

A cross-sectional survey on the psychological impact of the COVID-19 pandemic on inflammatory bowel disease patients in Saudi Arabia

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Abstract

Background/Aims: The coronavirus (COVID-19) pandemic has caused significant disruption to patients with chronic illnesses. We explored the emotional state, perception, and concerns of Saudi patients with inflammatory bowel disease (IBD) during the crisis.

Materials and Methods: We conducted a cross-sectional survey from 30 March to 5 April, 2020 using a pre-designed questionnaire distributed through social media platforms to IBD patients. The five-part questionnaire included an assessment of psychological wellbeing using a previously validated Arabic version of the Hospital Anxiety and Depression Scale (HADS), which includes domains for anxiety (HADS-A) and depression (HADS-D). A logistic regression analysis was used to uncover possible associations between patient characteristics and anxiety and depression.

Results: The data from 1156 IBD patients were analyzed. Normal, borderline, and HADS-A scores consistent with a diagnosis of anxiety were reported by 423 (36.6%), 174 (15.1%), and 559 (48.4%) patients, respectively. However, 635 (69%) patients had normal scores and 273 (30.1%) had borderline HADS-D scores; no patients reported scores consistent with depression. Based on a multiple logistic regression analysis, patients educated till a high school diploma (OR = 2.57, 95% CI: 0.09–6.05, $P = 0.03$) and that had indeterminate colitis (OR = 2.23, 95% CI: 1.27–3.89, $P = 0.005$) were more likely to express anxiety.

Conclusions: Many patients expressed symptoms of anxiety, although not depression. Female patients, patients educated till a high school diploma, and those with indeterminate colitis were more likely to have anxiety. IBD patients require greater attention during a pandemic to avoid adverse disease-related outcomes.

Keywords: Anxiety, depression, inflammatory bowel disease, pandemic, coronavirus

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INTRODUCTION

The severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) is a novel coronavirus that first emerged in Wuhan, China in December of 2019 and was proven to cause the coronavirus disease 2019 (COVID-19).^[1] As of March 30, 2020, there have been 638,146 laboratory-confirmed cases of COVID-19 reported by the World Health Organization (WHO), with at least 30,039 related deaths. On 11 March, the COVID-19 illness was declared a global pandemic by the WHO.^[2] The transmission rate (R0) of COVID-19 is broadly considered to be of an intermediate level, with an R0 estimated to be approximately 2.2, compared to an R0 of 3 given for the SARS outbreak in 2003.^[3] However, those that contract the disease can become severely ill and require hospitalization and possibly ventilatory support. Various studies have reported that the fatality rate of COVID-19 ranges between 7.2% and 67% and is largely affected by age, underlying diseases, and severity of pneumonia.^[4-6] Nevertheless, it has been reported that younger individuals with no known underlying diseases have also contracted the infection and became critically ill, with reported hospitalization rates that range between 20.7% and 31%.^[7] Moreover, it was reported that asymptomatic patients can potentially transmit the disease through close contact during the incubation period, which is the primary mechanism implicated in the observed rapid and widespread community transmission.^[8]

Inflammatory bowel disease (IBD) is an immune-related disease that is often treated with immune modification or immunosuppressive therapy in order to achieve symptom control and mucosal healing.^[9] IBD patients are more vulnerable to various emotional and psychological stresses than normal individuals.^[10,11] The medications used in these treatments can render patients more susceptible to various infections, which could become a major concern for patients and their health care providers during an infectious pandemic.^[12] In addition to the general preventive measures that have been widely advised during the current pandemic, several restrictive measures have also been adopted by hospitals worldwide, including rescheduling clinic visits, endoscopic procedures, and infusion appointments, all of which may be alarming and potentially distressing for IBD patients. Therefore, understanding the degree of fear, anxiety, and overall perception of IBD patients towards the pandemic may provide critical insights that would ultimately help physicians provide better clinical care and psychological support during such times in order to avoid any maladaptive coping strategies which significantly associated with poor patient-reported outcomes.^[13,14] Furthermore, analyzing the psychological standing of IBD

patients in the time of a global pandemic would aid them in combating similar future threats.

