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REVIEW

Covid-19 with gastrointestinal symptoms: a narrative review

Covid-19 con síntomas gastrointestinales: una revisión narrativa

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ABSTRACT

Objective: this study aims to conduct a brief literature review on gastrointestinal problems caused by COVID-19, characterized by symptoms and sequelae.
Design: literature review based on a narrative synthesis.
Data sources: databases: Scopus, Web of Science, Science Direct, Scielo, Google Scholar.
Study selection: the documents were selected and analyzed under a critical literature review, considering inclusion and exclusion criteria.
Results: out of a total of 461 161 potentially relevant articles, the analysis was based on 19 studies, of which 10 were statistical analyses, 5 were narrative reviews, and 3 were systematic reviews. Patients involved in these studies not only exhibited gastrointestinal conditions due to COVID-19 but also experienced neurological, cardiovascular issues, and pneumonia. The study populations included children, young adults, adults, and pregnant women, with studies conducted in the United States, China, Morocco, Iran, Mexico, Colombia, and Brazil.
Conclusions: COVID-19 has caused gastrointestinal problems such as diarrhea, abdominal pain, vomiting, and persistent sequelae like irritable bowel syndrome (IBS), erectile dysfunction, and functional dyspepsia. Adults also face psychosocial disorders, such as anxiety and depression. Long-term sequelae include cognitive disorders, fatigue, hypertension, and chronic respiratory problems. Severe patients are at higher risk for coagulopathies and require intensive care. These sequelae significantly impact quality of life, increase psychological stress, and contribute to economic burdens.

Keywords: Gastrointestinal Problems; COVID-19; Symptoms; Sequelae.

RESUMEN

Objetivo: este estudio pretende realizar una breve revisión bibliográfica sobre los problemas gastrointestinales causados por el COVID-19, caracterizados por síntomas y secuelas.
Diseño: revisión bibliográfica basada en una síntesis narrativa.
Fuentes de datos: bases de datos: Scopus, Web of Science, Science Direct, Scielo, Google Scholar.
Selección de estudios: los documentos fueron seleccionados y analizados bajo una revisión crítica de la literatura, considerando criterios de inclusión y exclusión.
Resultados: de un total de 461 161 artículos potencialmente relevantes, el análisis se basó en 19 estudios, de los cuales 10 eran análisis estadísticos, 5 eran revisiones narrativas y 3 eran revisiones sistemáticas. Los

pacientes implicados en estos estudios no sólo presentaban afecciones gastrointestinales debidas al COVID-19, sino que también experimentaron problemas neurológicos, cardiovasculares y neumonía. Las poblaciones de estudio incluían niños, adultos jóvenes, adultos y mujeres embarazadas, con estudios realizados en Estados Unidos, China, Marruecos, Irán, México, Colombia y Brasil.
Conclusiones: la COVID-19 ha causado problemas gastrointestinales como diarrea, dolor abdominal, vómitos y secuelas persistentes como el síndrome del intestino irritable (SII), disfunción eréctil y dispepsia funcional. Los adultos también se enfrentan a trastornos psicosociales, como ansiedad y depresión. Las secuelas a largo plazo incluyen trastornos cognitivos, fatiga, hipertensión y problemas respiratorios crónicos. Los pacientes graves tienen mayor riesgo de coagulopatías y requieren cuidados intensivos. Estas secuelas repercuten significativamente en la calidad de vida, aumentan el estrés psicológico y contribuyen a las cargas económicas.

Palabras clave: Problemas Gastrointestinales; COVID-19; Síntomas; Secuelas.

INTRODUCTION

COVID-19 is a respiratory disease caused by a virus that particularly affects children under the age of 5, posing a global public health challenge (Desconsi et al., 2024). The pediatric population is especially vulnerable to direct contagion (Desconsi et al., 2024). The virus is eliminated through feces (Aninagyei et al., 2024), causing damage to the gastrointestinal tract and further complicating the situation when combined with mental stress in pediatric patients (Desconsi et al., 2024). The symptoms resemble a common cold, including fever, cough, runny nose, and headache. In some cases, symptoms can become more severe, leading to respiratory failure and pneumonia (Desconsi et al., 2024). Underestimating symptoms makes early diagnosis difficult and increases the risk of contagion, worsening symptoms and requiring close monitoring (Tsai et al., 2024). This also complicates medication intake (Zhou et al., 2020) and leads to dehydration, which can hinder patient recovery (Zhou et al., 2020).

