Obesity and Long-term Gastrointestinal Outcomes after COVID-19 Infection: Finding from the RECOVER

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Background

Current research is focusing on the link between pre-COVID-19 elevated BMI or obesity and long-term gastrointestinal issues after infection, especially in children. Obese children, who are at higher risk for severe COVID-19, may face greater long-term gastrointestinal (GI) complications due to chronic inflammation and altered gut microbiota.[1, 2, 3, 4] Understanding this association is crucial for developing targeted interventions and improving health outcomes in this vulnerable group. This research is relevant to the OHDSI community as it leverages large-scale observational health data to investigate the link between pre-COVID-19 obesity and long-term GI issues in children.[5, 6] This study addresses critical public health concerns and aligns with OHDSI's capabilities in risk stratification, ultimately aiding in personalized care and public health strategies.

Methods

To tackle this issue, we utilized one of the largest pediatric Electronic Health Record (EHR) cohorts in the U.S., the pediatric RECOVER program by the National Institutes of Health (NIH). This program studies the long-term effects of COVID-19 and includes data from a national network of academic medical centers, covering approximately 10% of the U.S. pediatric population. Our analysis considered various covariates, including demographic characteristics (age, sex, race/ethnicity), virus-variant predominant periods, healthcare utilization metrics, severity of acute phase COVID-19, Pediatric Medical Complexity Algorithm (PMCA) index, and vaccination status. We fitted a Poisson regression model to estimate relative risks (RRs) and 95% confidence intervals (CIs) and conducted comprehensive sensitivity analyses. To ensure the robustness and generalizability of our findings, we selected a negative control outcome unrelated to pre-COVID-19 BMI or obesity, specifically "foreign body in ear." This helped us detect residual biases, validate our methods, and strengthen our conclusions, confirming that the associations between elevated BMI and gastrointestinal sequelae are genuine.

Results

Before fitting the model, we applied a cutoff incidence value of 0.1%[6] to avoid overfitting for rare GI outcomes. Before fitting the model, we applied a cutoff incidence value of 0.1% to avoid overfitting for rare gastrointestinal (GI) outcomes. This led us to identify nine GI symptoms and disorders: abdominal

pain, bloating, constipation, diarrhea, nausea, vomiting, gastroesophageal reflux disease, irritable bowel syndrome, and functional dyspepsia, occurring during the post-acute phase (28 to 179 days after cohort entry). Among the 242,034 participants, 129,002 (53.3%) were female, and 112,673 (46.6%) were non-Hispanic White. Compared to participants with a healthy weight, the risk for any GI symptoms or disorders increased in those with severe obesity (RR, 1.074; 95% CI, 1.031-1.119).
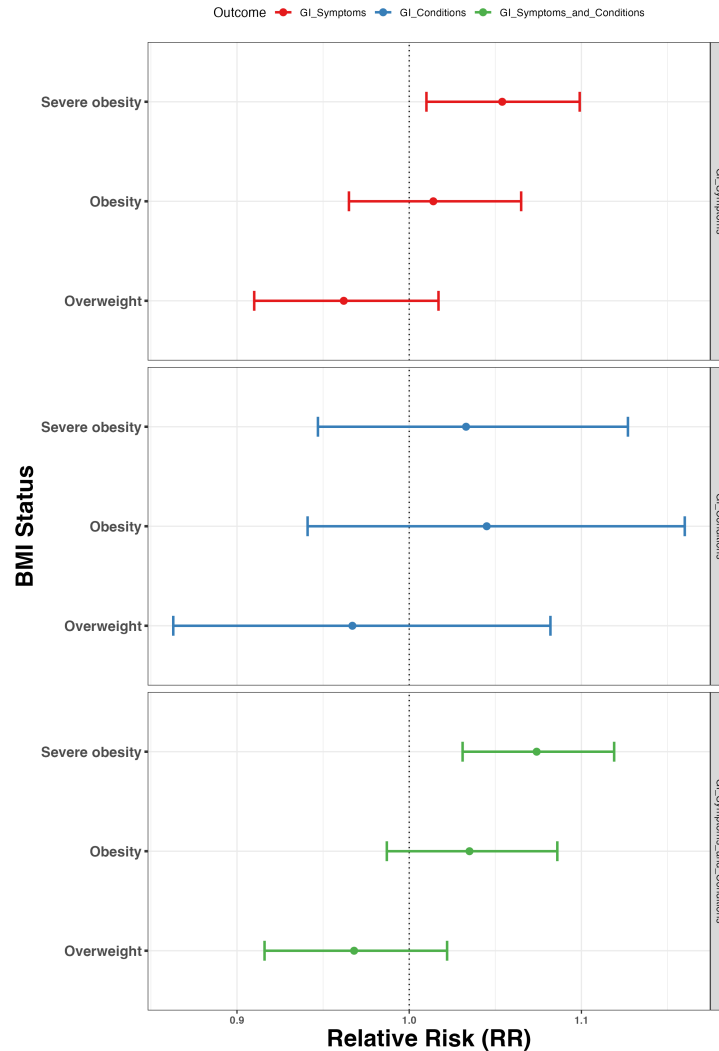

Figure 1. Estimated association of BMI status prior to the SARS-CoV-2 infection and risk of long-term gastrointestinal outcomes after the infection

Conclusion

The conclusion is that elevated BMI is a significant risk factor for long-term GI outcomes after COVID-19 infection in the pediatric population. The OHDSI community can take away that thorough consideration of BMI is crucial when assessing long-term health impacts of COVID-19 in children. This study underscores the importance of inclusive, large-scale data analyses to inform prevention and treatment strategies for post-COVID conditions.

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