBD is higher in women worldwide.[11] In the present study, a male predominance was found in CD, but the sex distribution of UC was equal. A male predominance has previously been reported in many Asian countries (including Saudi Arabia).[12,13]

A retrospective study in Saudi Arabia reported a higher prevalence of CD in men but UC was more common in women.[9] The factors which influence the gender distribution of IBD are complex and multifactorial. There are biological and non-biological factors. Biological factors include select gender-specific genes and hormonal differences.[13,14] Non-biological factors include age, geographical issues and access to health care.[13,14]

The prevalence of obesity in the general population in Saudi Arabia is high. Seventy percent of the population is either overweight or obese.[15] It has been reported that the rate of obesity is increasing in parallel with IBD worldwide.[16] Indeed, nearly half of the present cohort were either overweight or obese (**Figure 2**). Few studies have investigated the relationship between obesity and IBD. The treatment of IBD may increase the risk of obesity. The use of steroids is clearly relevant. One year of corticosteroid therapy can increase body weight by more than 10 kg.[16] Biological agents may also increase weight, albeit to a lesser degree, as does the cessation of smoking.[16,17] Other risk factors must be identified and prevented to mitigate the risk of obesity in this cohort.

Extraintestinal manifestations of IBD cause significant morbidity and mortality, affecting quality of life. Extraintestinal manifestations were diagnosed in 133 (31%) patients of the present cohort. The joints were involved (e.g., arthritis and arthralgia) in 55 (13%) patients of this cohort. These were the most common extraintestinal manifestations and were more often associated with UC. Previous studies have attributed this to the increased use of steroids in these patients.[18] This hypothesis is supported by the findings of the present study. The prevalence of primary sclerosing cholangitis (PSC) was 4% in the present study. An earlier study from Canada reported that 5% of patients with UC had PSC.[19] The risk of colorectal carcinoma is increased ten-fold in patients with IBD who develop PSC.[20,21] Thus, it is important to consider investigation for PSC during the follow-up of patients with IBD.[22,23]

The prevalence of psychological disorders which included depression and anxiety in our cohort was low (25, 6%) in comparison to other studies.[24,25] Psychological issues may have been underdiagnosed because of the stigma associated with psychiatric diseases and the limited time available for communication between
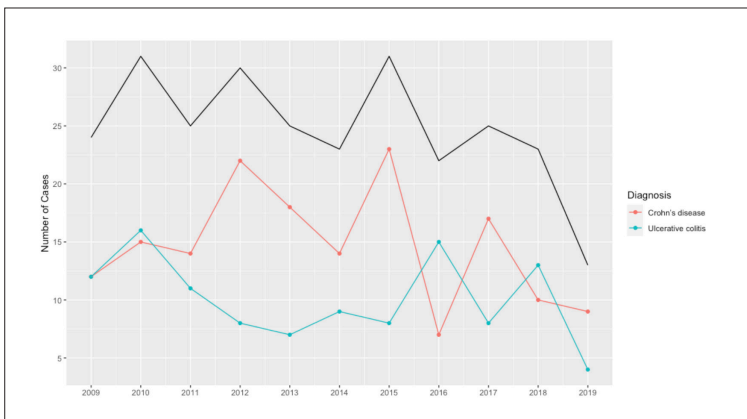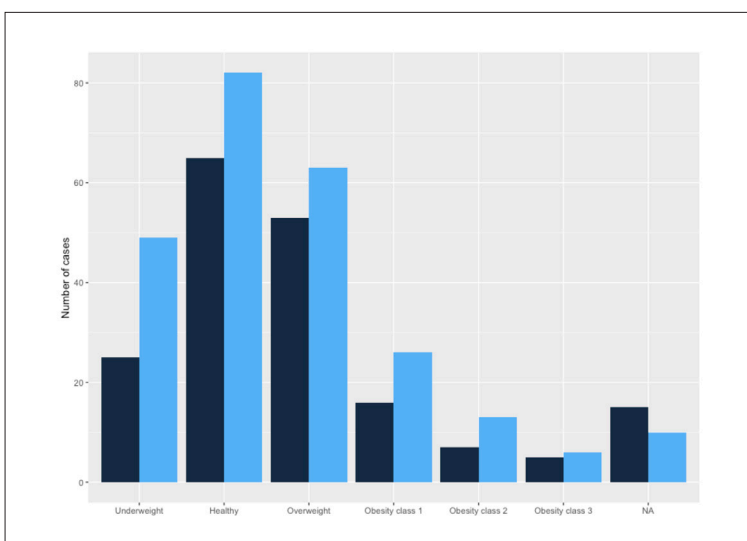
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Table 2. Gastrointestinal complications and malignancies in patients with inflammatory bowel disease

