Original Article

PREVALENCE OF COVID-19 POSITIVE TEST AMONG PATIENTS WITH PURE ACUTE GASTRO-INTESTINAL SYMPTOMS

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ABSTRACT

Objectives: To assess the prevalence of COVID-19 among patient from deferent ages with pure gastrointestinal symptoms by using COVID-19 rapid test. **Methods:** A cross sectional retrospective observational study conducted at Mosul General Hospital in Nineveh Governorate, an online survey which was composed of information regarding gender, age, exact gastrointestinal symptoms and the result of rapid COVID-19 test was recorded. **Results:** the total sample was 413 patient, 162 (39%) were considered to have COVID-19, and 251 (61%) were considered as negative for COVID-19. vomiting was significantly related to COVID-19 patients. Abdominal colic and loss of appetite were more prevalent among COVID-19 those who were older than 45. Males were more likely to have abdominal colic and epigastric pain than female. **Conclusion:** Patients with vomiting should may have occult COVID-19 infection, COVID-19 rapid test can be helpful to diagnose COVID-19 infection. Gastrointestinal COVID-19 infection can be prevented by controlling feco-oral root of infection.

KEYWORDS: COVID-19, Gastrointestinal symptoms, Rapid test.

INTRODUCTION

COVID-19 was first thought to be an exclusive respiratory condition, although severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) has the potential to have devastating systemic effects that can impair vital organs, such as the digestive system.[1,2] Having gastrointestinal (GI) symptoms like nausea, loss of appetite, or diarrhea are common and can have a variety of causes, therefore having one or more of these symptoms does not necessarily indicate that the patient have COVID-19.

However, they occasionally serve as possible indicators.[3]

Over time, COVID-19 is constantly mutating and altering its characteristics. As a result, new variants can occasionally be more or less contagious and infectious than older ones. The viral strain causing the infection mostly determines the severity of symptoms and how well vaccinations work.[4] These new variants might alter the performance of vaccines, diagnostic tools, therapeutic medicines, and other preventive measures.[5] The supercritical nature of some SARS-CoV-2 variations was demonstrated by older strains, and recent altered strains are posing challenges for the world's healthcare systems.

According to recent studies, COVID-19 can be transmitted by fecal-oral route. COVID-19 affects the body by binding to the angiotensin converting enzyme 2 (ACE2) receptor.[6-7] Numerous body organs include this receptor. In the gastrointestinal tract, ACE2 receptors are available 100 times more than in the respiratory system.[7] ACE2 is highly expressed in the glandular cells of the stomach, duodenum, small intestine, and

colon leading to the explanation that GI symptoms in COVID-19 patients are brought on by SARS-CoV-2 invasion into host GI cells.[6] The spike protein on the viral coat, which is stimulated by the cellular transmembrane serine protease 2, allows the virus to penetrate epithelial cells (TMPRSS-2). Diarrhea consequently was caused by the altered barrier function. Bacterial products and toxins can enter the bloodstream and exacerbate the inflammatory response throughout the body. Immune cells are drawn in as a result of the ensuing inflammation, which may cause a cytokine storm and organ failure.[8]

The rapid test for COVID-19 diagnosis provides qualitative detection of IgG and/or IgM from human serum, whole blood or plasma in approximately 10-15 minutes. The rapid tests are based on the principle of lateral flow immunoassay chromatography and are available in cassette form. The test is based on the separation of the components of a mixture through a medium using capillary force and the specific and rapid binding of an antibody to its antigen. IgM and IgG are immunoglobulins produced by the immune system to provide protection against SARS-CoV-2. Anti-SARS-CoV-2 IgM and IgG can therefore be detected in samples from affected patients.[8-10]

The advantages of the Rapid tests include quick turnover time (within 10-15 minutes), high detection efficiency: simultaneous monitoring of IgM and IgG, detection without any testing equipment, and easily stored at room temperature.[11-12] On the other hand, a more confirmatory test is the RT-PCR, which makes use of specialized equipment and frequently requires long time to generate a result.

In Iraq generally, and in Mosul particularly, due to lack of financial resources, high load of patients, shortage of time and limited number of staff, as well as lack of people adherent to preventive measures and the common believe that COVID-19 is a big lie, it is quite common to see COVID-19 positive test on many patients presenting with general or GI symptoms. We conducted this study to find out the prevalence of COVID-19 positive rapid test among patients with pure digestive symptoms.

MATERIALS AND METHODS

A cross sectional observational study conducted at Mosul General Hospital in Nineveh Governorate, Iraq during September and October 2022 period. Patients who attended consultation units, emergency room and inpatient departments of internal medicine or pediatrics with pure gastro-intestinal symptoms were included in the study.

