# Prevalence, Mechanism, and Implications of Gastrointestinal Symptoms in COVID-19

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## ABSTRACT

**Background;** The COVID-19 pandemic has steered the exceptional disorder among the health care system. Gastrointestinal disorder and mortality are considerably associated with the utilization of health care which is disrupted by coronavirus pandemic.

Aim: The aim of the present study was to assess the prevalence, mechanism and implications of Gastrointestinal Symptoms in COVID-19.

**Materials and Methods:** This retrospective study was carried out on consecutive patients of laboratory tested severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and received inpatients/ emergency care at Isra University Hospital, Hyderabad for duration of six months between November 2020 to April 2021. The SARS-CoV-2 tested patients of either symptomatic or asymptomatic were enrolled in this study. The prevalence, mechanism, and implications of gastrointestinal symptoms were evaluated with COVID-19 among patients. The basic parameters such as GI symptoms, health care utilization, clinical predictor, and medication used were assessed with three Functional gastrointestinal and motility disorders (familial dysautonomia (FD), gastroparesis, and Irritable bowel syndrome (IBS)). The nasopharyngeal swab was used for SARS-CoV-2 testing. The COVID-19 sensitivity and specificity were 95% and 98% respectively. STATA version 15.1 was used for data analysis. **Results:** Of the total SARS-CoV-2 tested patients in our hospital, 1540 FGIMD patients underwent testing for SARS-CoV-2 were enrolled. COVID-19 RNA positive test rate was found 15.3% (235/1540) during the same period. Of all the tested patients, SARS-CoV-2 positive rate was higher (p<0.05) in COVID-19 patients with risk factors such as obesity, hypertension, autoimmune disease, diabetes, and cardiovascular disease) at 57.5% (885/1540) compared to 42.5% (655/1540) without risk factors. The COVID-19 prevalence in FGIMD patients was

3.3% (51/1540), 4.8% in IBS (56/1174), gastroparesis3.12% (24/770), and FD 2.4% (30/1250) in our hospital. Increased diarrhea, vomiting/nausea, weight loss, abdominal pain, and constipation were observed in FGIMD patients along with increases in H2 blocker, proton pump inhibitor and opioid use. The outpatient's visits, diagnostic tests such as lower and upper endoscopies and hospitalization were higher during COVID-19 pandemic compared to the pandemic prior period.

**Conclusion:** The prevalence of gastrointestinal symptoms was found higher in functional gastrointestinal and motility disorders patients during COVID-19 pandemic with increase healthcare utilization and medication usage. **Key words:** Gastrointestinal Symptoms, COVID-19 pandemic, Respiratory syndrome

## INTRODUCTION

COVID-19 pandemic originated from China city Wuhan gives a pneumonia-like presentation and widely spreads across the globe [1]. Coronavirus disease mainly caused by manifestations of SARS-CoV-2 (severe acute respiratory syndrome coronavirus) like multi-organ failure, pneumonia, and acute respiratory distress syndrome [2, 3]. COVID-19 patients comprised non-respiratory manifestations [4]. The prevalence of FGMID or gut-brain interaction and motility disorders were higher with an estimation of above 40% population might be affected globally [5]. The FGIMD management represents a huge burden on the healthcare system in terms of major economic costs and social utilization [6]. The COVID-19 pandemic has steered the exceptional disorder among the health care system. Gastrointestinal disorder and mortality are considerably associated with the utilization of health care which is disrupted by coronavirus pandemic [7]. The pandemic also delayed non-COVID-19 service availability. The outcomes of FGMID patients are still to be determined due to the COVID-19 pandemic disrupted the clinical and healthcare system [8].

The epidemiology of coronavirus has been of greater interest for many researchers in gastrointestinal disease patients as severe acute respiratory syndrome coronavirus-(SARS-CoV-2) affects GI symptoms and the 2 gastrointestinal (GI) tract [9]. Many studies focused on COVID-19 epidemiology and clinical outcomes in inflammatory bowel disease (IBD), pancreatic and cirrhosis patients [10, 11]. The impact of COVID-19 on FGIMD patients and their clinical outcomes explored the prevalence of gastrointestinal symptoms. The exacerbating report of FGIMD or gastrointestinal motility with coronavirus has been clinically related and important. The 141 COVID-19 cases studied in intensive care as a severe diabetic gastric flare reported various diseases with prevalence such as ileus (55.7%) and Ogilvie's symptoms (3%) [13]. Asymptomatic individuals contribute to the fecal-oral transmission of COVID-19 due to viral RNA presence in stools. The SARS-CoV-2 was detected through analysis of wastewater and sewage in order to investigate the fecaloral transmission role in the community and propose a strategy for mitigation [14]. The gastrointestinal symptoms early detection and prompt attention are critical due to

concomitant GI symptoms in COVID-19 patients who develop severe diseases. These symptoms can be effectively characterized through early identification and understanding of the mechanism and prevalence of GI symptoms and manifestation. The present study's aim was to evaluate the prevalence, mechanism, and implications of gastrointestinal symptoms in coronavirus patients.