The focus of the present study was to explore the emotional state, perception, and coping strategies of IBD patients during the COVID-19 pandemic.

MATERIALS AND METHODS

We conducted a cross-sectional study between 30 March and 5 April 2020. The study examined a broad cohort of IBD patients living in Saudi Arabia, irrespective of age or nationality. A predesigned Arabic language questionnaire was used. The questionnaire was uploaded as a Google Doc file on Google Drive and distributed electronically to patients through their primary physician. The first section of the questionnaire included data on demographic and socioeconomic factors, such as age, gender, and educational level. The second section concerned details of the primary disease, including IBD subtype (Crohn's disease [CD], ulcerative colitis [UC], or indeterminate colitis), year of the diagnosis, age at the time of the diagnosis, presence of perianal disease or any extraintestinal manifestations, history of prior surgeries, and the number of flares per year. The third section of the survey addressed the current IBD treatment regimen and the effect of the COVID-19 pandemic on patient compliance. The fourth section mainly assessed the current level of patients' psychological wellbeing, using the previously validated Arabic version of the Hospital Anxiety and Depression Scale (HADS), which is a 14-item questionnaire that has been translated to Arabic and then validated by Terkawi *et al.* [Supplementary Table 1].^[15] Seven questions concern the anxiety domain (HADS-A), and the remaining questions constitute the depression domain (HADS-D). Each question can be answered through a response from an ordinal 4-point scale (0 = lowest, 3 = highest). The sum of the total points was translated into a scoring system to categorize patient outcome in each domain, as follows: normal = 0–7; borderline abnormal = 8–10; abnormal = 11–21. Patients with an abnormal score were considered to suffer from depression or anxiety, depending upon the domain. The final section focused on patients' knowledge of the COVID-19 pandemic, and how it influenced patient care. Completion of the questionnaire was considered as written consent for participation in the study.

Outcomes

The primary outcome of the study was to evaluate the prevalence of anxiety and depression experienced by IBD patients residing in Saudi Arabia during the time

of the COVID-19 pandemic through an examination of the proportion of patients with HADS-A and HADS-D scores that are consistent with anxiety and depression. The secondary outcomes of the study were to describe the perception and coping strategies of IBD patients during the COVID-19 pandemic, to estimate the prevalence rate of COVID-19 illness in this cohort, and to identify possible associations with anxiety or depression.

Statistical analysis

We calculated descriptive statistics for all variables. Means and standard deviations, or medians with interquartile ranges (IQRs), were used to summarize normally distributed and skewed continuous variables where appropriate, and frequencies were used to report categorical variables. Chi-squared or Fisher's exact tests were used to compare frequencies where appropriate. We used a standard formula to calculate the prevalence rate of depression and anxiety. HADS-A and HADS-D scores were dichotomized according to the cut-off points for depression and anxiety diagnosis, described above. Simple and multiple logistic regression analysis was used to examine the association between independent variables and the binary study outcomes where indicated. Multiple regression analysis was performed only if the number of variables available permits. Odds ratios (OR) and 95% confidence intervals (CI) were estimated. STATA 11.2 (StataCorp, Texas, USA) was used for our analysis. A *P* value of <0.05 was set as statistically significant.

RESULTS

Baseline characteristics

A total of 1435 responses were received. After excluding responses completed by 279 non-IBD participants, the data from 1156 IBD patients were analyzed. The majority of patients were between 17 and 40 years of age (84.6%), followed by >40 (13.4%) and <16 (2%). Males comprised 52.5% of the cohort (*n* = 607) and 78.5% (*n* = 853) were of Saudi nationality. 90% of the respondents reported being treated for IBD at 70 hospitals in Saudi Arabia Overall, (Jeddah, Makkah, Almadinah, Altaif, Riyadh, Dammam, Alhassa, Buraidah, Khubar, Abha, Dahrhan, Jizan, Albaha, Aljubail, and Najran) and the remaining 10% at hospitals located in the Gulf region (Kuwait, Qatar, Oman, Bahrain, and UAE). The majority of participants reported not having active medical insurance coverage (68.4%) and were nonsmokers (83.7%); 49.3% were married and 62.1% had an education level equivalent to a bachelor's degree. Medical illnesses other than IBD were reported by 16.0% of the cohort.

