


Coronavirus disease 2019 pandemic stress and its effects on irritable bowel syndrome patients in Saudi Arabia

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Abstract

Coronavirus disease 2019 (COVID-19) pandemic has affected the psychological health of people, causing a higher level of stress. Stress can exaggerate the symptoms of irritable bowel syndrome (IBS).

To assess the effect of the COVID-19 pandemic stress on patients with IBS in Saudi Arabia.

A descriptive cross-sectional approach was used, which targeted accessible subjects with IBS from different regions of Saudi Arabia. Data were collected from participants using a structured electronic questionnaire, which captured the participants' socio-demographic data, medical history, IBS clinical data, self-reported stress due to COVID-19, and its effect on IBS symptoms.

A total of 1255 IBS patients completed the questionnaire. About 63.4% of them reported stress due to the pandemic. The most frequently reported causes of stress were fear of infection occurring in the family, followed by fear of self-infection (43.5%), and death due to COVID-19 infection (17.2%). Most of the stressed participants (56.6%) reported that stress usually exaggerated IBS symptoms. Almost 22% of them consulted a physician for stress aggravation of the symptoms, 18.1% used sedatives due to stress, 9.2% modified IBS medications due to the stress, and 75.5% of the participants reported impaired daily activities due to symptoms exacerbation. Coexisting chronic morbidities and inability to differentiate between COVID-19 gastrointestinal symptoms and IBS symptoms were significantly associated with COVID-19 related stress ($P = .039$ and $.001$, respectively).

Two-thirds of IBS patients were stressed during the first few months of COVID-19 pandemic. Patients unable to differentiate between COVID-19 gastrointestinal tract symptoms and IBS symptoms, and patients suffering from chronic morbidities were more vulnerable. Pandemic stress exacerbated patients' symptoms and impacted their activities of daily life.

Abbreviations: COVID-19 = coronavirus disease 2019, GIT = gastrointestinal tract, IBS = irritable bowel syndrome.

Keywords: coronavirus disease 2019 pandemic, Effects, Irritable bowel syndrome, Saudi Arabia, Stress

1. Introduction

Irritable Bowel Syndrome (IBS) is a frequent functional bowel disorder that has a significant health care burden and adverse

effect on the patient's quality of life. It is the most commonly diagnosed gastrointestinal condition and has varied signs and symptoms. The most common symptoms include abdominal pain, cramps or bloating, diarrhea or constipation, and mucus in the stool.^[1,2]

The prevalence of IBS, as well as measures employed to state its existence, vary between countries. Globally, population-based studies estimate the prevalence of IBS at 10% to 20% and its incidence at 1% to 2% per year.^[2,3] The prevalence of IBS in Saudi Arabia has been reported to be slightly higher than these estimates; however, it is comparable to some worldwide reports.^[4]

The exact cause of IBS is unknown. Although many causes have been reported, none have been definitively proven to cause IBS. It was suggested that these causes are secondary to psychological disturbances, rather than being the primary cause. There is growing evidence that organic diseases of the gastrointestinal tract (GIT) are identified in different patients. Theories include combinations of gut-brain axis disorders, gut motility disorders, pain sensitivity, infections including small intestinal bacterial overgrowth, neurotransmitters, genetic factors, and food sensitivity. The onset might be triggered by an intestinal infection or a stressful life event.^[5-7]

Since the end of 2019 and beginning of 2020, the world has been facing a rapidly spreading epidemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2, which was later classified by the World Health

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Organization as a pandemic.^[8] The outbreak started in Wuhan, Hubei Province, China, in December 2019. The World Health Organization classified the disease as a Public Health Emergency of International Concern on 30 January 2020 and recognized it as a pandemic on 11 March 2020.^[9,10]

Saudi authorities reported the first case of COVID-19 on the 2, March 2020. On the 8, March 2020, the Saudi Ministry of Education announced the closure of all educational institutions to control the spread of the virus. Until the 9, March 2020, only imported COVID-19 cases were reported in Saudi Arabia. On the 10th of March 2020, with a total of twenty COVID-19 confirmed cases, local transmission was documented in the country. The following few days saw a progression towards more strict measures for social distancing and country lockdown. The health authorities' efforts to fight and control the pandemic included case finding and isolation, contact tracing, quarantining, and testing, active surveillance, and maintaining social distancing, travel, and movement restrictions. As of the time of closing the survey (end of June), there is an increasing number of cases with a total number of 274,219 cases and daily new cases of 4387.^[11-13]