Studies have reported intestinal bleeding in COVID-19 patients due to mechanisms affecting the gastrointestinal tract (GIT) (da Costa & da Fonseca Neto, 2024a). Another study found that almost half of COVID-19 patients experience gastrointestinal problems, with a higher incidence of IBS and functional dyspepsia (FD) compared to the healthy population (Zhang et al., 2023a). A cross-sectional study on 713 patients with an average age of 32 years (Moura et al., 2020) found that the angiotensin-converting enzyme 2 (ACE2) serves as a viral entry receptor via fecal-oral transmission (Díaz & Taboada, 2020).

The objective of this study was to review the literature on COVID-19 and its gastrointestinal symptoms, including associated symptoms and sequelae.

METHOD

A comprehensive narrative review was conducted to explore existing scientific literature, using databases: Scopus, Google Scholar, Scielo, ScienceDirect, and Web of Science. To refine the search, the following keywords were used: “COVID-19,” “Symptoms,” “Gastrointestinal,” “Sequelae,” and “Disorders.” Additionally, Boolean operators (AND) and quotation marks (“”) were applied to refine and broaden the search scope. The search period extended from August to November 2024, considering articles published between 2020 and 2024. This search included texts in any language, specifically excluding case reports, interviews, letters to the editor, theses, and books, due to their less empirical nature or specific focus. A total of 461 161 articles were initially identified through the designed search string across the following databases: Scopus (503), Web of Science (2 244), Science Direct (350), Scielo (64), and Google Scholar (458 000). A total of 302 663 duplicate articles were removed. Subsequently, 302 604 articles that did not align with the study’s objective and 302 585 articles that did not meet the inclusion criteria were excluded. As a result, a final corpus of 19 relevant articles was obtained for review.

RESULTS

The results were derived from an analysis of 19 studies, of which 10 were statistical analyses, 5 were narrative reviews, and 3 were systematic reviews. Patients included in the studies not only exhibited gastrointestinal conditions due to COVID-19 but also reported neurological, cardiovascular issues, and pneumonia. The study population included children, young adults, adults, and pregnant women, with research conducted in the United States, China, Morocco, Iran, Mexico, Colombia, and Brazil.

Symptoms

Patients with COVID-19 present various gastrointestinal problems: diarrhea and abdominal pain in children, though without severe complications (Jallouli et al., 2023b); nausea, vomiting, and hemorrhagic colitis (da Costa & da Fonseca Neto, 2024b); as well as functional diarrhea, functional dyspepsia, and functional constipation

within the first six months compared to healthy patients (D. Zhang et al., 2023b). However, these conditions do not prevent other hospital outcomes such as ICU admission, mechanical ventilation (MV), or mortality (Moura et al., 2020b).