Crohn's disease, UC, and inflammatory bowel disease unclassified (IBDU) were reported by 66.2%, 25.9%, and 8.0% of patients, respectively. A disease duration >5 years was reported by 60.8% of the cohort and 78.3% were diagnosed between ages 17 and 40. Extraintestinal manifestations (EIMs) were reported by 35.7% of patients, the most common being musculoskeletal complaints (17.4%). Previous bowel resections (small or large bowel) and perianal involvement were reported by 23.6% and 39.4% of patients, respectively. The majority of the cohort actively took medical therapies (92.1%) during the time of the outbreak, 51.3% were on biologics, and 40.3% were on anti-TNF- α agents [Table 1].

Study outcomes

Anxiety and depression among IBD patients during the COVID-19 pandemic

The total median HADS score was 16 (IQR = 10–22). The median HADS-A score was 9 (IQR = 5–12). Normal scores, borderline scores, and scores consistent with a diagnosis of anxiety were reported by 423 (36.6%), 174 (15.1%), and 559 (48.4%) patients, respectively. The median HADS-D score was 7 (IQR = 4–10). Six hundred and thirty-five patients (69%) had normal scores and 273 patients (30.1%) had borderline scores. No patients reported scores consistent with depression [Table 2].

Perceptions of COVID-19 in IBD patients

Of the total cohort, 355 patients (30.7%) reported that they had stopped or delayed their medications owing to the COVID-19 pandemic. The most common causes of this reaction were a belief that the medications predisposed to infection (35.5%), fear of visiting the hospital or doctor's office during the outbreak (27.3%), and lack of access to pharmacies owing to social distancing restrictions (23.7%). One thousand and forty-four participants (91.6%) believed airborne transmission was the primary mode of transmission of COVID-19. According to patients, the main sources of knowledge about COVID-19 were a mixture of sources (42.1%), Twitter (32.6%), and television (TV) (13.3%). The majority of patients thought that COVID-19 was either "very dangerous" (46.4%) or "extremely dangerous" (27.7%). Thirty-five percent of the cohort thought that IBD patients were more prone to contracting COVID-19 than compared to the general population, and 66.4% reported that their clinic visits were affected by the pandemic. Only 30.5% of patients were able to stay in contact with their treating physicians during the pandemic [Table 3].

COVID-19 among IBD patients

Out of the thirty patients that were tested, six patients reported having been diagnosed with COVID-19 [Table 4],

Table 1: A summary of the baseline characteristics of the study cohort

Characteristic	No. (%)
Age	
<16	23 (2.0)
17-40	977 (84.6)
>40	155 (13.4)
Gender	
Male	607 (52.5)
Female	549 (47.5)
Marital status	
Married	571 (49.4)
Single	551 (47.7)
Divorced	34 (2.9)
Nationality	
Saudi	853 (78.5)
Non Saudi	234 (21.5)
Medical Insurance Coverage	365 (31.6)
Level Of Education	
Elementary	29 (2.4)
High School Diploma	282 (24.5)
College Diploma	40 (3.5)
Bachelor	715 (62.1)
Post Graduate	86 (7.5)
Smoking status	189 (16.4)
Chronic medical illnesses	971 (84)
IBD Subtype	
Crohn's disease	765 (66.2)
Ulcerative colitis	299 (25.9)
Indeterminate Colitis	92 (7.9)
Disease duration	
<1 years	147 (12.8)
1-5 years	304 (26.4)
>5 years	701 (60.9)
Perianal disease	455 (39.4)
Previous bowel resections	273 (23.6)
Extraintestinal manifestations:	
Arthralgia/arthritis	201 (17.4)
Osteoporosis	76 (6.6)
Skin manifestations	73 (6.3)
Kidney stones	33 (2.9)
Ocular manifestations	30 (2.6)
Medications:	
Oral 5-aminosalicylic acid (5ASA) derivatives	252 (21.8)
Oral corticosteroids i.e., prednisone	238 (20.6)
Azathioprine	273 (23.6)
Methotrexate	7 (0.6)
Tofacitinib	3 (0.3)
Infliximab	198 (17.1)
Adalimumab	261 (22.6)
Golimumab	2 (0.2)
Certolizumab Pegol	5 (0.4)
Ustekinumab	74 (6.4)
Vedolizumab	53 (4.6)

