

**Table S1.** Demographic and clinical data of the included patients as reported by 24 studies.

| Author                       | Study Type<br>County  | N (total)<br>Gender (%M)  | Type of GI problem   | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities  | COVID-19<br>Date/<br>duration<br>Severity  | Time of GI<br>problem<br>detection          | Blood<br>markers | Management  | Follow up time<br>Outcome  | QA score<br>Type of test    |
|------------------------------|-----------------------|---|--|--|--|--|---|------------------|---|--|-----------------------------|
| Parrela et al.,<br>2022 [18] | Case report<br>Brazil | 1 M   | 1<br><br><u>Diagnoses</u><br>SMA and jejunal<br>branches<br>Thromboembolism<br><br>Short bowel syndrome<br><br><u>Signs and symptoms:</u><br>Nausea<br>Vomiting<br>Fever<br>Bloating<br>Abdominal pain<br>Diarrhea which<br>progressed to<br>obstipation<br>Anasarca<br>Hyporexia<br>Abdominal pain<br>Hypoalbuminemia | 62                                       | NR   | <u>Date</u><br>August 2020<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>NR | 20 days post<br>COVID-19<br>hospitalization | NR               | Thromboembolic<br>tomy<br><br>Enterectomy<br><br>Rivaroxaban 20<br>mg daily<br><br>Dietary<br>adjustments | 2 months after<br>discharge<br><br>Developed:<br>Anasarca<br>Hyperoxia<br>Abdominal<br>pain<br><br>Diagnosed with<br>short bowel<br>syndrome | 5<br>Murad et al.,<br>scale |
| Enas et al.,<br>2023 [19]    | Case control<br>Egypt | 210<br>(1 COVID-19<br>history and<br><i>Cryptosporidium</i><br>+ = 49 (23.3% M) | <u>Diagnoses</u><br><i>Cryptosporidium</i><br>spp. infection   | > 18 ( <i>Averages</i><br>NR)            | (1)<br><i>H. pylori</i> infection<br>(49.9%)<br>Diabetes (20.5%) | NR   | NR  | NR               | NR  | NR   | 7<br>NOS                    |

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|--------------------------|-----------------------------------|--|--|--|--|---|------------------------------------|------------------|------------|--|--------------------------|
|                          |                                   | (2) COVID-19 history and<br><i>Cryptosporidium</i> - = 161 (76.6% M)<br><br>COVID-19 negative controls n = 220<br><br>Gender NR  | <u>Signs and symptoms</u><br>Chronic diarrhea<br>Vomiting<br>Weight loss<br>Fecal occult blood<br>Elevated inflammatory biomarkers   |  | (2)<br><i>H. pylori</i> infection (16.8%)<br>Diabetes (18.3%)  |   |                                    |                  |            |  |                          |
| Golla, et al., 2023 [20] | Prospective cohort study<br>India | 920<br><br><u>Cohort 1</u><br>(COVID-19 cases): 320 M (50.9%)<br><br><u>Cohort 2</u><br>Group A (Age matched controls for cohort 1):320 (54.6% M)<br><br>Group B<br>Healthcare workers<br>COVID-19 negative: 280 (61.4% M) | 50/320 (15.6%)<br><br><u>Diagnoses</u><br>NR<br><br><u>Signs and symptoms</u><br>Diarrhea 23 (7.2%)<br>Abdominal pain 16 (5.0%)<br>Nausea with vomiting 11 (3.4%)<br>At 1 month after infection, 36/320 (11.3%) FGID-like symptoms | Cohort 1<br>38.02 ± 11.4                 | Cohort 1<br>Diabetes 8.4%<br>HTN 11.5%<br>CAD 2.5%<br>CKD 1.2% | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>Cohort 1<br>Mild 74.3%<br><br>Moderate<br>22.1%<br><br>Severe 3.4% | 1 month after infection            | NR               | NR         | At 3 months, 27 (8.4%) persisted to have symptoms<br><br>At 6 months, 21 (6.6%) had persistent symptoms<br><br>Of the various reported FGID at 3 months:<br><br>8 (2.5%) IBS, 7 (2.2%) functional diarrhea | 8<br>NOS                 |

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|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|------------------------|------------|--|--------------------------|
|        |                      |                          |                    |  |               |   |                                 |                        |            | <p>6 (1.9%)<br/>functional<br/>dyspepsia (FD)</p> <p>3 (0.9%)<br/>functional<br/>constipation</p> <p>2 (0.6%)<br/>FD-IBS overlap</p> <p>1 (0.3%)<br/>functional<br/>abdominal<br/>bloating/distention</p> <p>Of the 27<br/>patients with<br/>persistent<br/>symptoms at 3<br/>months:</p> <p>8 (29.6%)<br/>isolated<br/>carbohydrate<br/>malabsorption</p> |                          |

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|-------------------------------|---|--|---|--|---|--|--|---|------------|---|--------------------------|
|                               |   |  |   |  |   |  |  |   |            | 1 (3.7%) 2<br>positive tests<br>for MAS<br><br>1 (3.7%) IMO |                          |
| Zollner et al.,<br>2022 [21]  | (Observational study;<br>Analytical)<br><br>Austria | 46 COVID-19<br>positive IBD<br>patients<br>(56.5% M)   | <u>Diagnoses</u><br>70% (32/46) of patients<br>with positive qPCR<br>signal in at least 1<br>segment of the gut.<br><br>52% (24/46)<br>of patients with<br>immunoreactivity<br>against the viral<br>nucleocapsid<br>phosphoprotein<br>in the<br>small and large intestine<br><br>NR | 44.67 (25.45,<br>50.58)                  | Crohn's Disease (22/32 (68.8))<br><br>UC 8/32 (25.0)<br><br>IBD unclassified 2/32 (6.2)<br><br>Heart disease 2/32 (6.2)<br><br>Diabetes 2/32 (6.2)<br><br>Lung disease 1/32 (3.1) | <u>Date</u><br>October 2020<br>and- February<br>2021<br><br><u>Duration</u> NR<br><br><u>Severity</u><br>Asymptomatic (2.2%)<br><br>Mild (91.3%)<br><br>Moderate (4.3%)<br><br>Severe (2.2%) | Days since<br>PCR)-<br>confirmed<br>SARS-CoV-2<br>infection and<br>biopsy: 218.50<br>(94.50, 256.75;<br>Range) | NR  | NR         | No follow up,<br>3<br>single sample<br>NOS                  |                          |
| Ferreira et al.,<br>2022 [22] | Case-<br>Control<br>Study<br><br>Brazil             | COVID-19<br>positive cases:<br>149 (34.23% M)<br><br>Control group<br>(COVID-19<br>negative): 71<br>(28.17% M) | <u>Diagnoses</u><br>Comparing both groups,<br>significant differences<br>were seen in microbial<br>diversity in post-<br>COVID-19 patients<br><br><u>Signs and symptoms</u>   | NR                                       | Obesity (38.26%)<br><br>Systemic arterial<br>hypertension<br>(21%)<br><br>T2DM (7.4%)   | <u>Date</u><br>October to<br>December 2020<br><br>presenting<br>positive<br>COVID-19 test  | 1-8 months<br>after positive<br>COVID-19 test  | <u>Total SARS-<br/>CoV-2<br/>Antibodies</u><br><br>Asymptom<br>atic: 29.2 ±<br>49.1 | NR         | Ranges from 1<br>month follow<br>up to 8 month<br>follow up | 5<br>NOS                 |