Specific complication	Overall	Crohn's disease	Ulcerative colitis	P value	Missing data
Gastrointestinal complications	248 (61.4)	199 (82.6)	49 (30.1)	**<.0001**	35
Fistula	150 (37.5)	141 (59)	9 (5.6)	**<.0001**	35
Strictures	103 (25.7)	97 (40.6)	6 (3.7)	**<.0001**	34
Abscess	89 (22.3)	78 (32.6)	11 (6.8)	**<.0001**	35
Intestinal obstruction	58 (14.5)	49 (20.5)	9 (5.6)	**<.0001**	34
Perforation	20 (5)	17 (7.1)	3 (1.9)	**.0190**	35
Polyps	18 (4.5)	9 (3.8)	9 (5.6)	.4008	35
Adhesions	17 (4.2)	15 (6.3)	2 (1.2)	**.0202**	34
Anal fissure	16 (4)	13 (5.4)	3 (1.9)	.1160	34
Toxic megacolon	2 (0.5)	0	2 (1.2)	.1626	34
Cyst	1 (0.3)	0	1 (0.6)	.4040	34
Colon involvement in Crohn's disease	152 (34.9)	152 (64.4)	NA	NA	13
Gastrointestinal malignancy					
Gastric cancer	4 (1.0)	1 (0.4)	3 (1.9)	.3076	34
Colorectal cancer	14 (3.2)	9 (3.6)	5 (2.7)	.5881	22

Data are n (%).

Table 3. Extraintestinal manifestations of inflammatory bowel disease.

	Specific manifestation	Overall	Crohn's disease	Ulcerative colitis	P value	Missing data
Extraintestinal manifestation						
Hepatobiliary	Primary sclerosing cholangitis	18 (4.1)	9 (4.8)	9 (3.6)	.5259	0
Ocular	Eye manifestations	2 (0.5)	1 (0.4)	1 (0.6)	.999	34
	Episcleritis	1 (0.3)	1 (0.4)	0	.999	34
	Conjunctivitis	1 (0.3)	0	1 (0.6)	.4040	34
Skin	Erythema nodosum	5 (1.3)	2 (0.8)	3 (1.9)	.3975	34
Musculoskeletal	Arthralgia	45 (10.9)	17 (7.1)	28 (16.2)	.0034	22
	Arthritis	13 (3)	7 (2.8)	6 (3.2)	.7940	1
	Back pain	36 (9)	19 (8)	17 (10.5)	.3891	35
Other	Unspecified ulcer	27 (6.8)	14 (5.9)	13 (8.0)	.4018	35
	Periodontitis	2 (0.5)	1 (0.4)	1 (0.6)	.999	35
	Bronchiolitis	1 (0.3)	1 (0.4)	0	.999	34

Data are n (%).

Table 4. Gastrointestinal comorbidities in patients with inflammatory bowel disease.