COVID-19 pandemic and the associated control measures have affected the psychological health of people, causing higher levels of stress and depression.^[14] Research shows that during pandemic time, a sense of fear and worry increases the levels of anxiety, nervousness and stress in healthy persons and exaggerates the symptoms of individuals having preexisting psychological problems.^[15] Evaluating the COVID-19 stress and its impacts in IBS patients is important to alleviate COVID-19 consequences. The literature available is only from a few of the affected countries and might not reflect the experience of people living in other parts of the world. The current study aimed to assess the COVID-19 pandemic stress and stress related effects on patients with IBS in the southwest of Saudi Arabia.

2. Methods

2.1. Study design and setting

A descriptive cross-sectional approach was used to target accessible populations suffering from IBS in different regions of Saudi Arabia.

2.2. Study population and sample size calculation

Adults aged 18 years or above having IBS were the target population. The survey covered participants from the 5 regions of Saudi Arabia (central, eastern, northern, southwestern and western). The sample size was estimated by Epi Info software, version 7.2. With predicted proportion of COVID-19 related stress among IBS patients of 50%, an absolute precision of 3% and at 95% confidence, the minimal sample size required for the study was measured to be 1068 IBS subjects. To account for non-response bias, a total sample of 1255 was targeted.

2.3. Sampling, recruitment and eligibility

A Survey Monkey platform was developed by the researchers. The survey link was circulated in the Arabic language starting from March 2020 to June 2020. The link was distributed by the exponential non-discriminative snowballing method, IBS subjects receiving the message were requested to complete the survey and

then forward the link to their close contacts in various WhatsApp group, Facebook, and Twitter platforms. A total number of 1857 responses were collected of which, 1255 (67.58%) responses were included in the study, and 602 were excluded. The main reasons for exclusions were: unconfirmed IBS, incomplete response, concurrent severe illness, chronic organic bowel disease, history of gastrointestinal surgery, weight loss, blood in stool, nocturnal frequency, cancer, and unwilling to participate. The study included eligible adults with diagnosed IBS and agreed to participate in the study. Diagnosis of IBS in Saudi Arabia based on the fulfillment of Rome Criteria for the diagnosis of IBS among adults.^[16,17] In order to manage the possible sampling bias of the online survey, the questionnaire's visibility was improved by uploading it using all social media platforms by the researchers and their relatives.

2.4. Survey tools

The researchers constructed the survey tool after an intensive literature review and expert consultation. The tool was reviewed by a panel of 5 experts for content validity. Tool reliability was validated with a pilot study of 30 participants with a reliability coefficient (α -Cronbach) of 0.71. Participants who positively responded to the question: "do you have a diagnosed IBS?" could complete the survey. The tool covered participants' socio-demographic data such as age, gender, place of residence, education, and medical history. In addition, IBS related data, including clinical presentation and duration, were included. Participants' subjective feelings of stress due to the COVID-19 pandemic and its effect on IBS symptoms were included in the questionnaire. Participants' awareness regarding the COVID-19 pandemic including GIT symptoms and its effect on the psychological wellbeing was also investigated. Data were collected from the participants using an anonymous structured online questionnaire.

2.5. Ethical considerations

The study proposal was presented to and officially approved by the Research Ethics Committee at King Khalid University, (ECM#2020-0810). Informed permission was taken from study participants before responding to the questionnaire. Confidentiality and privacy of participants were assured.

2.6. Data analysis

After data extraction, data were revised, coded, and uploaded into the statistical software IBM SPSS Statistics for Windows, version 22 (IBM Corp., Armonk, NY). Participants' clinico-demographic characteristics, participants' awareness about COVID-19, stress causes and effects were presented as frequencies and percentages. Associations between stress due to COVID-19 pandemic and participants' bio-demographic data were evaluated by Chi-square statistic. *P*-values less than .05 were considered statistically significant.

3. Results

3.1. Description of the study Sample

In the present study, a total of 1857 responses were collected of which 1255 (67.58%)

Table 1
Clinico-demographic characteristics of IBS cases (n = 1255).