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|-----------------------|----------------------------|--------------------------|---|--|--|--|---------------------------------|--|---|---------------------------|--------------------------|
|                       |                            |                          | 49 had diarrhea   |  | Heart diseases, such as arrhythmias, coronary artery disease and cardiac dispositive (5.4%)<br><br>Chronic lung diseases, including asthma (4.7%)<br><br>Chronic renal disease (2.7%)<br><br>Depression (3.3%)<br><br>Autoimmune diseases (2%) | <u>Duration</u><br>NR<br><br><u>Severity:</u><br>Asymptomatic: 10<br><br>Mild: 117<br>Moderate: 10<br>Severe: 12 |                                 | Mild: 68.6 ± 58.8<br><br>Moderate: 101.1 ± 57.5<br><br>Severe: 87.3 ± 43.4<br><br><u>CRP (mg/dL)</u><br><br>Asymptomatic: 0.42 ± 0.27<br><br>Mild: 0.56 ± 0.92<br><br>Moderate: 1.56 ± 1.68<br><br>Severe: 3.22 ± 4.35 |   |                           |                          |
| Lee et al., 2021 [23] | Case Report<br>South Korea | 1 M                      | <u>Diagnoses</u><br>Oropharyngeal dysphagia<br><br><u>Signs and symptoms</u><br>Dysphagia | 73 years                                 | Parkinson's Disease  | <u>Date</u><br>NR<br><br><u>Duration</u><br>14 days after testing positive<br><br><u>Severity</u><br>NR          | 21 days after negative PCR      | NR   | Swallowing therapy<br><br>Enteral feeding | NR                        | 6<br>Murad et al., scale |

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|-------------------------------|-----------------------------------|--------------------------|---|--|--------------------------|---|-----------------------------------|------------------------|---|---------------------------|--------------------------|
| Banerjee et al., 2023 [24]    | Case Report<br>India              | 1 F                      | <u>Diagnoses</u><br>Intestinal and Mesenteric Mucormycosis<br><br>Pneumoperitoneum with thrombosis of the ileocolic artery<br><br><u>Signs and symptoms</u><br>Abdominal Pain<br>Nausea<br>Vomiting | 38 years                                 | Type 2 diabetes Mellitus | <u>Date</u><br>NR<br><br><u>Duration</u><br>2 weeks<br><br><u>Severity</u> NR | After 2 weeks of infection        | NR                     | Exploratory laparotomy<br><br>Inotropes and vasopressors<br><br>Formation of barrel stoma and a mesh laparostomy<br><br><u>Postoperatively:</u><br>Liposomal amphotericin B (200 mg IV)<br><br>Broad spectrum antibiotics | NR                        | 4<br>Murad et al., scale |
| Anayat et al., 2022 [25]      | Cross Sectional Study<br>Pakistan | 30<br>(50% M)            | <u>Diagnoses</u><br>Dyspepsia (6.7%)<br><br><u>Signs and symptoms</u><br>NR   | NR                                       | NR                       | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>NR   | NR                                | NR                     | NR  | NR                        | 2<br>NOS                 |
| AbdurRaheem et al., 2022 [26] | Case report<br>(2 cases)          | 2 M                      | <u>Diagnoses</u><br>(1) Abdominal cocoon and SBO  | (1) 46                                   | None                     | <u>Date</u><br>NR   | Both cases are recovered patients | NR                     | NR  | NR                        | 5<br>Murad et al., scale |

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|-----------------------------|------------------------------------|--------------------------|---|--|---------------|---|--|-------------------|--|--|-----------------------------|
|                             | Country NR                         |                          | <u>Signs and Symptoms</u><br>(1) Abdominal pain,<br>nausea, vomiting,<br>constipation   |  |               | <u>Duration</u><br>NR<br><u>Severity</u><br>Severe  | (1) 6 months<br>post-COVID-19<br>recovery  |                   |  |  |                             |
|                             |                                    |                          | <u>Diagnoses</u><br>Abdominal cocoon<br><br><u>Signs and symptoms</u><br>Abdominal pain, nausea,<br>vomiting                                  | (2) 47                                   | None          | <u>Date</u><br>NR<br><u>Duration</u><br>NR<br><u>Severity</u><br>Severe                           | (2) 6 months<br>post COVID-19<br>diagnosis | NR                | NR   | NR   |                             |
| Jain et al.,<br>2022 [27]   | Case report<br>India               | 1 F                      | <u>Diagnoses</u><br>Mesenteric thrombosis<br>with invasive<br>Mucormycosis<br><br><u>Signs and symptoms</u><br>Abdominal pain<br>Constipation | 57                                       | Diabetes      | <u>Date</u><br>NR<br><u>Duration</u><br>NR<br><u>Severity</u><br>NR                               | 20 days after<br>COVID-19<br>diagnosis     | Hgb 11.8<br>gm/dl | IV fluids,<br>analgesics, and<br>antibiotics<br><br>Right<br>hemicolecotomy<br><br>Inotropic support | Post-operative<br>cardio-<br>pulmonary<br>arrest - Could<br>not be<br>resuscitated | 4<br>Murad et al.,<br>scale |
| Cooney et al.,<br>2022 [28] | Retrospecti<br>ve cohort<br><br>UK | 122<br>(48% M)           | <u>1<sup>st</sup> survey</u><br><br>87 (71.3%) total<br><br><u>Diagnoses</u><br>Dyspepsia 27 (22.1%)<br><br><u>Signs and symptoms</u>         | NR                                       | IBS (7.4%)    | <u>Date</u><br>Between Feb 4<br>2020-April 17<br>2021<br><u>Duration</u><br>NR<br><u>Severity</u> | NR   | NR                | NR   | NR   | 2<br>NOS                    |

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|-------------------------|--|--------------------------|---|--|---------------|--|--|------------------------|---|---------------------------|--------------------------|
|                         |  |                          | Abdominal pain 28 (23%),<br>Diarrhea 37 (30.3%)<br>Constipation 15 (12.3%)<br>Nausea 32 (26.2%)   |  |               | 36% required ICU admission   |  |                        |   |                           |                          |
|                         | Retrospective Cohort<br>UK             | 48 (48% M)               | <u>6-month follow-up survey</u><br><u>Diagnoses</u><br>Dyspepsia 14 (29.2%)<br><u>Signs and symptoms</u><br>New abdominal pain 14 (29.2%)<br>Diarrhea 9 (18.8%)<br>Constipation 5 (10.4%)<br>Nausea 5 (10.4%) | NR                                       | NR            | <u>Date</u><br>Between Feb 4 2020-April 17 2021<br><u>Duration</u><br>NR<br><u>Severity</u><br>16.7 % needed ICU | 6 months after infection                 | NR                     | NR  | NR                        |                          |
| Sandal et al, 2023 [29] | Retrospective study (Cohort)<br>Turkey | 8 Cases (37.5% M)        | <u>Signs and symptoms</u><br>Vomiting 28.5%<br>Epigastric pain 57.1%<br>Regurgitation 57.1%<br>Anorexia 71.4%   | Median 16 (Range: 7-17)                  | NR            | <u>Date</u><br>NR<br><u>Duration</u><br>NR<br><u>Severity</u>  | 5.8 months after COVID-19 PCR positivity | NR                     | Anakinra for the patient who went to ICU for MIS-C<br>3 patients received PPI and antacid | NR                        | 9 NOS                    |