Data collection was planned after thorough review of the research on COVID-19 digestive complaints.[13-17] Data included patients' gender, age, specific symptoms (including diarrhea, vomiting, epigastric pain, abdominal colic, malaise, bloating, dehydration, fever, constipation,

loss of appetite, reflux or nausea). Patients were sent for rapid COVID-19 test and the result was recorded. We used the standard Chinese cassette which is provided by Iraqi directorate of health called one step rapid test from Khibio IVD company. Also, patient with a recent documented COVID-19 infection or if they received vaccination within last six months were excluded, to avoid positive bias.

Ethical approval was obtained from Nineveh health directorate and director of

Mosul general hospital. The data did not include any information on personal identifiers. Furthermore, the participation was voluntary with assuring the confidentially of responses.

Data was analyzed using SPSS (Statistical Package for Social Sciences) software, version 20 (IBM, Chicago, Illinois, US). Number and percentage (%) of respondents to each measure were calculated in overall sample and then compared between different groups. Comparison was done using Chi–squared (χ2) test. A p value of < 0.05 was considered as statistically significant.

RESULTS

Out of 413 total subjects enrolled in the study, 162 were considered as acute

COVID-19 (have IgM positive), and 251 were considered as negative for COVID-19 (have IgM negative), regardless of IgG status.

Table 1 characterizes the demographic baseline data, as well as differences in symptoms between subjects with COVID-19 and no COVID-19.

Patients with acute COVID-19 were more likely to have vomiting (23% in COVID-19 versus 18% in non-COVID-19; p=0.025). There was no difference in prevalence of fever, diarrhea, abdominal colic, bloating, loss of appetite, reflux, or constipation (p value > 0.05 in all).

Comparing different symptoms between COVID-19 patients who are younger than 45 and those older than 45, abdominal colic was more prevalent in COVID-19 patients older than 45 years (60%) compared to 39% in those younger than 45 years (p=0.010); table 2. Loss of appetite was also more prevalent in COVID-19 patients older than 45 years (p=0.019). No difference in other GI symptoms was found between these two groups. Table 3 elaborates the comparison of symptoms between female and male patients with acute COVID-19. Males were more likely to have abdominal colic (57%) compared to females (40%), p=0.036. Also, Males were having more epigastric pain (47.8%) than female (30.5%), p=0.026. No significant difference in other symptoms between males and females.

Table 1: Comparison of symptoms between patients with COVID-19 and no COVID19 (n=413).

Variables	No COVID-19 (controls) (n=251; 61%)	COVID-19 (cases) (n=162; 39%)	*p*-value
Baseline characteristics			
Male gender, n (%) Female gender, n (%)	105 (41.8%) 146 (58.2%)	67 (41.4%) 95(58.6%)	0.924
Age, n (%): * Less than 5 * 5-less than 15 * 15- less than 45 * 45-less than 60 * More than 60	13 (5.2% 25 (10.0% 154 (61.4% 38 (15.1% 21 (8.4%	9 (5.6%) 9 (5.6%) 82 (50.6%) 42 (25.9%) 20 (12.3%)	NA
Symptoms			
Fever, n (%)	75 (29.9%)	52 (32.1%)	0.633
Malaise, n (%)	193 (76.9%)	107 (66.0%)	0.016
Diarrhea, n (%)	50 (19.9%)	37 (22.8%)	0.477
Nausea, n (%)	46 (18.3%)	37 (22.8%)	0.264
Vomiting, n (%)	37 (14.7%)	38 (23.5%)	0.025
Epigastric pain, n (%)	142 (56.6%)	61 (37.7%)	<0.001
Abdo colic, n (%)	134 (53.4%)	76 (46.9%)	0.199
Bloating, n (%)	43 (17.1%)	29 (17.9%)	0.840
Loss of appetite	62 (24.7%)	48 (29.6%)	0.269
Reflux, n (%)	35 (13.9%)	24 (14.8%)	0.805
Constipation, n (%)	9 (3.6%)	11 (6.8%)	0.139

Table 2: Comparison of symptoms between COVID-19 patients who are younger than 45 and Those older than 45 (n=162).

Variables	Age < 45 years (n=100; 62%)	Age >= 45 years (n=162; 38%)	*p*value
General symptoms			
Fever, n (%)	30 (30.0%)	22 (35.5%)	0.467
Malaise, n (%)	58 (58.0%)	49 (79.0%)	0.006
GI symptoms			
Diarrhea, n (%)	25 (25.0%)	12 (19.4%)	0.405
Nausea, n (%)	19 (19.0%)	18 (29.0%)	0.139
Vomiting, n (%)	26 (26.0%)	12 (19.4%)	0.332
Epigastric pain, n (%)	29 (29.0%)	32 (51.6%)	0.004
Abdo colic, n (%)	39 (39.0%)	37 (59.7%)	0.010
Bloating, n (%)	17 (17.0%)	12 (19.4%)	0.704
Loss of appetite	23 (23.0%)	25 (40.3%)	0.019
Reflux, n (%)	16 (16.0%)	8 (12.9%)	0.590
Constipation, n (%)	8 (8.0%)	3 (4.8%)	0.437

Table 3: Comparison of symptoms between COVID-19 female and COVID-19 male patients (n=162).