Clinico-demographic characteristics		No.	%	
Age in yr	≤ 30 yr	811	64.6	
	> 30 yr	444	35.4	
Gender	Male	326	26.0	
	Female	929	74.0	
Marital status	Single	830	66.1	
	Married	378	30.1	
	Divorced/ widow	47	3.7	
Educational level	Below university	466	37.1	
	University	726	57.8	
	Post-graduate	63	5.0	
Work	Not working	332	26.5	
	Student	550	43.8	
	Employee	330	26.3	
	Free works	43	3.4	
Monthly income	Insufficient	303	24.1	
	Just sufficient	771	61.4	
	More than sufficient	181	14.4	
Residence	Rural area	194	15.5	
	Urban area	1061	84.5	
Other chronic health problems	No	1006	80.2	
	Immune deficiency	18	1.4	
	Asthma	98	7.8	
	Diabetes Mellitus	38	3.0	
	Depression	54	4.3	
	Other non-specific	67	5.3	
	Duration of IBS	< 1 yr	337	26.9
		1–2 yr	435	34.7
		> 2 yr	483	38.5
	Clinical presentation ^a	None	4	0.3
Abdominal pain		594	47.5	
Gases with abdominal distension		628	50.2	
Constipation		147	11.8	
Diarrhea		154	12.3	
Vomiting		2	0.2	

IBS= irritable bowel syndrome.

^aData are not mutually exclusive.

Respondents were eligible and completed the questionnaire: 329 (26.2%) from central region, 143 (10.3%) from eastern region, 220 (17.5%) from northern, 319 (25.4%) from southwestern region and 244 (19.4%) from western region. Participants' clinico-demographic characteristics shown in Table 1. Participants' age ranged from 18 to 75 years and a mean age of 27.5 ± 9.3 years. The majority of the respondents were females (74%), single (66.1%), having a university level of education (57.8%), students (43.8%), had just adequate monthly income (61.4%), and from urban areas (84.5%). Only 19.8% suffered other chronic health problems besides IBS. The onset of IBS was recent (less than 1- year) in 26.9% of subjects and more than 2 years in 38.5%. The most frequent IBS symptoms reported by participants were flatulence with abdominal distension (50.2%), abdominal pain (47.5%), and changes in bowel habits (diarrhea and constipation) (24.1%).

3.2. Participants' awareness about COVID-19

Table 2 shows the results of the participants' awareness of COVID-19. A total of 1228 (98.9%) respondents were aware of the COVID-19 pandemic. The most frequently identified clinical

Table 2
Awareness of COVID-19 pandemic among IBS patients (n = 1255).

COVID-19 awareness		No.	%
Know about COVID-19 pandemic	Yes	1241	98.9
	No	14	1.1
COVID-19 symptoms ^a	Not aware	66	5.3
	Fever	1123	89.5
	Cough	845	67.3
	Dyspnea	1016	81.0
	Diarrhea	294	23.4
Previously infected with COVID-19	Sore throat	3	0.2
	Loss of appetite	18	1.4
	Yes	30	2.4
Know any COVID-19 case	No	1225	97.6
	Yes	769	61.3
COVID-19 infection had GIT symptoms	No	486	38.7
	Yes	215	17.1
	No	264	21.0
COVID-19 GIT symptoms ^a	May be	776	61.8
	Not aware	125	12.6
	Vomiting	306	30.9
	Loss of appetite	725	73.2
	Diarrhea	414	41.8
Can differentiate COVID-19 symptoms from IBS	Nausea	327	33.0
	Yes	1014	80.8
	No	241	19.2

COVID-19 = coronavirus disease 2019, GIT= gastrointestinal tract, IBS= irritable bowel syndrome.
^aData are not mutually exclusive.

symptoms of COVID-19 infection were fever (89.5%), dyspnea (81%), cough (67.3%), and diarrhea (23.4%). Only 30 participants (2.4%) had contracted the COVID-19 infection, and 769 (61.3%) knew somebody infected with a COVID-19. Among the respondents, 215 (17.1%) were aware that COVID-19 might have GIT symptoms, of which loss of appetite was the most reported (73.2%) followed by diarrhea (41.8%), nausea (33%) and vomiting (30.9%). About 81% of the participants reported that they could differentiate COVID-19 GIT symptoms from those of IBS.