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|---------------------------|---|---|---|--|---|---|--|--|--|-------------------------------------|-----------------------------|
|                           |   |   |   |  |   | NR  |  |  |  |                                     |                             |
|                           | Retrospective study<br>Cohort<br><br>Turkey | 8 controls (with<br>GI symptoms<br>but no previous<br>COVID-19<br>infection)<br>(37.5% M) | <u>Diagnoses</u><br>NR<br><u>Signs and symptoms</u><br>Chronic Abdominal Pain   | Median - 16 y/o<br>(7-17)                | NR  | <u>Date</u><br>NR<br><u>Duration</u><br>NR<br><u>Severity</u><br>NR                     | NR                                     | NR   | NR   | NR                                  |                             |
| Wang et al.,<br>2022 [30] | Case Report                                 | 1 F   | <u>Diagnoses</u><br>GERD<br>Gallbladder dyskinesia<br>SIBO<br><u>Signs and symptoms</u><br>Nausea<br>Abdominal pain<br>Loss of appetite<br>Constipation | 55-60                                    | Graves disease<br>HTN<br>HLD<br>prediabetes | <u>Date</u><br>April 2020<br><u>Duration</u> NR.<br><u>Severity</u><br>Mild-to-moderate | 1 month after<br>COVID-19<br>diagnosis | <u>Initial</u><br>(4mo prior):<br>ALP: 173<br>(IU/L)<br><br>ALT: 15<br>(U/L)<br>AST: 27<br>(U/L)<br><br>Serum<br>Leptin: N/A<br><br>Cholesterol:<br>N/A<br><br>HDL: N/A<br><br>LDL: N/A<br><br><u>Day 9:</u><br>ALP: 205<br>(IU/L) | Cholecystectomy<br>Dicyclomine<br>Pantoprazole<br>Ondansetron<br>Paroxetine<br><br>Experimental<br>high fiber diet | Symptoms<br>resolved in 2<br>months | 6<br>Murad et al.,<br>scale |

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|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|---|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | ALT: 14<br>(U/L)<br>AST:<br>29(U/L)<br>Serum<br>leptin: 121.2<br>(ng/mL)<br><br>Cholesterol:<br>184 (mg/dL)<br>HDL:<br>76 (mg/dL)<br>LDL: 86<br>(mg/dL)<br><br>Day 58:<br>ALP: 144<br>(IU/L)<br>ALT: 12<br>AST: 24<br>serum<br>Leptin: 91.7<br>(ng/mL)<br><br>Cholesterol:<br>145 (mg/dL)<br>HDL:<br>57 (mg/dL)<br>LDL: 70<br>(mg/dL) |            |                           |                          |

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|--------------------------------|------------------------------------|--------------------------|--|--|--|--|---|--|---|---------------------------|-----------------------------|
| Abbassi et al.,<br>2021 [31]   | Case report<br>Texas, US           | 1 M                      | <u>Diagnoses</u><br>Bowel perforation<br>Intra-Abdominal<br>adhesions<br><br>Numerous Duodenal<br>and Gastric Ulcers<br><br><u>Signs and symptoms</u><br>Abdominal Pain<br>Nausea Vomiting | 34 year old                              | Morbidly Obese<br>with no<br>comorbidities | <u>Date</u><br>NR<br><br><u>Duration</u><br>26 ICU days<br><br><u>Severity</u><br>Severe   | 2 months after<br>COVID-19<br>infection | Reported as<br>unremarkable  | Midline<br>Laparotomy<br>requiring<br>adhesiolysis,<br>small bowel<br>resection and<br>anastomosis. | NR                        | 4<br>Murad et al.,<br>scale |
| Natarajan et<br>al., 2022 [32] | Randomize<br>d controlled<br>trial | 111<br>(59% M)           | <u>Diagnoses</u><br>NR<br><br><u>Signs and Symptoms</u><br>Any GI symptoms (54)<br><br>Abdominal pain (13)<br><br>Diarrhea (29)<br><br>Nausea (31)<br><br>Vomiting (5)                     | Median: 36<br>(IQR = 29–51<br>years)     | NR   | <u>Date</u><br>NR<br><br><u>Duration</u><br>Between 25<br>April and 17<br>July 2020.<br><br><u>Severity</u><br>mild to<br>moderate<br>COVID-19 | Symptoms at<br>enrollment               | Overall:<br>Absolute<br>lymphocyte<br>count:<br>1.5(cells/μL)<br><br>ALT: 30<br>(IU/L)<br><br>AST: 30<br>(IU/L)<br><br>Seropositivi<br>ty at<br>enrollment:<br>n(46)<br><br>WBC: 5.5<br>(cells/μL) | NR  | 10-month post<br>COVID-19 | 2<br>Jadad Scale            |

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|----------------------------|----------------------|--------------------------|--|--|---------------|--|---------------------------------|---|--|---|--------------------------|
|                            |                      |                          | 57 (with no GI symptoms)   |  |               |  |                                 | No GI symptoms at enrollment:<br><br>Overall:<br>Absolute lymphocyte count:<br>1.6(cells/μL)<br><br>ALT: 28 (IU/L)<br><br>AST: 29 (IU/L)<br><br>Seropositivity at enrollment:<br>n(24)<br><br>WBC: 5.8 (cells/μL) |  |   |                          |
| Gundogdu et al., 2022 [33] | Case Report          | 1 M                      | <u>Diagnoses</u><br>partial thrombosis in SMV<br><br>Jejunal perforation | 58                                       | NR            | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR | 15 weeks after positive test    | WBC:<br>11.79/uL<br>neutrophils<br>9.86/uL  | -Anticoagulation<br><br>-Small bowel resection | 12 days with no further complications<br><br>Outcome: | 5<br>Murad et al., scale |