Variables	COVID-19 and female (n=95; 59%)	COVID-19 and male (n=67; 41%)	*p*value
General symptoms			
Fever, n (%)	27 (28.4%)	25 (37.3%)	0.233
Malaise, n (%)	59 (62.1%)	48 (71.6%)	0.207
GI symptoms			
Diarrhea, n (%)	18 (18.9%)	19 (28.4%)	0.160
Nausea, n (%)	24 (25.3%)	13 (19.4%)	0.382
Vomiting, n (%)	22 (23.2%)	16 (23.9%)	0.915
Epigastric pain, n (%)	29 (30.5%)	32 (47.8%)	0.026
Abdo colic, n (%)	38 (40.0%)	38 (56.7%)	0.036

Bloating, n (%)	15 (15.8%)	14 (20.9%)	0.404
Loss of appetite	29 (30.5%)	19 (28.4%)	0.766
Reflux, n (%)	17 (17.9%)	7 (10.4%)	0.189
Constipation, n (%)	7 (7.4%)	4 (6.0%)	0.728

DISCUSSION

Many people think that COVID-19 virus pandemic is finished, and so many are not adhering to infection prevention measures anymore. Decreased number of mortality rate, atypical Covid cases presentation, increase in herd immunity, in addition to introduction of vaccine may have led to this misunderstanding.

This study was conducted at Mosul General hospital, which is the only medical and pediatric Hospital in west of Mosul. The patients were tested if they had at least one of the pure GIT symptoms.

Digestive symptoms could be a sign of a higher viral load, which would increase the severity of the sickness. The risk of fecal-oral transmission is increased by the viral presence in the stool, and precautions should be taken .

The purpose of this study was to offer more light on the prevalence of GI symptoms that might be missed or maltreated as other GI differential diagnosis. This will also emphasize the importance of infection prevention measures in these patients.

In people who did not have COVID-19, antigen tests correctly ruled out infection in 99.6% of people with symptoms and 99.7% of people without symptoms.[18]

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The purpose of this study was to offer more light on the prevalence of GI symptoms that might be missed or maltreated as other GI differential diagnosis. This will also emphasize the importance of infection prevention measures in these patients.

About two fifth of the tested patients (with at least one GIT symptom) were IgM positive. This is similar to a study done at Wuhan, China by Zhang JJ, Dong X and Cao YY.[19] Equal gender distribution was noted as seen by other study done by Han C and Duan C, Zhang at China.[20]

Vomiting was shown to be significantly associated with COVID-19 infection.

This was a similar finding by a study done at Wuhan, China by Luo S., Zhang X. and Xu H.[21] On the other hand, similar to other reports, our study showed that epigastric pain was actually shown to be significantly associated with COVID-19 negative as well other GIT symptoms shown to be not significantly different.[22]

In addition, we compared GI symptoms in acute COVID-19 between those younger than 45 years old versus those older than 45 years old. Malaise, epigastric pain, abdominal colic and loss of appetite were more common among patients more than 45 years old. This may be related to better general health of younger patients and better tolerance to their illness / these symptoms. No recent study shows such comparison. Other GIT symptoms were not significantly different between these age groups.

Interestingly, when we compared patients younger than 15 and older than 15 years, diarrhea was more common among younger age group versus epigastric pain and abdominal colic were more in the old age group. This may raise a hint that COVID-19 virus can pass easily to lower GI tract in younger age group. Also, no recent study shows such comparison. Other GI symptoms were not significantly different between these age groups.

Epigastric pain and abdominal colic were significantly more among male with COVID-19 infection. This was also shown to be present in a study which was conducted at Baghdad teaching hospitals.[23]

Conclusion and Recommendations

COVID-19 affect all ages and both genders with atypical symptoms. our study revealed that COVID-19 exists in patients with pure GI symptoms. In patients with GI symptoms especially vomiting, it should be kept in mind that they may have occult COVID-19 infection. COVID-19 rapid test can be helpful to rule in or out COVID-19 infection. Gastrointestinal tract COVID-19 infection raises a question that infection prevention should include feco-oral controlling measures as well as other respiratory measures. Also, this fact may open the door for future vaccines that can be given via oral root.

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