	Overall	Crohn's disease	Ulcerative colitis	*P* value	Missing data
Gastrointestinal comorbidities	102 (23.5)	41 (16.5)	61 (32.8)	**<.0001**	0
Liver disease	35 (8.1)	14 (5.6)	21 (11.3)	.0315	0
Hepatitis	19 (4.4)	7 (2.8)	12 (6.5)	.0661	0
Infectious	34 (7.8)	18 (7.2)	16 (8.6)	.5976	0
Clostridium difficile	11 (2.5)	4 (1.6)	7 (3.8)	.2176	0
Helicobacter pylori infection	9 (2.1)	6 (2.4)	3 (1.6)	.7385	0
Intestinal tuberculosis	6 (1.4)	6 (2.4)	0	**.0401**	0
Pancreatobiliary (gallbladder, biliary tract and pancreas)	27 (6.2)	9 (3.6)	18 (9.7)	**.0095**	0
Autoimmune	14 (3.2)	2 (0.8)	12 (6.5)	**.0014**	0
Celiac	7 (1.6)	1 (0.4)	6 (3.2)	**.0456**	0
Gastroesophageal reflux disease	13 (3)	4 (1.6)	9 (4.8)	**.0839**	0
Gastrointestinal malignancy	10 (2.3)	3 (1.2)	7 (3.8)	**.0192**	2
Irritable bowel syndrome	9 (2.1)	4 (1.6)	5 (2.7)	.5060	0
Other gastrointestinal comorbidities	7 (1.6)	4 (1.6)	3 (1.6)	.999	0
Diverticular	4 (1)	3 (1.2)	1 (0.5)	.6390	0
Primary biliary cirrhosis	1 (0.2)	1 (0.4)	0	.999	0

Data are n (%).

patients and physicians in the outpatient setting.[26,27] In contrast to previous reports, neither smoking nor family history of IBD were associated with worse outcomes in the present study (*P*>.05).[28] Cigarette smoking is a culturally sensitive topic. It may have been underreported.

Consistent with previous reports, male sex was associated with a higher incidence of GI complications in both CD and UC. However, this did not translate into an increased rate of surgery.[14] In patients with UC, extraintestinal manifestations were associated with increased complications and surgery rates. This has been reported previously.[29] Considering the associated morbidity and the negative impact on patients' prognosis and quality of life, the early identification and treatment of the extraintestinal manifestations of IBD are vital.

The use of biological agents is associated with high rates of clinical and histological remission.[30] In our cohort, 88% of patients with CD received biological therapy. This reflects the widespread adoption of the top-down strategy at our institution. This approach is based on the theory that the early introduction of biological therapy can reduce the risk of complications in the long term.[31] In the present study, the patients with UC who received biological treatment required less surgical intervention. Only 37% of the patients with CD and 10% of the patients with UC required surgical intervention. The need for surgical intervention was significantly less in our cohort than that reported in a previous study from Saudi Arabia published in 2009.[9] This may reflect improved control of IBD in the patients in our cohort who received biological treatment.

This large retrospective study of patients managed

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Table 5. Systemic comorbidities in patients with inflammatory bowel disease.

	Overall	Crohn's disease	Ulcerative colitis	*P* value	Missing data
Systemic Comorbidities	197 (45.5)	105 (42.2)	92 (50.0)	.1057	2
Endocrine	73 (16.8)	25 (10.0)	48 (25.95)	**<.0001**	1
Diabetes	52 (12)	12 (4.8)	40 (21.6)	**<.0001**	1
Cardiovascular	70 (16.1)	31 (12.5)	39 (21.1)	**.0156**	1
Hypertension	47 (10.8)	19 (7.6)	28 (15.1)	**.0128**	1
Respiratory	28 (6.5)	15 (6.02)	13 (7.0)	.6741	1
Musculoskeletal	28 (6.5)	12 (4.9)	16 (8.7)	.1133	3
Renal	25 (5.9)	12 (4.8)	13 (7.0)	.3290	1
Psychological	25 (5.8)	12 (4.8)	13 (7.0)	.3290	1
Dyslipidemia	25 (5.8)	9 (3.6)	16 (8.7)	**.0260**	1
Hematological	23 (5.3)	12 (4.8)	11 (6)	.6044	1
Non-gastrointestinal infectious	26 (6)	17 (6.8)	9 (4.9)	.3942	1
Non-gastrointestinal malignancy	13 (3)	3 (1.2)	10 (5.4)	**.0192**	2
Non-gastrointestinal autoimmune	11 (2.5)	8 (3.2)	3 (1.6)	.3667	1