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|-------------------------------------|--|--------------------------|---|--|-----------------------------------|---|---------------------------------|---|-----------------------------------|-------------------------------------|--------------------------|
|                                     |  |                          | <p>jejunal dilation and thickening</p> <p>Abscess formation in abdominal cavity</p> <p><u>Signs and symptoms</u><br/>Abdominal Pain<br/>Nausea Vomiting</p> |  |                                   | <p><u>Severity</u><br/>NR</p>   |                                 | <p>CRP: 125.4 mg/L</p> <p>Lactate: 2.4 mmol/L</p> <p>fibrinogen 592.6 mg/dL</p> <p>D-dimer 12.77 mg/L</p> <p>2 weeks later:<br/>CRP: 288.1 mg/L,<br/>procalcitonin: 13.25 ng/mL</p> | Abscess drainage.                 | survived                            |                          |
| Chancharoen-thana et al., 2023 [34] | Observational cohort study<br>Thailand | 577<br>(48% M)           | <p><u>Diagnoses</u><br/>Anorexia 90.9%</p> <p><u>Signs and symptoms</u><br/>Abdominal pain 62.5%<br/>Loss of taste 64%</p>                                  | NR                                       | NR                                | <p><u>Date</u><br/>NR</p> <p><u>Duration</u><br/>NR</p> <p><u>Severity</u><br/>NR</p> | NR                              | NR  | None, self-resolved in 2-3 months | 3 months after initial presentation | 6<br>NOS                 |
|                                     | Observational cohort study             | 524 on HD<br>(46.9% M)   | <p><u>Diagnoses</u><br/>Anorexia<br/>Dysphagia<br/>Peritonitis</p>  | 48 (+/- 9)                               | -HTN (92.9%)<br>-Diabetes (77.9%) | <p><u>Date</u><br/>between January 2022 to 31 July 2022</p>                           | Detected during infection       | During COVID-19 infection:  | NR                                | 3 months after initial presentation |                          |

| Author | Study Type<br>County                   | N (total)<br>Gender (%M)               | Type of GI problem  | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities   | COVID-19<br>Date/<br>duration<br>Severity  | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management   | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|--|--|---|--|---|--|---------------------------------|--|--|---------------------------|--------------------------|
|        | Thailand                               |  | <u>Signs and symptoms</u><br>Abdominal pain<br>Diarrhea<br>Constipation Belching<br>Loss of taste |  | -Heart disease (85.9%)<br>-Pulmonary Disease (9.9%)<br><br>-Hepatic disease (2.7%)  | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>Mild= 48.1%<br>Moderate=26.1%<br>Severe= 25.8%  |                                 | Baseline<br>Creatinine:<br>8 +/- 2<br>mg/dL<br><br>CRP 32+/-<br>14 mg/L<br><br>D-dimer<br>2749 +/- 578<br>ng/mL                                      |  |                           |                          |
|        | Observational cohort study<br>Thailand | 34 on PD<br>(58.8% M)                  |   | 71+/-2                                   | HTN (100%)<br><br>Diabetes (88.2%)<br><br>Heart disease (82.4%)<br><br>Pulmonary Disease (14.7%)<br><br>Hepatic disease (11.8%) | <u>Date</u><br>NR<br><br><u>Duration</u><br>Between<br>January 2022 to<br>31 July 2022<br><br><u>Severity</u><br>Mild= 5.9%<br>Moderate=20.6%<br>Severe= 73.5% | Detected during infection       | During<br>COVID-19<br>infection:<br>Baseline<br>Creatinine:<br>11 +/- 2<br>mg/dL<br><br>CRP 59+/-<br>11 mg/L<br><br>D-dimer<br>5339 +/- 786<br>ng/mL |  |                           |                          |
|        | Observational cohort study<br>Thailand | 19 kidney transplantation<br>(57.9% M) |   | 44+/-12                                  | HTN (63.2%)<br><br>Diabetes (31.6%)<br><br>Heart disease (47.4%)  | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR   | Detected during infection       | During<br>COVID-19<br>infection:<br>Baseline<br>Creatinine:  | 6 of 19 abdominal pain found to be due to mesenteric panniculitis which were all effectively |                           |                          |

| Author                      | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem   | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities  | COVID-19<br>Date/<br>duration<br>Severity   | Time of<br>problem<br>detection          | GI<br>Blood<br>markers   | Management   | Follow up time<br>Outcome  | QA score<br>Type of test    |
|-----------------------------|----------------------|--------------------------|--|--|--|---|--|--|--|--|-----------------------------|
|                             |                      |                          |  |  | Pulmonary<br>Disease (5.3%)<br><br>Hepatic disease<br>(0%) | between<br>january 2022 to<br>31 July 2022<br><br>Severity<br>Mild= 0%<br><br>Moderate=21.1<br>%<br><br>Severe= 0%  |  | 2.5 +/- 0.8<br>mg/dL<br><br>CRP 17 +/- 9<br>mg/L<br><br>D-dimer<br>1699 +/- 175<br>ng/mL   | treated with 8<br>weeks of oral<br>corticosteroids   |  |                             |
| Morita et al.,<br>2023 [35] | Case report<br>Japan | 1 F                      | <u>Diagnoses</u><br>UC<br><br>Mesenteric<br>lymphadenopathy<br><br>intestinal inflammation<br><br>erosions & luminal<br>bleeding of colon<br><br><u>Signs and Symptoms</u><br>Abdominal pain<br><br>Diarrhea<br><br>Hematochezia | 13                                       | NR   | <u>Date</u><br>NR<br><br><u>Duration</u><br>1 month after<br>self limiting<br>COVID-19<br><br><u>Severity</u><br>NR | one month after<br>acquiring<br>COVID-19 | Collected<br>period (M -<br>months)<br><br>erythrocyte<br>sedimentati<br>on rate<br>(mm/h)<br><br>M2 - 22<br>M2.5 - 21<br>M3.5 - 5<br>M5 - 4<br><br>WBC (#/μL)<br>M1 - 5,400<br>M2 - 12,000<br>M2.5 - 9,700<br>M3.5<br>18,700<br>M5 - 12,000 | Antiflatulent<br>(hematochezia<br>subsided;<br>abdominal pain<br>& diarrhea<br>persisted)<br><br>Aminosalicylate<br>therapy (did not<br>work)<br><br>Sulfasalazine<br>(did not work)<br><br>Steroid therapy<br>(achieved<br>remission) | 5 months<br>(after the onset<br>of GI<br>symptoms)<br><br>M0 - onset of GI<br>M1<br>M2<br>M2.5<br>M3.5<br>M5 | 6<br>Murad et al.,<br>scale |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers  | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|---|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | CRP<br>(mg/dL)<br>M1 - 0.05<br>M2 - 1.61<br>M2.5 - 0.24<br>M3.5 - <0.03<br>M5 - <0.03<br><br>Lymphocytes<br>(#/μL)<br>M1 - 2,215<br>M2 - 5,880<br>M2.5 - 4,355<br>M3.5 - 5,142<br>M5 - 6,360<br><br>leucine-rich<br>α <sub>2</sub><br>glycoprotein<br>(μg/mL)<br>M2 - 30.6<br>M5 - 10.2<br><br>IgG<br>(250 mg/dL)<br><br>hemoglobin<br>(11.4 g/dL)<br><br>serum |            |                           |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|--|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | amyloid A<br>(36.3<br>µg/mL)<br><br>serum<br>proteinase 3<br>antineutrop<br>hil<br>cytoplasmic<br>antibodies<br>(32.3 U/mL)<br><br>serum iron<br>(8 U/mL)<br><br>ferritin (11.0<br>µg/mL)<br><br>fecal<br>calprotectin<br>(6,110<br>mg/kg)<br><br>Elevated<br>levels of IL-<br>6, IL-8, IL-<br>12/IL-23p40,<br>CXCL9,<br>CXCL10<br>which<br>demonstrat<br>e CD8+T cell<br>activation |            |                           |                          |