3.3. COVID-19 pandemic stress and its effects

Table 3 describes the COVID-19 pandemic stress and its effects on IBS symptoms. About 63.4% of the participants stressed due to the pandemic. The most frequently reported causes of stress were fear of a family member contracting the infection (84.1%), followed by fear of self-infection (43.5%), and death due to COVID-19 infection (17.2%). Most of the stressed participants (56.6%) reported that stress usually exaggerates IBS symptoms, and (33.8%) that the stress sometimes exaggerates the symptoms. Almost 22% of the subjects consulted a physician for stress aggravation of the symptoms, 18.1% used sedatives due to stress, and 9.2% modified IBS medications due to the stress. Moreover, 75.5% of the participants reported impaired daily activities due to symptoms exacerbation.

3.4. Factors associated with COVID-19 pandemic related stress

Table 4 demonstrates the factors associated with COVID-19 pandemic related stress in IBS patients. Co-existing of chronic

Table 3
COVID-19 pandemic related stress and its effects on IBS patients.

	Stress and stress effects	No.	%
Stressed due to COVID-19 pandemic and related procedures	Yes	796	63.4
	No	459	36.6
Causes of stress ^a	Afraid of infection in family member	670	84.1
	Afraid of being infected	347	43.5
	Afraid of loss of income source	63	7.9
	Afraid of dying due to the virus	137	17.2
Stress exaggerated IBS symptoms	Yes	444	56.6
	Sometimes	265	33.8
	No	75	9.6
Consulted doctor due to stress	Yes	172	21.9
	No	612	78.1
Used sedatives due to stress	Yes	142	18.1
	No	642	81.9
Exaggerated symptoms affect daily activities	Yes	592	75.5
	No	192	24.5
Modified IBS medications due to stress	Yes	72	9.2
	No	712	90.8

COVID-19 = coronavirus disease 2019, IBS= irritable bowel syndrome.

^aData are not mutually exclusive.

morbidities and being unable to differentiate between COVID-19 GIT symptoms and IBS symptoms were significantly associated with COVID-19 related stress among IBS patients ($P = .039$ and $.001$, respectively). On the other hand, other factors were not significantly related to stress ($P > .05$).

4. Discussion

The COVID-19 pandemic is a global health crisis affecting several countries, with millions of cases and thousands of deaths reported to date.^[10] Such a widespread pandemic is associated with adverse effects on mental health. Our study targeted IBS patients in Saudi Arabia to assess the subjective stress they experienced due to the COVID-19 pandemic and its effect on IBS symptoms. The study revealed that two-thirds of the participants were stressed due to the COVID-19 pandemic. During a pandemic, the burden of mental health issues is greater than the proportion of people affected by the infection.^[18,19]

In the present study, fear of contracting the infection by self or the family were the most commonly reported sources of stress. Also, about 61% of participants knew a case of COVID-19 and 2% of participants contracted the infection. Studies revealed that fear from COVID-19 infection can create stress and deteriorate psychiatric symptoms.^[20,21] Fear of contracting the corona virus and becoming sick, suffering economic losses, helplessness, separation from relatives, and stigma are the most widely reported sources of negative mental health issues in the literature.^[22,23]

Although studies established that the proportion of confirmed cases of COVID-19 against suspected cases of COVID-19 is low,

Table 4
Factors associated with COVID-19 pandemic related stress in IBS cases (n = 1255).

Bio-demographic data		Stressed due to COVID-19 pandemic				P-value
		Yes		No		
		No.	%	No.	%	
Age in years	≤ 30 yr	524	64.6	287	35.4	0.239
	> 30 yr	272	61.3	172	38.7	
Gender	Male	200	61.3	126	38.7	0.366
	Female	596	64.2	333	35.8	
Marital status	Single	519	62.5	311	37.5	0.570
	Married	248	65.6	130	34.4	
	Divorced/ widow	29	61.7	18	38.3	
Educational level	Below university	311	66.7	155	33.3	0.143
	University	444	61.2	282	38.8	
	Post-graduate	41	65.1	22	34.9	
Residence	Rural area	121	62.4	73	37.6	0.740
	Urban area	675	63.6	386	36.4	
Other chronic health problems	No	624	62.0	382	38.0	0.039*
	Yes	172	69.1	77	30.9	
Duration of IBS	< 1 year	225	66.8	112	33.2	0.323
	1–2 years	269	61.8	166	38.2	
	> 2 years	302	62.5	181	37.5	
Know about COVID-19 pandemic	Yes	777	63.3	451	36.7	0.306
	No	7	50.0	7	50.0	
Did you have COVID-19 infection	Yes	19	63.3	11	36.7	0.991
	No	777	63.4	448	36.6	
Know any COVID-19 case	Yes	501	65.1	268	34.9	0.111
	No	295	60.7	191	39.3	
Can differentiate COVID symptoms from IBS	Yes	621	61.2	393	38.8	0.001*
	No	175	72.6	66	27.4	