and twelve patients reported having relatives diagnosed with COVID-19.

Predictors of anxiety and depression among IBD patients during the COVID-19 pandemic

Based on a multiple logistic regression analysis, patients with an education limited to a high school diploma (OR = 2.57, 95% CI: 0.09–6.05, $P = 0.03$) and a diagnosis of indeterminate colitis (OR = 2.23, 95% CI: 1.27–3.89,

Table 2: Outcomes of the study

	Total HADS Score	HADS-A (Anxiety)	HADS-D (Depression)
Median (IQR)	16 (10-22)	9 (5-12)	7 (4-10)
Normal, n (%)		423 (36.6%)	635 (69%)
Borderline, n (%)	-	174 (15.1%)	273 (30.1%)
Abnormal, n (%)	-	559 (48.4)	-

$P = 0.005$) were more likely to express anxiety. Conversely, males (OR = 0.66, 95% CI: 0.50–0.87, $P = 0.003$), patients with previous bowel resections (OR = 0.65, 95% CI: 0.47–0.90, $P = 0.01$), patients who thought that IBD patients are not (OR = 0.41, 95% CI: 0.28–0.61, $P = <0.001$) or might (OR = 0.48, 95% CI: 0.3–0.65, $P < 0.001$) be more prone to COVID-19 compared to the general population, and patients actively taking azathioprine (AZA) (OR = 0.53, 95% CI 0.37–0.75, $P < 0.001$) or biologics (OR = 0.61, 95% CI: 0.38–0.99, $P = 0.045$) were less likely to express anxiety. Since none of the patients included in the study had HADS-D scores consistent with depression, no predictors could be identified [Table 5].

DISCUSSION

IBD is a chronic inflammatory condition that has been associated with higher rates of mood disturbances, such as anxiety and depression, compared with the general population.^[16] Patients with UC are four times more likely than controls to express anxiety, and twice as likely to be depressed, and patients with CD are five times more likely than controls to suffer from anxiety or depression.^[17] Since the COVID-19 pandemic was declared a global health emergency by the WHO, physicians treating patients with IBD have been advised to follow strict precautions against the virus, such as utilizing virtual clinics rather than office visits, delaying nonurgent endoscopic procedures, and taking into consideration the risks associated with immunosuppressive medications prior to prescribing them.^[18] All of these measures may potentially precipitate or exacerbate mood alterations in patients. An examination into the degree of anxiety and depression in a large cohort of Saudi patients diagnosed with IBD may, therefore, be important for improving treatment plans.

This cross-sectional study enrolled 1156 participants and revealed a high prevalence rate of mental health symptoms in IBD patients during the COVID-19 pandemic in Saudi Arabia. Overall, 48.4% and 30.1% of all participants reported symptoms of anxiety and borderline depression, respectively. Most participants had CD, were nonsmokers, aged between 17 and 40 years, married, and had disease duration of more than 5 years. Patients limited to a high