| Author                       | Study Type<br>County   | N (total)<br>Gender (%M)                                     | Type of GI problem  | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity  | Time of<br>problem<br>detection   | GI<br>Blood<br>markers             | Management  | Follow up time<br>Outcome                  | QA score<br>Type of test |
|------------------------------|--|--|---|--|---------------|--|---|------------------------------------|---|--|--------------------------|
|                              |  |  |   |  |               |  |   | Elevated anti-SARS-CoV-2 spike IgG |   |  |                          |
| Altuwaijri et al., 2023 [36] | Prospective Study<br>Saudi Arabia                              | 50 (62% M)   | <u>Diagnoses</u><br>19 participants developed IBS (around 25%)<br><u>Signs and symptoms</u><br>Nausea<br>Vomiting<br>Diarrhea<br>Abdominal pain   | ≤50 years: 48<br>>50 years: 52           | NR            | <u>Date</u><br>NR<br><u>Duration</u><br>Between June 2020 and June 2021<br><u>Severity</u><br>NR | After the recovery (NR specifically; at least 3 months later)                       | NR                                 | NR  | Follow up period of each participant<br>NR | 2<br>-NOS                |
| Marinoni et al., 2023 [37]   | Phase 3, randomized, double blind, placebo controlled<br>Italy | 39 (20 in treatment group and 19 in placebo group) (52.6% M) | Reported as %: 73.7%<br><u>Diagnoses</u><br>Acute pancreatitis<br>Hepatic and biliary disease<br><u>Signs and symptoms</u><br>Abdominal pain/discomfort<br>Gastroesophageal reflux (acid related)<br>Reduced appetite | 54.16 (±7.9)                             | NR            | <u>Date</u><br>NR<br><u>Duration</u><br>Between Nov. 2022 to May 2023<br><u>Severity</u><br>NR   | Data collected after: 27.0 months (±10.7)<br>Symptom persists for more than 4 weeks | NR                                 | VSL#3 (independent variable)<br>relationship between VSL#3 treatment and GI complication:<br>Overall significant (p=0.0429)<br>epigastric pain (p=0.0768) | 8 weeks                                    | 5<br>Jadad Scale         |

| Author                 | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem   | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity                                   | Time of<br>problem<br>detection                               | GI<br>Blood<br>markers  | Management  | Follow up time<br>Outcome | QA score<br>Type of test |
|------------------------|----------------------|--------------------------|--|--|---------------|---|---|---|---|---------------------------|--------------------------|
|                        |                      |                          | Nausea/vomiting<br><br>Diarrhea  |  |               |   |   |   | IBS (p= 0.9826)<br><br>acid regurgitation - significant (p =0.0159)<br><br>nausea and vomit (p = 0.2343)<br><br>constipation (p =0.0964)                              |                           |                          |
| Tong et al., 2022 [38] | Case report          | 1 M                      | <u>Diagnoses</u><br>Terminal ileitis<br>Phlegmon adjacent to the mesentery<br><br>Pediatric Inflammatory Multisystem Syndrome<br><br><u>Signs and Symptoms</u><br>Abdominal pain<br>Vomiting | 15                                       | None          | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>NR | 8-weeks Post COVID-19 which was complicated by encephalopathy | CRP: 100 mg/L<br><br>Neutrophilia: 8.51 x 10 <sup>9</sup> /L<br><br>Ferritin: 118ug/L<br><br>D-dimer: 1.68 mg/L<br><br>Lymphopenia: 1.17 x 10 <sup>9</sup> /L | Initial treatment: IV antibiotics, IVIG<br><br>2 weeks: TPN<br><br>Next 2 weeks: gradual diet upgrade which did not resolve symptoms, thus he got ileocecal resection | 4-weeks post discharge    | 6<br>Murad et al., scale |

| Author                       | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem  | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity  | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management  | Follow up time<br>Outcome   | QA score<br>Type of test    |
|------------------------------|----------------------|--------------------------|---|--|---------------|--|---------------------------------|--|---|---|-----------------------------|
| Hosoda et al.,<br>2022 [39]  | Case report<br>Japan | 1 M                      | <u>Diagnoses</u><br>Bowel dilatation<br><br>Ascites<br><br>Extensive pneumatosis<br>in gastric intestinalis<br><br>Portal venous gas<br><br>Acute mesenteric<br>ischemia<br><br>Hemorrhagic necrosis in<br>gastric and extensive<br>small bowel mucosa<br><br><u>Signs and Symptoms</u><br>Constipation<br>Abdominal distension | 82                                       | CAD, DM, HTN  | <u>Date</u><br>NR<br><br><u>Duration</u><br>6 weeks post<br>positive result<br><br><u>Severity</u><br>Severe | Day 36 after<br>disease onset   | Elevated<br>AST and<br>ALT<br><br>D dimer >20<br>µg/mL<br><br>Lactate 13<br>mmol/L | Favipiravir and<br>dexamethasone<br><br>Fluid<br>resuscitation and<br>vasopressors                      | Fatal case:<br>cause of death<br>was extensive<br>gastrointestinal<br>necrosis<br>induced by<br>excessive portal<br>hypertension<br>due to portal<br>and mesenteric<br>vein<br>thrombosis | 5<br>Murad et al.,<br>scale |
| Basravi et al.,<br>2023 [40] | Case Report          | 1 M                      | <u>Diagnoses:</u><br>SBO and gangrene due<br>to acute mesenteric<br>ischemia from venous<br>thrombosis<br><br>Peritonitis<br><br><u>Signs and Symptoms</u><br>Periumbilical non-<br>radiating pain<br><br>Nausea  | 68                                       | None          | <u>Date</u><br>NR<br><br><u>Duration</u><br>NR<br><br><u>Severity</u><br>NR                                  | During<br>COVID-19<br>infection | CRP: 116<br>mg/L<br><br>WBC:<br>11,000<br><br>CPK: 660<br>µg/L                     | Side-to-side<br>resection-<br>anastomosis<br><br>Post-surgery:<br>Required ICU<br>care for COVID-<br>19 | 6 months  | 5<br>Murad et al.,<br>scale |