Data are n (%).

at a single center over the last decade has some limitations. Electronic medical records were only available from January 2016 so paper-based files were used to collect data prior to 2016. Some data (e.g., fecal calprotectin) were not available in the paper charts. Some patients were diagnosed and/or had follow-up in other hospitals. The data available for these patients were somewhat limited. Furthermore, data on fistulas were collected without differentiation between abdominal and perianal fistulae. This is because the precise nature and location of fistulae was rarely documented in the patients' medical records.

In conclusion, the number of patients diagnosed with IBD at our institution per annum seems to have plateaued in the last decade. Crohn's disease was diagnosed more frequently than UC. IBD has a male preponderance and mainly affects people in their second and third decade. Smoking and a family history of IBD were not associated with worse outcomes. Joint involvement was the most common extraintestinal manifestation. The prevalence of PSC and psychological disorders were relatively low. Our observations suggest a significant decrease in the need for surgical intervention in patients with UC who received biological treatment. This is likely to reflect an improvement in the treatment of IBD in Saudi Arabia. However, almost half of the patients with IBD were either overweight or obese.

Table 6. Association between risk factors and outcomes of gastrointestinal complications and operations in Crohn's disease.

	Gastrointestinal complications				Surgery			
	Total	Yes	P value	Missing	Total	Yes	P value	Missing data
Age at presentation								
<16 years	54 (22.4)	42 (77.8)	.5787	8	56 (23)	29 (51.8)	.3023	5
17–40 years	169 (70.1)	142 (84)			169 (69.3)	82 (48.5)		
> 40 years	18 (7.5)	15 (83.3)			19 (7.8)	6 (31.6)		
Disease burden								
Systemic comorbidities	102 (42.3)	80 (78.4)	.1466	8	104 (42.6)	54 (51.9)	.2844	5
Gastrointestinal comorbidities	39 (16.2)	27 (69.2)	**.0164**	8	40 (16.4)	16 (40)	.2710	5
Extensive disease	126 (55)	108 (85.7)	.3947	20	125 (54.1)	63 (50.4)	.7290	18
Perianal symptoms	30 (12.8)	25 (83.3)	.8951	15	30 (12.7)	8 (26.7)	**.0119**	12
Extraintestinal manifestation	39 (16.3)	32 (82.1)	.8245	10	39 (16.5)	17 (43.6)	.4642	12
Family history	9 (4.1)	7 (77.8)	.6504	30	9 (4)	5 (55.6)	.7471	27
Smoking	41 (17.8)	36 (87.8)	.4106	19	42 (17.9)	24 (57.1)	.2404	14
Treatment								
Biological treatment	209 (87.8)	180 (86.1)	**.0002**	11	209 (87.8)	103 (49.3)	.2525	11
Steroid treatment	68 (28.6)	53 (77.9)	.2118	11	70 (29.4)	31 (44.3)	.4713	11
Sex								
Female	95 (39.4)	72 (75.8)	**.0251**	8	96 (39.3)	42 (43.8)	.2901	5
Male	146 (60.6)	127 (87)			148 (60.7)	75 (50.7)		

Data are n (%).

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Table 7. Association between risk factors and outcomes of gastrointestinal complications and operations in ulcerative colitis.