#### **METHODS**

This retrospective study was carried out on consecutive patients of laboratory tested severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) and received inpatients/ emergency care at Isra University Hospital, Hyderabad for duration of six months between November 2020 to April 2021. The SARS-CoV-2 tested patients of either symptomatic or asymptomatic were enrolled in this study. The prevalence, mechanism, and implications of gastrointestinal symptoms were evaluated with COVID-19 among patients. The basic parameters such as GI symptoms, health care utilization, clinical predictor, and medication used were assessed with three Functional motility gastrointestinal and disorders (familial dysautonomia (FD), gastroparesis, and Irritable bowel syndrome (IBS)). The nasopharyngeal swab was used for SARS-CoV-2 testing. The COVID-19 sensitivity and specificity were 95% and 98% respectively. Prior to the study conduction, ethical approval was taken from the hospital ethical committee. COVID-19 patients were out through a standard assessment screened questionnaire. The SARS-CoV-2 and gastrointestinal symptoms were evaluated as a review system for standard care by physicians. The baseline demographic characteristics such as age, gender, smoking status, BMI, diabetes mellitus, and hypertension were recorded. Also, infectious symptoms such as cough, fever, dyspnea, cough, viral pneumonia, and sore throat were noted on predesigned proforma.

Abdominal pain, melena, vomiting/nausea, smell loss/anosmia, diarrhea, and gastrointestinal bleed were the recorded gastrointestinal symptoms. Data regarding medication were collected from all the individuals. These medications were H2 blockers, opioids, reuptake inhibitors, and non-steroid anti-inflammatory drugs (NSAIDs). All data were retrieved automatically from the medical record (MR). The gastrointestinal complaints rates, healthcare utilization, and medication use were compared with non-COVID patients. Chi-square test was used for dichotomous variables outcomes while t-test was used for continuous variables if normally distributed patients. For analysis, patients with gastroparesis, FD, and IBS were analyzed in subgroups.

## RESULTS

Of the total SARS-CoV-2 tested patients in our hospital, 1540 FGIMD patients underwent testing for SARS-CoV-2 were enrolled. COVID-19 RNA positive test rate was found 15.3% (235/1540) during the same period. Of all the tested patients, SARS-CoV-2 positive rate was higher (p<0.05) in COVID-19 patients with risk factors such as obesity, hypertension, autoimmune disease, diabetes, and cardiovascular disease) at 57.5% (885/1540) compared to 42.5% (655/1540) without risk factors. The COVID-

19prevalence in FGIMD patients was 3.3% (51/1540), 4.8% in IBS (56/1174), gastroparesis 3.12% (24/770), and FD 2.4% (30/1250) in our hospital. Increased diarrhea, vomiting/nausea, weight loss, abdominal pain, and constipation were observed in FGIMD patients along with increases in H2 blocker, proton pump inhibitor and opioid use. The outpatient's visits, diagnostic tests such as lower and upper endoscopies and hospitalization were higher during COVID-19 pandemic compared to the pandemic prior period. The FGIMD patients tested for coronavirus demographic characteristics are demonstrated in Table-1. Our study findings comprised 1540 FGIMD patients distributed as follows; 1250 with FD, 770 with gastroparesis, and 1174 with IBS and some overlapping diagnosed patients. The overall mean age was 49.56± 8.34 years. Out of 1540 FGIMD, the prevalence of females and male were 1082 (70.3%) and 458 (29.7%) respectively as shown in Figure-1.

Table/Figure-2 demonstrates gastrointestinal symptoms rates among FGIMD patients during the COVID-19 pandemic. The prevalence of GI symptoms was vomiting (14.72%), weight loss (5.32%), abdominal pain (24.62%), diarrhea (11.8%), and constipation (14.21%) with a p-value  $\leq$  of 0.0001 as statistical significant. In IBS patients, weight loss was significant while FD and gastroparesis was insignificant among COVID-19 patients. On other hand, positive COVID-19 tested patients with FGIMD found an increased prevalence of diarrhea (7.3%) during a pandemic. Additionally, coronavirus-positive tested patients with FD and gastroparesis showed insignificant association with GI symptoms.