| Author               | Study Type<br>County      | N (total)<br>Gender (%M)  | Type of GI problem   | Age (years)<br>Mean ±SE/<br>Median (IQR)   | Comorbidities   | COVID-19<br>Date/<br>duration<br>Severity  | Time of GI<br>problem<br>detection  | Blood<br>markers   | Management   | Follow up time<br>Outcome | QA score<br>Type of test |
|----------------------|---------------------------|---|--|--|---|--|---|--|--|---------------------------|--------------------------|
|                      |                           |   | Vomiting<br>No defecation or gas passing for 3 days  |  |   |  |   |  |  |                           |                          |
| Xu et al., 2023 [41] | Case-Control Study<br>USA | COVID-19 Cohort: 154,068 (89.04% M)<br>Control 1 (contemporary): 5,638,795 (90.31% M)<br>Control 2 (historical): 5,859,621 (90.60% M) | <u>Diagnoses</u><br>GERD<br>PUD<br>Acute pancreatitis<br>Functional dyspepsia<br>Acute gastritis<br>IBS<br>Cholangitis<br><u>Signs and Symptoms</u><br><u>Signs and Symptoms</u><br>Constipation<br>Abdominal pain<br>Diarrhea<br>Vomiting<br>Bloating | COVID-19 Cohort: 61.42 ± 15.64<br>Control 1 (contemporary): 63.46 ± 16.23<br>Control 2 (historical): 62.89 ± 16.48 | (% listed in order of COVID - 19, Contemporary control, and Date Historical control cohort)<br>Cancer: (8.14%, 6.14%, 5.93%)<br>CVD: (17.32%, 12.66%, 13.04%)<br>Cerebrovascular disease : (1.41%, 0.84%, 0.91%)<br>CKD: (19.51%, 16.67%, 15.38%)<br>Chronic lung disease: (15.27%, 10.86%, 11.19%)<br>Diabetes mellitus type 2: (32.12%, 22.68%, 22.85%) | COVID-19 Cohort: Positive PCR test between March 1st 2020 and January 15th 2021<br>Severity Non-hospitalized: 131,915<br>Hospitalized: 16,764<br>Intensive Care: 5,389 | Detected 30 days after positive COVID-19 test until end of follow up (1 year) | (Provided as Absolute burden; difference per 1000 persons at 12 months (95% confidence interval provided)<br>COVID-19 cohort compared to Contemporary control (Coagulation):<br>PT>13s : 7.90 (6.99, 8.84)<br>PTT>35s : 2.11 (1.63, 2.64)<br>INR>1 : 1.37 (0.93, 1.85) | NR<br>Median follow up provided with IQR in days:<br>COVID-19 Cohort: 408 (interquartile range: 378–500)<br>Contemporary Control Cohort: 409 (379–505)<br>Historical Control Cohort: 409 (379–504) | 8<br>NOS                  |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities                    | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|----------------------------------|---|---------------------------------|--|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  | HLD: (62.08%,<br>49.08%, 51.36%) |   |                                 | COVID-19<br>cohort<br>compared<br>to<br>Contempor<br>ary control<br>(Liver and<br>biliary tree<br>function<br><b>tests):</b><br>Albumin<3.<br>5 g/dL:<br>20.90 (19.27,<br>22.57)<br><br>ALT>35<br>U/L: 16.39<br>(14.60,<br>18.22)<br><br>Total<br>protein<6.0<br>g/dL: 14.54<br>(13.26,<br>15.85)<br><br>AST>35<br>U/L: 10.69<br>(9.33, 12.10) |            |                           |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|--|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | LDH>100<br>U/L: 10.22<br>(9.17, 11.31)<br><br>CRP>0.8<br>mg/dL: 9.43<br>(8.49, 10.40)<br><br>ALP>92<br>U/L: 9.21<br>(7.94, 10.52)<br><br>Total<br>bilirubin>1.<br>2 mg/dL:<br>7.40 (6.11,<br>8.73)<br><br>GGT>30<br>U/L: 3.25<br>(2.54, 3.99)<br>Direct<br>bilirubin>0.<br>3 mg/dL:<br>1.43 (0.98,<br>1.92)<br><br>Lipase>300<br>U/L: 0.54<br>(0.30, 0.82) |            |                           |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|--|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | <p>Amylase&gt;390 U/L: 0.07 (0.01, 0.16)</p> <p>COVID-19 cohort compared to Historical control (Coagulation): PT&gt;13s : 4.02 (3.12, 4.97)</p> <p>PTT&gt;35s: 1.25 (0.77, 1.78)</p> <p>INR&gt;1: 0.70 (0.26, 1.18)</p> <p>COVID-19 cohort compared to historical control (Liver and biliary tree function tests): Albumin&lt;3.</p> |            |                           |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers  | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|---|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | 5 g/dL:<br>16.71 (15.08,<br>18.38)<br><br>ALT>35<br>U/L: 14.08<br>(12.29,<br>15.91)<br>Total<br>protein<6.0<br>g/dL: 12.42<br>(11.15,<br>13.73)<br><br>AST>35 U/L<br>: 9.98 (8.61,<br>11.38)<br><br>LDH>100<br>U/L: 11.67<br>(10.62,<br>12.76)<br><br>CRP>0.8<br>mg/dL:<br>10.67 (9.74,<br>11.65) |            |                           |                          |

| Author | Study Type<br>County | N (total)<br>Gender (%M) | Type of GI problem | Age (years)<br>Mean ±SE/<br>Median (IQR) | Comorbidities | COVID-19<br>Date/<br>duration<br>Severity | Time of<br>problem<br>detection | GI<br>Blood<br>markers   | Management | Follow up time<br>Outcome | QA score<br>Type of test |
|--------|----------------------|--------------------------|--------------------|--|---------------|---|---------------------------------|--|------------|---------------------------|--------------------------|
|        |                      |                          |                    |  |               |   |                                 | ALP>92<br>U/L: 7.85<br>(6.58, 9.16)<br><br>Total<br>bilirubin>1.<br>2 mg/dL:<br>6.30 (5.01,<br>7.62)<br><br>GGT>30<br>U/L: 2.08<br>(1.37,<br>2.82)<br><br>Direct<br>bilirubin>0.<br>3 mg/dL:<br>1.48 (1.03,<br>1.96)<br><br>Lipase>300<br>U/L: 0.14 (-<br>0.10, 0.42)<br><br>Amylase>39<br>0 U/L: 0.03 (-<br>0.04, 0.12) |            |                           |                          |

HTN: Hypertension; CKD: Chronic Kidney Disease; UC: Ulcerative Colitis; AST: Aspartate transaminase; ALT: Alanine transaminase; ALP: Alkaline phosphatase; LDH: Lactate Dehydrogenase; HLD: Hyperlipidemia; GTT:  $\gamma$ -glutamyl transferase; SBO: Small Bowel Obstruction; SIBO: Small Intestine Bacterial Overgrowth; PT: Prothrombin Time; PTT: Partial Thromboplastin Time; INR: International Normalized Ratio; CRP: c-

reactive peptide; PD: Peritoneal Dialysis; HD: Hemodialysis; WBC: White Blood Cell Count; CPK: Creatinine Phospho Kinase; GERD: Gastroesophageal Reflux Disease; PUD: Peptic Ulcer Disease; IBS: Irritable bowel Syndrome; CVD: Cardiovascular Disease; NOS: Newcastle - Ottawa Quality Assessment Scale.