Table 1. Descriptive analysis

N°	Study Title	Methodology	Objective / Sample	Main Findings
1	Digestive manifestations of Covid-19 in children: a retrospective study. (Jallouli et al., 2023a)	Retrospective study	Show gastrointestinal manifestations in symptomatic children with COVID-19	After respiratory problems, digestive issues ranked second in children: diarrhea, abdominal pain without severe complications. Causes: elevated aspartate aminotransferase (AST) and alanine transaminase (ALT).
2	Gastrointestinal manifestations in COVID-19 infection: a Moroccan prospective study. (Tarik et al., 2021b)	Cross-sectional descriptive prospective study	Identify the main gastrointestinal symptoms	Digestive problems last longer in patients compared to other symptoms, with a possibility of fecal-oral transmission.
3	Gastrointestinal bleeding in patients with COVID-19: an integrative review. (da Costa & da Fonseca Neto, 2024b)	Narrative review	review Identify pathophysiological mechanisms causing gastrointestinal bleeding	Higher mortality rate. Lesions: Gastric and duodenal ulcers. Symptoms: Nausea, vomiting, hemorrhagic colitis bleeding.
4	SARS-CoV-2 Omicron BA.1 Variant Infection of human colon epithelial cells. (Antia et al., 2024)	Cell culture study	Analyze the infectivity of the Omicron variant in the gastrointestinal tract	Omicron variant infects colon epithelial cells (colonoids), producing high viral RNA replication.
5	Gastrointestinal manifestations of the 'new coronavirus' infection. (Díaz & Taboada, 2020)	Narrative review	Observe gastrointestinal manifestations in COVID-19	Symptoms: Nausea, vomiting, and diarrhea. Angiotensin-converting enzyme 2 (ACE2) enters enterocytes and duplicates, causing malabsorption in the small intestine, leading to diarrhea. Fecal-oral transmission route, as COVID-19 has been detected in feces.
6	Shortening the long-COVID: An exploratory review on the potential of Unani medicines in mitigating post-Covid-19 sequelae. (Nikhat & Fazil, 2024)	Article	Clinical research in this area may provide a practical solution to overcome post-COVID-19 sequelae.	The most common post-COVID-19 symptoms are neurological (cognitive impairment, headache, insomnia, etc.), cardiovascular conditions (thromboembolism, hypertension, etc.), respiratory problems, and general symptoms such as fatigue and malaise.
7	Post-infection functional gastrointestinal disorders following coronavirus disease-19: a prospective follow-up cohort study. (Zhang et al., 2023)	Prospective cohort study	Examine the frequency and risk factors for post-infectious functional gastrointestinal disorders (FGIDs).	COVID-19 increases the incidence of functional gastrointestinal disorders (FGIDs): functional diarrhea, functional dyspepsia, and functional constipation within the first 6 months, compared to healthy individuals.
8	Gastrointestinal Manifestations and Associated Health Outcomes of COVID-19: a Brazilian Experience from the Largest South American Public Hospital. (Moura et al., 2020)	Article	Assess the prevalence and impact of gastrointestinal symptoms associated with COVID-19	Gastrointestinal problems like diarrhea, fatigue, and myalgia do not interfere with hospital outcomes such as ICU admission, mechanical ventilation, or mortality.