		Gastrointestinal complications				Surgery		
	Total	Yes	P value	Missing	Total	Yes	P value	Missing data
Age at presentation								
17-40 years	97 (59.5)	31 (32)	.2786	23	103 (60.2)	21 (20.4)	.3796	15
< 16 years	32 (19.6)	6 (18.8)			33 (19.3)	4 (12.1)		
> 40 years	34 (20.9)	12 (35.3)			35 (20.5)	9 (25.7)		
Disease burden								
Systemic comorbidities	83 (51.6)	28 (33.7)	.2619	25	83 (49.1)	18 (21.7)	.4865	17
Gastrointestinal comorbidities	57 (35)	26 (45.6)	**.0015**	23	60 (35.1)	15 (25)	.2177	15
Extensive disease	33 (21.3)	11 (33.3)	.8107	31	33 (20.1)	8 (24.2)	.5778	22
Extraintestinal manifestations	47 (29.0)	28 (59.6)	**<.0001**	24	49 (30.4)	15 (30.6)	.0509	25
Family History	11 (7.5)	1 (9.1)	.1762	39	11 (7.2)	0	.2177	34
Smoking	13 (8.3)	4 (30.8)	.2434	30	13 (8.1)	5 (38.5)	.0575	26
Treatment								
Biological treatment	93 (58.9)	23 (24.7)	.1469	28	99 (59.3)	13 (13.1)	.0294	19
Steroid treatment	73 (46.2)	22 (30.1)	.7931	28	76 (45.5)	16 (21.1)	.4495	19
Sex								
Female	82 (50.3)	18 (22)	**.0231**	23	85 (49.7)	13 (15.3)	.1350	15
Male	81 (49.7)	31 (38.3)			86 (50.3)	21 (24.4)		

Data are n (%).

Table 8. Medications in patients with inflammatory bowel disease.[a]

	Overall	Crohn's disease	Ulcerative colitis	P value
5-ASA	297 (71.6)	141 (58.5)	156 (89.7)	**<.0001**
Azathioprine	252 (60.7)	164 (68.0)	88 (50.6)	**.0003**
Corticosteroid	149 (35.9)	70 (29.0)	79 (45.4)	**.0006**
Infliximab	124 (29.9)	90 (37.3)	34 (19.5)	**<.0001**
Adalimumab	93 (22.4)	76 (31.5)	17 (9.8)	**<.0001**
Vedolizumab	28 (6.8)	17 (7.1)	11 (6.3)	.7692
Omeprazole	17 (4.1)	13 (5.4)	4 (2.3)	.1374
Ustekinumab	14 (3.4)	12 (5)	2 (1.2)	.0502
Methotrexate	1 (0.2)	0	1 (0.6)	.4193

Data are n (%). [a]The medication history of 20 patients was not available.

Table 9. Surgery in patients with inflammatory bowel disease.

	Overall	Crohn's disease	Ulcerative colitis	P value	Missing data
Surgery (overall)	192 (46.3)	151 (62.4)	41 (23.8)	**<.0001**	30
Adhesiolysis	10 (2.5)	8 (3.4)	2 (1.2)	.2050	31
Stricturoplasty	4 (1)	4 (1.7)	0	.1445	31
Abscess drainage	43 (10.6)	40 (17)	3 (1.8)	**<.0001**	31
Fistula repair	32 (7.9)	28 (11.9)	4 (2.4)	**.0003**	31
Partial colectomy	22 (5.5)	18 (7.6)	4 (2.4)	**.0253**	31
Right hemicolectomy	28 (6.9)	27 (11.4)	1 (0.6)	**<.0001**	31
Total colectomy	15 (3.7)	2 (0.9)	13 (7.7)	**.0006**	31
Proctocolectomy	19 (4.7)	2 (0.9)	17 (10.12)	**<.0001**	31
Ileocaecal resection	49 (12.1)	48 (20.3)	1 (0.60)	**<.0001**	31
Small bowel resection	53 (13.1)	52 (22.0)	1 (0.6)	**<.0001**	31

Data are n (%).

original article

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