**Table S2.** Quality assessment results for case reports and case series using Murad et al. scale [16].

| <b>Study</b>            | <b>Score/6</b> |
|-------------------------|----------------|
| Parrela et al. [18]     | 5              |
| Lee et al. [23]         | 6              |
| Banerjee et al. [24]    | 4              |
| AbdurRaheem et al. [26] | 5              |
| Jain et al. [27]        | 4              |
| Wang et al. [30]        | 6              |
| Abbassi et al. [31]     | 4              |
| Gundogdu et al. [33]    | 5              |
| Morita et al. [35]      | 6              |
| Tong et al. [38]        | 6              |
| Hosoda et al. [39]      | 5              |
| Basravi et al. [40]     | 5              |

**Table S3.** Quality assessment results for cohort studies using New Castle Ottawa Scale (NOS) [14].

| <b>Study</b>                 | <b>Score/8</b> |
|------------------------------|----------------|
| Enas et al. [19]             | 7              |
| Golla, et al. [20]           | 8              |
| Zollner et al. [21]          | 3              |
| Ferreira et al. [22]         | 5              |
| Anayat et al. [25]           | 2              |
| Cooney et al. [28]           | 2              |
| Sandal et al. [29]           | 9              |
| Chancharoenthana et al. [34] | 6              |
| Altuwaijri et al. [36]       | 2              |
| Xu et al. [41]               | 8              |

**Table S4.** Quality assessment results for clinical trials using Jadad scale [15].

| Study                 | Score/5 |
|-----------------------|---------|
| Natarajan et al. [32] | 2       |
| Marinoni et al. [37]  | 5       |

**Table S5.** Post-COVID-19 GI inflammatory conditions.

| Disorder                   | Number of studies   | Total number of patients | Outcome         |
|----------------------------|---|--------------------------|-----------------|
| UC                         | 1 Study [35]<br>Morita et al., 2023                               | 1/1                      | Recovered       |
| Mesenteric lymphadenopathy | 1 Study [35]<br>Morita et al., 2023                               | 1/1                      | NR              |
| Acute pancreatitis         | 2 Studies [37,41]<br>Marinoni et al., 2023**<br>Xu et al., 2023** | NR                       | NR              |
| Acute gastritis            | 1 Study [41]<br>Xu et al. 2023**                                  | N/A                      | NR              |
| MIS-C                      | 1 Study [38]<br>Tong et al., 2022                                 | 1/1                      | Did not recover |
| Terminal ileitis           | 1 Study [38]<br>Tong et al., 2022                                 | 1/1                      | Did not recover |
| Peritonitis                | 1 Study [40]<br>Basravi et al., 2023                              | 1/1                      | NR              |

\*\* No. of patients was not reported in this study. UC: Ulcerative Colitis; MIS-C: MIS-C: Multisystem Inflammatory Syndrome in Children; NR: Not reported.

**Table S6.** Post-COVID-19 GI infections.

| Disorder   | Number of studies                 | Total number of patients | Outcome |
|--|-----------------------------------|--------------------------|---------|
| <i>Cryptosporidium</i> spp. and <i>H. Pylori</i> infection | 1 Study [19]<br>Enas et al., 2023 | NR                       | NR      |

|   |                                       |       |                 |
|---|---------------------------------------|-------|-----------------|
| Detected SARS-CoV-2 anti-nucleocapsid in intestines   | 1 Study [21]<br>Zollner et al., 2022  | 32/46 | NR              |
| Intestinal and mesenteric mucormycosis                | 1 Study [24]<br>Banerjee et al., 2023 | 1/1   | NR              |
| Positive qPCR signal in at least 1 segment of the gut | 1 Study [21]<br>Zollner et al., 2022  | 32/46 | NR              |
| invasive mucormycosis                                 | 1 Study [27]<br>Jain et al., 2022     | 1/1   | Did not recover |
| Phlegmon adjacent to the mesentery                    | 1 Study [38]<br>Tong et al., 2022     | 1/1   | Did not recover |
| Abscess formation                                     | 1 Study [33]<br>Gundogdu et al., 2022 | 1/1   | Recovered       |

NR: Not Reported; qPCR: quantitative Polymerase Chain Reaction.

**Table S7.** Post-COVID-19 GI vascular disorders.

| <b>Disorder</b>  | <b>Number of studies</b>              | <b>Total number of patients</b> | <b>Outcome</b>  |
|--|---------------------------------------|---------------------------------|-----------------|
| SMA and jejunal branches thromboembolism                 | 1 Study [18]<br>Parrela et al., 2022  | 1/1                             | Did not recover |
| Pneumoperitoneum with thrombosis of the ileocolic artery | 1 Study [24]<br>Banerjee et al., 2023 | 1/1                             | NR              |
| Mesenteric thrombosis                                    | 1 Study [27]<br>Jain et al., 2022     | 1/1                             | Did not recover |
| Thrombosis in SMV  | 1 Study [33]<br>Gundogdu et al., 2022 | 1/1                             | Recovered       |
| Portal venous gas  | 1 Study [39]<br>Hosoda et al., 2022   | 1/1                             | Did not recover |

|                           |  |     |                           |
|---------------------------|--|-----|---------------------------|
| Acute mesenteric ischemia | 2 Studies [39,40]<br>Hosoda et al., 2022<br>Basravi et al., 2023 | 2/2 | 1 did not recover<br>1 NR |
|---------------------------|--|-----|---------------------------|

SMA: Superior Mesenteric Artery; SMV: Superior Mesenteric Vein.

**Table S8.** Post-COVID-19 GI structural abnormalities.

| Disorder                           | Number of studies   | Total number of patients | Outcome                          |
|------------------------------------|---|--------------------------|----------------------------------|
| Short bowel syndrome               | 1 Study [18]<br>Parrella et al., 2022                                 | 1/1                      | Did not recover                  |
| SBO                                | 2 Studies [26,40]<br>AbdurRaheem et al., 2022<br>Basravi et al., 2023 | 2/3                      | 1 recovered<br>1 did not recover |
| Abdominal cocoon                   | 1 Study [26]<br>AbdurRaheem et al., 2022                              | 2/2                      | 2 recovered                      |
| Bowel perforation                  | 2 Studies [31,33]<br>Abbassi et al., 2021<br>Gundogdu et al., 2022    | 2/2                      | 1 did not recover<br>1 recovered |
| Intra-abdominal adhesions          | 1 Study [31]<br>Abbassi et al., 2021                                  | 1/1                      | 1 did not recover                |
| Phlegmon adjacent to the mesentery | 1 Study [38]<br>Tong et al., 2022                                     | 1/1                      | 1 did not recover                |
| Gallbladder dyskinesia             | 1 Study [30]<br>Wang et al., 2022                                     | 1/1                      | 1 recovered                      |
| Abscess formation                  | 1 Study [33]<br>Gundogdu et al., 2022                                 | 1/1                      | 1 recovered                      |

SBO: Small Bowel Obstruction.