9	Gastrointestinal symptoms and disorders related to COVID-19. (Higuera-de la Tijera et al., 2023a)	Narrative review	Describe gastrointestinal symptoms and disorders related to COVID-19	A 55-year-old woman presented with neurological and gastrointestinal symptoms. Due to a lack of diagnostic studies, she received empirical treatment with vancomycin, meropenem, and acyclovir. Later, a COVID-19 test confirmed infection, prompting treatment change to hydroxychloroquine and azithromycin.
10	Acute surgical-like abdomen as a gastrointestinal manifestation of COVID-19 infection: a case report in Colombia. (Sierra-Arango et al., 2021)	Case report	Describe acute abdominal pain as a primary COVID-19 manifestation (37-year-old female patient).	Some cases present mild abdominal pain initially. Due to lack of further testing, cases may progress to severe surgical procedures.
11	COVID-19 gastrointestinal manifestations: a systematic review. (da Silva et al., 2020)	Systematic review	Review gastrointestinal symptoms associated with COVID-19 and liver biomarker levels (43 studies, 18,246 patients).	Diarrhea was the most common symptom, followed by nausea/vomiting. Some patients exhibited liver test abnormalities.
12	Gastrointestinal Sequelae of COVID-19: Investigating Post-Infection Complications—A Systematic Review. (Mohammed et al., 2024)	Systematic review	Investigate post-infectious gastrointestinal complications of COVID-19 (561 patients).	Reported multiple complications, including colitis, pancreatitis, intestinal perforation, and vascular disorders.
13	COVID-19 and the gastrointestinal tract: what do we already know? (Almeida & Chehter, 2020)	Review	Examine the prevalence of gastrointestinal symptoms and fecal-oral transmission of COVID-19 (14 studies).	The prevalence of gastrointestinal symptoms ranged from 6,8 % to 61,3 %, with viral RNA detected in feces.
14	Frequency and Risk Factors for Post-COVID-19 Functional Gastrointestinal Disorders After One Year. (Soheilipour et al., 2024)	Research article	Evaluate the frequency and risk factors of functional gastrointestinal disorders (FGIDs) one year after COVID-19 (357 post-COVID-19 patients).	FGIDs such as irritable bowel syndrome (IBS), erectile dysfunction, and long-term sequelae of COVID-19. Anxiety and depression were also observed.
15	The recovery of a woman with insidious gastrointestinal and neurological symptoms from COVID-19. (Mohtadi et al., 2023)	Case report	Describe the recovery of a female patient with insidious gastrointestinal and neurological symptoms due to COVID-19.	The patient received empirical treatment with vancomycin, meropenem, and acyclovir. She recovered after early intervention. Main symptoms: weakness, lethargy, and fever.
16	Post-acute sequelae of COVID-19: understanding and addressing the burden of multisystem manifestations. (Matteo Parotto, 2023)	Review	Describe the pathophysiological mechanisms and challenges in providing clinical care and support to critically ill COVID-19 survivors.	COVID-19 survivors are at risk for sequelae such as acute respiratory distress syndrome (ARDS), sepsis, and chronic critical illness.
17	Long-term Gastrointestinal Sequelae Following COVID-19: A Prospective Follow-up Cohort Study. (Golla et al., 2023)	Cohort study	Evaluate the frequency and risk factors for gastrointestinal disorders.	COVID-19 patients presented symptoms at 3 months including IBS, functional diarrhea, functional dyspepsia, functional constipation, overlapping dyspepsia-IBS, and functional bloating.
18	Gastrointestinal symptoms and disorders related to COVID-19. Lessons learned from gastroenterologists. (Higuera-de la Tijera et al., 2023b)	Review article	Summarize relevant findings on COVID-19 in the digestive system, including common gastrointestinal symptoms and atypical manifestations.	Possible relationship between COVID-19 and gut microbiota dysbiosis. Liver function abnormalities were linked to poor prognosis in severe COVID-19 patients.
19	Gut microbiome alterations and gut barrier dysfunction are associated with host immune homeostasis in COVID-19 patients. (Sun et al., 2022)	Research article	Investigate the association between gut microbiota alterations, gut barrier dysfunction, and immune homeostasis in COVID-19.	Severe disease was associated with pathogenic species increase, altered gut microbiota, and gut barrier dysfunction, affecting immune responses.

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DISCUSSION

The purpose of this study was to conduct a literature review on the gastrointestinal problems caused by COVID-19, characterized by its symptoms and sequelae.

COVID-19 causes various gastrointestinal problems: diarrhea and abdominal pain in children without severe complications (Jallouli et al., 2023b), which, alongside cognitive issues, manifest post-COVID (Sierra-Arango et al., 2021). Likewise, hypertension associated with intestinal problems presents a higher risk of developing severe symptoms (Alanazi et al., 2024), and patients also experience psychological symptoms such as anxiety, depression, and fear, which are common manifestations in gastrointestinal diagnoses (Wu et al., 2023).

COVID-19 has also been linked to complications such as hemorrhagic colitis (da Costa & da Fonseca Neto, 2024b), and bleeding and thrombosis further complicate ECMO (extracorporeal membrane oxygenation) (Feth et al., 2024). Hemorrhages or hematomas have been observed in sites including the retroperitoneum, brain, digestive tract, muscles, and soft tissues (Sha et al., 2024). Additionally, it causes coagulopathy, the primary cause of hemorrhage (Hazzi et al., 2024), with frequent risks including anticoagulation, dialysis, and arterial hypertension (Martio et al., 2023).

COVID-19 negatively impacts patients with functional dyspepsia (FD) and functional constipation during the first six months compared to healthy patients (D. Zhang et al., 2023c). When patients develop FD and irritable bowel syndrome (IBS) overlap syndrome, they generally experience worse gastrointestinal and psychological outcomes (Oshima et al., 2021), with a higher anxiety level than patients without FD (Zulfitri et al., 2023). FD persists as a high-risk sequela of COVID-19, significantly affecting patients' quality of life, increasing their psychological burden, and raising economic costs (Peng et al., 2022).