Table 3: Patient responses to the study questionnaire

Domain	Category (%)			P	Domain	Category (%)			P
	Normal (0-7)	Borderline (8-10)	Abnormal (11-21)			Normal (0-7)	Borderline (8-10)	Abnormal (11-21)	
HADS-A (Anxiety)					HADS-D (Depression)				
Q1: I feel tense or "wound up":					Q1: I still enjoy the things I used to enjoy:				
Most of the time (3)	8 (1.9)	17 (9.8)	163 (29.7)	<0.01	Definitely as much (0)	276 (44.0)	16 (5.9)	-	<0.01*
A lot of the time (2)	168 (39.9)	117 (67.6)	240 (43.8)		Not quite so much (1)	298 (47.5)	200 (73.3)	-	
From time to time, occasionally (1)	17 (4.0)	24 (13.9)	125 (22.8)		Only a little (2)	52 (8.3)	47 (17.2)	-	
Not at all (0)	228 (54.2)	15 (8.7)	20 (3.7)		Hardly at all (3)	2 (0.3)	10 (3.7)	-	
Q2: I get a sort of frightened feeling as if something awful is about to happen:					Q2: I can laugh and see the funny side of things:				
Very definitely and quite badly (3)	10 (2.4)	5 (2.9)	112 (20.4)	<0.01	As much as I always could (0)	487 (77.4)	50 (18.4)	-	<0.01*
Yes, but not too badly (2)	30 (7.2)	41 (23.7)	163 (29.6)		Not quite so much now (1)	117 (18.6)	160 (58.8)	-	
A little, but it doesn't worry me (1)	116 (27.7)	102 (59.0)	239 (43.5)		Definitely not so much now (2)	20 (3.2)	58 (21.3)	-	
Not at all (0)	271 (64.7)	25 (14.5)	36 (6.6)		Not at all (3)	6 (1.4)	0	-	
Q3: Worrying thoughts go through my mind:					Q3: I feel cheerful:				
A great deal of the time (3)	13 (3.1)	20 (11.5)	172 (31.4)	<0.01	Not at all (3)	3 (0.5)	4 (1.5)	-	<0.01*
A lot of the time (2)	150 (35.8)	123 (70.7)	212 (38.7)		Not often (2)	47 (7.5)	120 (44.1)	-	
From time to time, but not too often (1)	16 (3.8)	23 (13.2)	138 (25.2)		Sometimes (1)	229 (36.4)	120 (44.1)	-	
Only occasionally (0)	240 (27.3)	8 (4.6)	26 (4.7)		Most of the time (0)	351 (55.7)	28 (10.3)	-	
Q4: I can sit at ease and feel relaxed:					Q4: I feel as if I am slowed down:				
Definitely (0)	318 (75.4)	55 (31.8)	87 (15.9)	<0.01	Nearly all the time (3)	80 (12.6)	97 (35.7)	-	<0.01*
Usually (1)	78 (18.5)	69 (39.9)	148 (27.0)		Very often (2)	279 (44.0)	100 (36.8)	-	
Not often (2)	22 (5.2)	47 (27.7)	269 (49.0)		Sometimes (1)	70 (11.0)	66 (24.3)	-	
Not at all (3)	4 (1)	2 (1.2)	45 (8.2)		Not at all (0)	205 (32.3)	9 (3.3)	-	
Q5: I get a sort of frightened feeling like 'butterflies' in the stomach:					Q5: I have lost interest in my appearance:				
Not at all (0)	343 (82.3)	96 (55.5)	167 (30.6)	<0.01	Definitely (3)	4 (0.6)	31 (11.4)	-	<0.01*
Occasionally (1)	10 (2.4)	11 (6.4)	36 (6.6)		I don't take as much care as I should (2)	43 (6.8)	81 (29.7)	-	
Quite Often (2)	61 (14.6)	55 (31.8)	237 (43.4)		I may not take quite as much care (1)	103 (16.3)	90 (33.0)	-	
Very Often (3)	3 (0.7)	11 (6.4)	106 (19.4)		I take just as much care as ever (0)	484 (76.3)	71 (26.0)	-	
Q6: I feel restless as I have to be on the move:					Q6: I look forward with enjoyment to things:				
Very much indeed (3)	11 (2.6)	18 (10.4)	179 (32.6)	<0.01	As much as I ever did (0)	470 (74.4)	63 (23.3)	-	<0.01*
Quite a lot (2)	77 (18.4)	90 (52.0)	198 (36.1)		Rather less than I used to (1)	145 (22.9)	164 (60.5)	-	
Not very much (1)	17 (4.1)	29 (16.8)	123 (22.4)		Definitely less than I used to (2)	13 (2.1)	41 (15.1)	-	
Not at all (0)	314 (75.0)	36 (20.8)	49 (8.9)		Hardly at all (3)	4 (0.6)	3 (1.1)	-	
Q7: I get sudden feelings of panic:					Q7: I can enjoy a good book or radio or TV program:				
Very often indeed (3)	1 (0.2)	7 (4.1)	112 (20.4)	<0.01	Often (0)	168 (26.6)	97 (35.5)	-	<0.01*
Quite often (2)	42 (10.1)	66 (38.4)	244 (44.5)		Sometimes (1)	393 (62.3)	76 (27.8)	-	
Not very often (1)	4 (1)	5 (2.9)	77 (14.1)		Not often (2)	41 (6.5)	72 (26.4)	-	
Not at all (0)	370 (88.7)	94 (54.7)	115 (21.0)		Very seldom (3)	29 (4.6)	28 (10.3)	-	