**Table S9.** Other post-COVID-19 GI diagnosed abnormalities.

| <b>Disorder</b>                               | <b>Number of studies</b>  | <b>Total number of patients</b> | <b>Outcome</b>        |
|---|---|---------------------------------|-----------------------|
| Oropharyngeal dysphagia                       | 1 Study [23]<br>Lee et al., 2021  | 1/1                             | NR                    |
| Dyspepsia                                     | 3 Studies [25,28,41]<br>Anayat et al., 2022<br>Cooney et al., 2022<br>Xu et al., 2023 | 67% of 30 pts*<br>27/122        | NR                    |
| Anorexia                                      | 2 Studies [29,34]<br>Sandal et al., 2023<br>Chancharoenthana et al., 2023             | 530/585                         | 5 NR<br>525 recovered |
| GERD  | 3 Studies [30,37,41]<br>Wang et al., 2022<br>Marinoni et al., 2023<br>Xu et al., 2023 | 1/1                             | Recovered             |
| SIBO  | 1 Study [30]<br>Wang et al., 2022   | 1/1                             | Recovered             |
| Gastric ulcers                                | 1 Study [31]<br>Abbassi et al., 2021  | 1/1                             | Did not recover       |
| Duodenal ulcers                               | 1 Study [31]<br>Abbassi et al., 2021  | 1/1                             | Did not recover       |
| Hematochezia                                  | 1 Study [35]<br>Morita et al., 2023   | 1/1                             | Did not recover       |
| erosions & luminal bleeding of colon          | 1 Study [35]<br>Morita et al., 2023   | 1/1                             | NR                    |
| IBS   | 2 Studies [36,41]<br>Altuwaijri et al., 2023<br>Xu et al., 2023                       | 25%*                            | NR                    |
| Ascites                                       | 1 Study [39]<br>Hosoda et al., 2022   | 1/1                             | Did not recover       |
| Extensive pneumatosis in gastric intestinalis | 1 Study [39]<br>Hosoda et al., 2022   | 1/1                             | Did not recover       |

|  |                                     |     |                 |
|--|-------------------------------------|-----|-----------------|
| Hemorrhagic necrosis in gastric and extensive small bowel mucosa | 1 Study [39]<br>Hosoda et al., 2022 | 1/1 | Did not recover |
| PUD  | 1 Study [41]<br>Xu et al., 2023**   | NR  | NR              |

GERD: Gastroesophageal Reflux Disease; SIBO: Small Intestinal Bacterial Overgrowth; IBS: Irritable Bowel Syndrome; PUD: Peptic Ulcer Disease. \* only reported as percentage. \*\* No. of patients was not reported in this study.

**Table S10.** Post-COVID-19 GI undiagnosed conditions.

| Disorder       | Number of studies  | Total number of patients | Outcome                                     |
|----------------|--|--------------------------|---|
|                | 11 Studies<br>[18,20,24,26,28,30–33,36,37]   |                          |   |
| Nausea         | Parrela et al., 2022<br>Golla et al., 2023<br>Banerjee et al., 2023<br>AbdurRaheem et al., 2022<br>Cooney et al., 2022<br>Wang et al., 2022<br>Abbassi et al., 2021<br>Natarajan et al., 2022<br>Gundogdu et al., 2022<br>Altuwaijri et al., 2023<br>Marinoni et al., 2023** (No NR) | 82/561                   | 2 did not recover<br>2 recovered<br>Rest NR |
|                | 17 Studies [18,20,24,26–38,41]   |                          | 5 Did not recover                           |
| Abdominal pain | Parrela et al., 2022<br>Golla, et al., 2023<br>Banerjee, et al., 2023<br>AbdurRaheem, et al., 2022   | 439/1149                 | 16 Recovered<br>Rest NR                     |

| Disorder  | Number of studies  | Total number of patients | Outcome                          |
|-----------|--|--------------------------|----------------------------------|
|           | Jain, et al., 2022<br>Cooney, et al., 2022<br>Sandal, et al., 2023<br>Wang, et al., 2022<br>Abbassi, et al., 2021<br>Natarajan, et al., 2022<br>Gundogdu, et al., 2022<br>Chancharoenthana, et al., 2023<br>Morita, et al., 2023<br>Altuwaijri, et al., 2023<br>Marinoni, et al., 2023**<br>Tong, et al., 2022<br>Xu, et al., 2023** |                          |                                  |
|           | 10 Studies [18–20,22,28,32,35–37,41]   |                          |                                  |
| Diarrhea  | Parrela, et al., 2022<br>Enas, et al., 2023<br>Golla, et al., 2023<br>Ferreira, et al., 2022<br>Cooney, et al., 2022<br>Natarajan, et al., 2022<br>Morita, et al., 2023<br>Altuwaijri, et al., 2023<br>Marinoni, et al., 2023**<br>Xu, et al., 2023**  | 141/705                  | 2 did not recover<br><br>Rest NR |
| Hyporexia | 3 Studies [18,30,37]<br>Parrela, et al., 2022<br>Wang, et al., 2022<br>Marinoni, et al., 2023**  | 2/2                      | 1 did not recover<br><br>Rest NR |

| Disorder           | Number of studies   | Total number of patients | Outcome                                     |
|--------------------|---|--------------------------|---|
|                    | 12 Studies [18–20,24,26,29,31–33,36,37,41]  |                          |   |
| Vomiting           | Parrela, et al., 2022<br>Enas, et al., 2023<br>Golla, et al., 2023<br>Banerjee, et al., 2023<br>AbdurRaheem, et al., 2022<br>Sandal, et al., 2023<br>Abbassi, et al., 2021<br>Natarajan, et al., 2022<br>Gundogdu, et al., 2022<br>Altuwaijri, et al., 2023<br>Marinoni, et al., 2023**<br>Xu, et al., 2023** | 25/446                   | 2 did not recover<br>3 Recovered<br>Rest NR |
| Weight loss        | 1 Study [19]<br>Enas, et al., 2023**  | NR                       | NR  |
| FGID-like symptoms | 1 Study [20]<br>Golla, et al., 2023   | 36/320                   | NR  |
| Dysphagia          | 1 Study [23]<br>Lee, et al., 2021   | 1/1                      | NR  |
| Constipation       | 6 Studies [26–28,30,39,41]<br>AbdurRaheem, et al., 2022<br>Jain, et al., 2022<br>Cooney, et al., 2022<br>Wang, et al., 2022<br>Hosoda, et al., 2022<br>Xu, et al., 2023**   | 19/127                   | 1 recovered<br>2 did not recover<br>NR      |
| Regurgitation      | 1 Study [29]<br>Sandal, et al., 2023  | 4/8                      | NR  |
| Loss of taste      | 1 Study [34]  | 372/577                  | 372 recovered                               |

| Disorder                      | Number of studies   | Total number of patients | Outcome                 |
|-------------------------------|---|--------------------------|-------------------------|
|                               | Chancharoenthana, et al., 2023                                  |                          |                         |
| Abdominal distension/bloating | 2 Studies [39,41]<br>Hosoda, et al., 2022<br>Xu, et al., 2023** | 1/1                      | 1 did not recover<br>NR |

FGID: Functional Gastrointestinal disorders. \*\* No. of patients was not reported in this study.