COVID-19 = coronavirus disease 2019, IBS= irritable bowel syndrome. P: Pearson χ^2 test.

* $P < .05$ (significant).

and that the majority of infections are asymptomatic or mild, and that the disease has a relatively low fatality rate,^[24] the mental health impacts remain usually high.^[18]

The current study revealed significant impacts of COVID-19 pandemic related stress on IBS patients. More than 90% of the stressed participants had usual or sometimes aggravation of IBS symptoms, especially abdominal distension and cramps, and 75% of them stated that the aggravation of symptoms affected their activities of daily life. Other participants (18%) reported taking sedatives to minimize the stress. The impact of stress on IBS patients is an important issue that should be considered by both clinicians and patients. IBS symptoms could fluctuate with daily stress,^[25,26] and patients having IBS report more stressful events in their lifetime compared to healthy controls.^[27] There is significant evidence about the role of usual stressors of life besides the COVID-19 pandemic in patients of IBS. Patients with IBS frequently experience anxiety and depression, which can aggravate the symptoms. This is because the colon is partly controlled by the nervous system, which responds to environmental stress. Evidence also suggests that the immune system, which also responds to stress, plays a role. IBS can also make the patient feel more anxious and depressed.^[28,29] Notably, subsyndromal mental health problems are a common occurrence during the COVID-19 pandemic.^[23] The direct relationship between the reported COVID-19 stress and exacerbation of symptoms among IBS patient in the present study may be high due to the lack of complete information regarding the nature of the disease, its full clinical presentation, and consequences.

Despite the high effect of COVID-19 related stress on the participants' IBS symptoms, only 20% consulted their physicians, which might be due to fear of being infected by contact with others in the clinic.^[30] Also, difficulty access to their physicians due to curfews and restriction of movements could be a reason for this low consultation rate.^[31]

In the present study, the inability to differentiate between IBS symptoms and COVID-19 symptoms was a significant factor for COVID-19 pandemic stress. People Confused between chronic disease symptoms, including IBS, and suspected COVID-19 symptoms are at a greater risk of mental health problems.^[32]

Another important factor associated with COVID-19 stress in IBS patients, revealed by our study, is the preexistence of other chronic diseases. People with preexisting chronic morbidity are more vulnerable to COVID-19 psychological stress compared with others due to the fear of the possibility that infection with COVID-19 may be associated with the risk of progression to severe disease.^[33,34] During public health emergencies, clinicians and health caregivers should be emphasis beside IBS care on the mental health of patients.^[35]

4.1. Study limitations

Although the current study provided significant findings concerning the COVID-19 pandemic effects on IBS patients in Saudi Arabia during the first few months of the pandemic, few limitations should be considered. First, the potential bias of the online survey. However, the large number of surveys collected may reduce the risk of this bias. Second, the dependence on subjective measurements of collected data may increase the risk of information bias. Though, the usage of a validated assessment tool may decrease the likelihood of this incident. Another limitation is related to the inherited characteristic of the online survey, which targeted only those who had access to the online

platforms. Consequently, study participants may not be representative of different age structures and socioeconomic standards of IBS subjects in the country.

5. Conclusions

In conclusion, our study revealed that the majority of patients with IBS suffered stress during the COVID-19 pandemic, which exacerbated their symptoms and impacted their everyday life. Patients unable to differentiate between COVID-19 GIT symptoms and IBS symptoms, and patients suffering from chronic morbidities are more vulnerable. COVID-19 pandemic stress exacerbated IBS patients' symptoms and impacted their activities of daily life. The impact of pandemic stress on IBS patients is an important issue that should be considered by both clinicians and patients. IBS patients should be enrolled in supportive psychological health education programs to cope with stressors, including the current pandemic.

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