Sequelae

Patients who have recovered from COVID-19 exhibit sequelae affecting the gastrointestinal tract (GIT) such as irritable bowel syndrome (IBS), erectile dysfunction, and other long-term consequences like anxiety and depression (Soheilipour et al., 2024). They also experience cognitive impairment, headaches, insomnia, cardiovascular conditions, thromboembolism, hypertension, respiratory issues, and general symptoms like fatigue and malaise (Nikhat & Fazil, 2024b). Additionally, they are at risk of acute respiratory distress, sepsis, and chronic critical illness (Parotto et al., 2023).

Post-COVID patients presented IBS, erectile dysfunction, and other long-term sequelae like anxiety and depression (Soheilipour et al., 2024). It is characterized by abdominal pain and changes in bowel habits (Z. Zhang et al., 2023). Individuals with IBS and comorbid anxiety or depression report increased symptom severity and reduced quality of life compared to those who only have IBS (Kendra et al., 2022). This condition is more common worldwide, particularly in women and individuals under 50 years of age (Belogianni et al., 2024).

Cognitive impairment, headaches, and insomnia (Nikhat & Fazil, 2024b) are sequelae that further delay COVID-19 diagnosis and treatment and have short- and long-term impacts on public health (Wysokiński et al., 2023). This condition appears to be more common in critically ill patients (Chen et al., 2022) and is suspected to increase the incidence rates of neurodegenerative disorders worldwide in the coming years (Matar-Khalil, 2022).

Patients recovering from COVID-19 often experience hypertension, respiratory issues, and general symptoms like fatigue and malaise, according to Nikhat & Fazil (2024c). They also exhibit an increase in IgG antibodies, associated with pneumonia and underlying conditions such as obesity, dyslipidemia, and diabetes mellitus (Khongsiri et al., 2024). Furthermore, ischemic heart disease has been linked to infected individuals (Alanazi et al., 2024). On the other hand, factors such as gender, advanced age, severity of symptoms, symptoms at admission, shortness of breath, sore throat, body weakness, hypertension, and diabetes increase the risk of mortality due to the virus (Anteneh et al., 2024).

COVID-19 also presents patients with respiratory problems and general symptoms like fatigue and malaise (Nikhat & Fazil, 2024b). Along with chronic respiratory diseases and other pre-existing conditions, these symptoms increase the risk of developing post-acute COVID-19 syndrome (PACS) (McDonald et al., 2024). Additionally, hospitalized immunocompromised COVID-19 patients develop severe disease requiring ICU admission, and most require respiratory assistance (either non-invasive or invasive mechanical ventilation) (Singh et al., 2023). However, patients without respiratory symptoms showed recovery when azithromycin was added to their treatment (Issa et al., 2023).

This study has some limitations, such as initially approaching the topic in a general manner, refining specific aspects throughout the investigation, which ultimately determined the objective. Some studies with specific results were generalized during the literature analysis. Although other specialized health databases exist, access was limited to generic databases such as those previously reported.

CONCLUSIONS

COVID-19 causes various gastrointestinal problems, associated with cognitive issues and hypertension, along with psychological symptoms. It is also linked to complications such as hemorrhagic bleeding due to

prior coagulopathy and thrombosis, as well as risks like anticoagulation, dialysis, and hypertension, alongside functional dyspepsia (FD) and functional constipation, resulting in gastrointestinal and psychological manifestations. These conditions affect patients' quality of life, increasing their economic and psychological burden.

Post-COVID patients experience IBS and erectile dysfunction, leaving long-term sequelae such as anxiety and depression. This results in reduced quality of life, primarily affecting women and individuals under 50 years of age. Additionally, general sequelae of COVID-19 include cognitive decline, headaches, and insomnia, which may lead to a rise in neurodegenerative disorders over time.

Patients also develop cardiovascular issues such as hypertension, respiratory problems, fatigue, obesity, and diabetes. Factors like advanced age and symptom severity increase mortality risk, particularly among those with chronic conditions or immunosuppression, who are at higher risk of developing severe disease and often require ICU admission and respiratory support. Azithromycin has shown positive effects in the recovery of some patients without respiratory symptoms.

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CONFLICT OF INTEREST

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