Table 4: A description of the six patients who reported being diagnosed with COVID-19

#	Age group	Province, city	Gender	Disease	Medications	Comorbidities
1	>40	Makkah, Jeddah	Female	CD	Adalimumab, prednisone	None
2	17-40	Riyadh, Riyadh	Male	CD	5ASA	None
3	17-40	Riyadh, Riyadh	Male	UC	5ASA	None
4	>40	Makkah, Jeddah	Female	CD	None	None
5	17-40	Riyadh, Riyadh	Female	CD	Infliximab	None
6	>40	Qatif, Eastern province	Male	CD	AZA, 5ASA	None

school educational level and those with indeterminate colitis were more prone to anxiety while male patients and those that had commenced AZA and biologics were less likely to have anxiety. A nationwide population-based study conducted in Korea found IBD patients to be at

significant risk of anxiety (12.2% vs. 8.7%; $P < 0.001$) and depression (8.0% vs. 4.7%; $P < 0.001$) compared to controls. However, patients who required immunomodulators or biologics within one year of diagnosis of IBD were less prone to these diseases.^[19]

Table 5: Multiple logistic regression analysis for predictors of anxiety

Predictors Of Anxiety	OR	P	95% CI
Age	0.89	0.570	0.61-1.31
Gender (Male)	0.66	0.003	0.50-0.87
Nationality (Saudi)	0.79	0.138	0.58-1.08
Medical insurance	1.04	0.786	0.79-1.37
Marital status:			
Married	0.88	0.374	0.66-1.17
Divorced	0.94	0.875	0.42-2.11
Level of education:			
High School Diploma	2.57	0.030	0.09-6.05
College Diploma	1.80	0.280	0.62-5.23
Bachelor	1.87	0.137	0.82-4.28
Post Graduate	1.44	0.448	0.56-3.69
Chronic medical illness	1.25	0.224	0.87-1.77
IBD subtype:			
UC	1.19	0.347	0.83-1.70
IBDU	2.23	0.005	1.27-3.89
Disease duration:			
1-5 years	0.68	0.085	0.44-1.06
>5 years	0.98	0.923	0.65-1.48
Perianal disease	1.29	0.074	0.98-1.69
Bowel resections	0.65	0.010	0.47-0.90
Did you stop or delay medication?			
Yes	1.28	0.095	0.96-1.70
How dangerous do you rate COVID-19?			
Somewhat	2.29	0.337	0.42-12.44
Very	2.47	0.292	0.46-13.29
Extremely	2.91	2.504	0.54-15.72
Were you tested for COVID-19?			
Yes	0.60	0.233	0.26-1.39
Were you diagnosed with COVID 19?			
Yes	0.76	0.769	0.12-4.81
Did COVID-19 disturb your clinic visits?			
Yes	1.27	0.097	0.96-1.67
Do you think IBD patients are more prone to COVID-19?			
No	0.41	<0.001	0.28-0.61
Maybe	0.48	<0.001	0.36-0.65
Did you talk/reach your primary physician during the time of the outbreak?			
Yes	1.05	0.730	0.79-1.40
Do you have any relatives who were diagnosed with COVID 19?			
Yes	0.92	0.892	0.27-3.15
Medications:			
5ASA	0.87	0.480	0.58-1.29
Prednisone	0.79	0.262	0.52-1.19
Azathioprine	0.53	<0.001	0.37-0.75
Biologics	0.61	0.045	0.38-0.99
Anti-TNF- α	1.04	0.888	0.64-1.68
Smoking	1.00	0.984	0.70-1.45