Figure-1. Gender distribution of FGIMD (n=1540 patients)

Table-1	Demographic	Characteristics	of	FGIMD	patients
tested for	or coronavirus				

Parameters	FGIMD (n)	Percentage %	P-value			
Age, Mean ± SD (years)	49.56± 8.34		0.436			
BMI (kg/m2)	25.3±4.36		0.381			
Obese (BMI≥30 kg/m2)	364	23.6	0.692			
Clinical Features						
Sore throat	134	8.7	0.54			
Fever	185	12.01	0.02			
Cough	301	19.54	<0.001			
Dyspnea	311	20.2	0.002			
Nasal congestion	30	1.94	0.312			
Pneumonia	11	0.71	<0.001			

patients during the COVID-19 pandemic							
GI Symptoms	Frequency n	Percentage %					
Abdominal pain	379	24.62					
Vomiting	227	14.72					
Diarrhea	182	11.8					
Constipation	219	14.21					
Weight Loss	82	5.32					

Table-2. Gastrointestinal symptoms rates among FGIMD patients during the COVID-19 pandemic



Figure-2 Gastrointestinal symptoms rates among FGIMD patients during the COVID-19 pandemic

#### DISCUSSION

FGIMD patients with (FD, IBS, and gastroparesis) reported in COVID-19 pandemic steered up the healthcare utilization, gastrointestinal complaints, and medication use. The COVID-19 prevalence with FGIMD was 3.3% (51/1540), 4.8% in IBS (56/1174), gastroparesis 3.12% (24/770), and FD 2.4% (30/1250) in our hospital. IBS and active smoking were COVID-19 independent risk factors with dyspnea, pneumonia, and cough. The present study found increased healthcare utilization, medication use, and gastrointestinal symptoms with FGIMD patients during COVID-19 pandemic. Diarrhea was only symptom in COVID-19infection increased as in independent infection. The COVID-19 patient's common symptom of gastrointestinal disease was diarrhea. Disease feco-oral transmission potential has been given by public health significantly. The diarrhea overall prevalence was between 5% and 10% as shown by various studies [15, 16]. Another study found 2 to 50% prevalence of diarrhea among a wide range of coronavirus patients [17]. Similarly, Chinese study reported 36.6% diarrhea prevalence among 355 covid-19 cases [18].

Vomiting/nausea along with other gastrointestinal symptoms such as diarrhea, abdominal pain and anorexia were presented in COVID-19 patients. Various studies reported about 7.8% prevalence of vomiting/nausea among coronavirus patients. While another study found 5.2% vomiting symptoms among coronavirus patients [19]. COVID-19 patients presented less frequent abdominal pain compared to diarrhea, nausea and anorexia. Abdominal pain prevalence varied from 3.9% to 6.9% among coronavirus patients [20]. The duration and severity of abdominal pain had no consensus among COVID-19 patients. However, few studies reported acute abdominal pain in coronavirus patients [21]. Angiotensin as converting enzyme receptors host the coronavirus through mucous membranes such as the oral cavity and nose.

Further, salivary secretion transmits it to the gastric lumen being subjected to the stomach acidic environment. Hypochlorhydria patients had more susceptibility to virus infection due to viral load approach to the small intestine [23]. Gastrointestinal homeostasis is maintained by Gut flora as a significant part and symptoms such as diarrhea, vomiting and nausea by any worries regarding coronavirus. Microbiome variation causes higher risk for COVID-19 patients.

Gastrointestinal symptoms were frequently higher among COVID-19 patients. However, coronavirus severity and GI manifestation were reported differently by a number of studies [24, 25]. A study conducted on 150 hospitalized COVID-19 patients with and without gastrointestinal symptoms found no significant dissimilarities in mechanical ventilation and stay duration [26]. The higher prevalence of gastrointestinal symptoms and COVID-19 severity were reported [27]. Another study gastrointestinal symptoms were distinct in COVID-19 increased severity among patients [28]. Multiple analysis assessed an association between COVID-19 severity and gastrointestinal symptoms. Marginal increases in vomiting, nausea and abdominal pain were correlated with odds of disease severity [29].

The manifestation of gastrointestinal symptoms was more prevalent in COVID-19 patients. The patient's disease severity might be increased with multiple viral organs and their increased load. COVID-19 patients had gastrointestinal symptoms with or without respiratory symptoms. Abdominal pain, diarrhea, loss of smell and taste could be the gastrointestinal symptoms. Individuals working in a high risk environment and had these symptoms should be isolated and checked for coronavirus. Multiple studies reported higher infection of SARS-CoV-2 acquired due to endoscopic stuff. The endoscopic procedure causes viral transmission of coronavirus that still needs to be determined.

## CONCLUSION

The prevalence of gastrointestinal symptoms was found higher in functional gastrointestinal and motility disorders patients during COVID-19 pandemic with increase healthcare utilization and medication usage.

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