Values in bold signify statistical significance

The high magnitude of reported anxiety and borderline depression highlights the urgent need for virtual outreach support programs that can provide psychological support during such events. A similar program was implanted in a West China hospital during the current pandemic. It integrates physicians, psychiatrists, psychologists, and social workers into Internet platforms to conduct a psychological intervention on patients, their families, and medical staff.^[20] Furthermore, a helpline has been provided by the Centers for Disease Control and Prevention (CDC) through their website, offering psychological support to the public during the COVID-19 pandemic.^[21]

In this study, a significant proportion of participants experienced anxiety and more than 30% reported borderline depression symptoms. In previous studies, emotional stress and difficult life experiences were significantly associated with decreased quality of life in IBD patients.^[22,23] Furthermore, such stressors may affect the course of the disease and result in a relapse.^[24] Indeed, the psychological impact of an infectious epidemic on IBD patients has not been widely studied. Sources of distress may include feeling vulnerable to infections or worries about loss of disease control and subsequent flaring attacks. The fact that IBD patients often take immunosuppressants, such as AZA or anti-TNF- α therapy, which has been associated with an increased risk of infections, may explain the perception of personal danger.^[25] This, however, was not observed in our cohort. Additionally, lack of access to pharmacies owing to social distancing measures contributes to the pressures and concerns of IBD patients about their disease control. Limited access to health care services experienced in previous outbreaks led to a major impact on patients' wellbeing, demonstrated in previous studies conducted during the Ebola virus outbreak: there was a significant decline in the provided healthcare services, which resulted in serious morbidity among patients; emergency departments, inpatient admissions, and surgeries were the most affected services.^[26,27] In a study conducted by McQuilkin *et al.* looking at the factors affecting access to healthcare services during the Ebola outbreak in Liberia, closure of facilities and patients' fears were among the main cited causes.^[28]

Another finding in our study was that 30.7% of patients reported either stopping or delaying their medication during the pandemic. The two main reasons attributed to this behavior were a belief that the medications predispose to infection (35.5%) and fear of visiting the hospital or doctor's office during the outbreak (27.3%). The hazard of medication disruption due to the limited access to healthcare services and patients' fears during the COVID-19 outbreak has been previously demonstrated by several health

organizations. Various strategies have been proposed to ensure the continuity of care for these patients.^[29]

Interestingly, in our study we found that social media platforms were the main source of information that patients relied on to receive knowledge about how to deal with the disease. As a result, the perception among two-thirds of participants was that the COVID-19 virus is extremely harmful, and about a third of patients believed that they were at a higher risk of acquiring the infection because of their disease. A previous study by Reich *et al.* demonstrated that social media is a preferred source of information for IBD patients.^[30] Another study by Groshek *et al.* revealed the negative impact of the media as a source of information for IBD patients, since it contributes to a decrease of knowledge about the disease and can increase disease-related stigma.^[31] Social media, in particular during such outbreaks of disease, has a major effect on patients' behavior, according to a study conducted by McNeill during the H1N1 pandemic in the United Kingdom in 2009; Twitter was recognized as having a significant influence on the rate of vaccination and antiviral agents used.^[32]

IBD patients are more vulnerable to psychological stress compared to non-IBD patients. COVID-19 is considered a major source of stress for such a vulnerable population. There is a lack of studies that assessed the impact of background psychological stresses on emotional states in a large cohort of IBD population in Saudi Arabia. This study is an opportunity to evaluate how IBD patients in Saudi Arabia collectively react to a major stressful event. Therefore, we believe that it will provide us with very significant insights. However, we acknowledge that our study has several limitations, including its cross-sectional design and our inability to calculate the response rate, which is mainly due to our reliance on social media platforms to recruit patients. Furthermore, we acknowledge that internet-based surveys are susceptible to information bias. On the other hand, the strengths of the study are its relatively large sample size and that it was conducted in the early phases of the outbreak. This allowed for early identification of the magnitude of its psychological effect on IBD patients and the possibility of uncovering any associated risk factors. This can also help provide IBD patients with the necessary psychosocial support and establish protocols and pathways for similar outbreaks in the future.

CONCLUSIONS

A significant proportion of IBD patients in Saudi Arabia expressed symptoms of anxiety, although not depression,

during the COVID-19 pandemic. Female patients, those with an education limited to a high school diploma, and with a diagnosis of indeterminate colitis were more likely to express anxiety. A considerable number of patients reported interruption to their care owing to the pandemic. Attention should be given to IBD patients before, during, and after such pandemics to avoid undesirable disease-related outcomes.

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Conflicts of interest

There are no conflicts of interest.

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Supplementary Table 1: The Arabic version of the hospital anxiety and depression score that was validated by Terkawi *et al.* and used in this survey⁽¹¹⁾

Hospital Anxiety and Depression Scale (HADS)			
Tick the box beside the reply that is closest to how you have been feeling in the past week.			
Don't take too long over you replies: your immediate is best.			
D	A	D	A
	I feel tense or 'wound up':		I feel as if I am slowed down:
3	Most of the time	3	Nearly all the time
2	A lot of the time	2	Very often
1	From time to time, occasionally	1	Sometimes
0	Not at all	0	Not at all
	I still enjoy the things I used to enjoy:		I get a sort of frightened feeling like 'butterflies' in the stomach
0	Definitely as much	0	Not at all
1	Not quite so much	1	Occasionally
2	Only a little	2	Quite Often
3	Hardly at all	3	Very Often
	I get a sort of frightened feeling as if something awful is about to happen		I have lost interest in my appearance:
3	Very definitely and quite badly	3	Definitely
2	Yes, but not too badly	2	I don't take as much care as I should
1	A little, but it doesn't worry me	1	I may not take quite as much care
0	Not at all	0	I take just as much care as ever
	I can laugh and see the funny side of things:		I feel restless as I have to be on the move:
0	As much as I always could	3	Very much indeed
1	Not quite so much now	2	Quite a lot
2	Definitely not so much now	1	Not very much
3	Not at all	0	Not at all
	Worrying thoughts go through my mind:		I look forward with enjoyment to things:
3	A great deal of the time	0	As much as I ever did
2	A lot of the time	1	Rather less than I used to
1	From time to time, but not too often	2	Definitely less than I used to
0	Only occasionally	3	Hardly at all
	I feel cheerful:		I get sudden feelings of panic:
3	Not at all	3	Very often indeed
2	Not often	2	Quite often
1	Sometimes	1	Not very often
0	Most of the time	0	Not at all
	I can sit at ease and feel relaxed		I can enjoy a good book or radio or TV program:
0	Definitely	0	Often
1	Usually	1	Sometimes
2	Not Often	2	Not often
3	Not at all	3	Very seldom

Scoring:

Total score: Depression (D): Anxiety (A):

0-7 = Normal

8-10 = Borderline abnormal (borderline case) 11-21 = Abnormal (case)