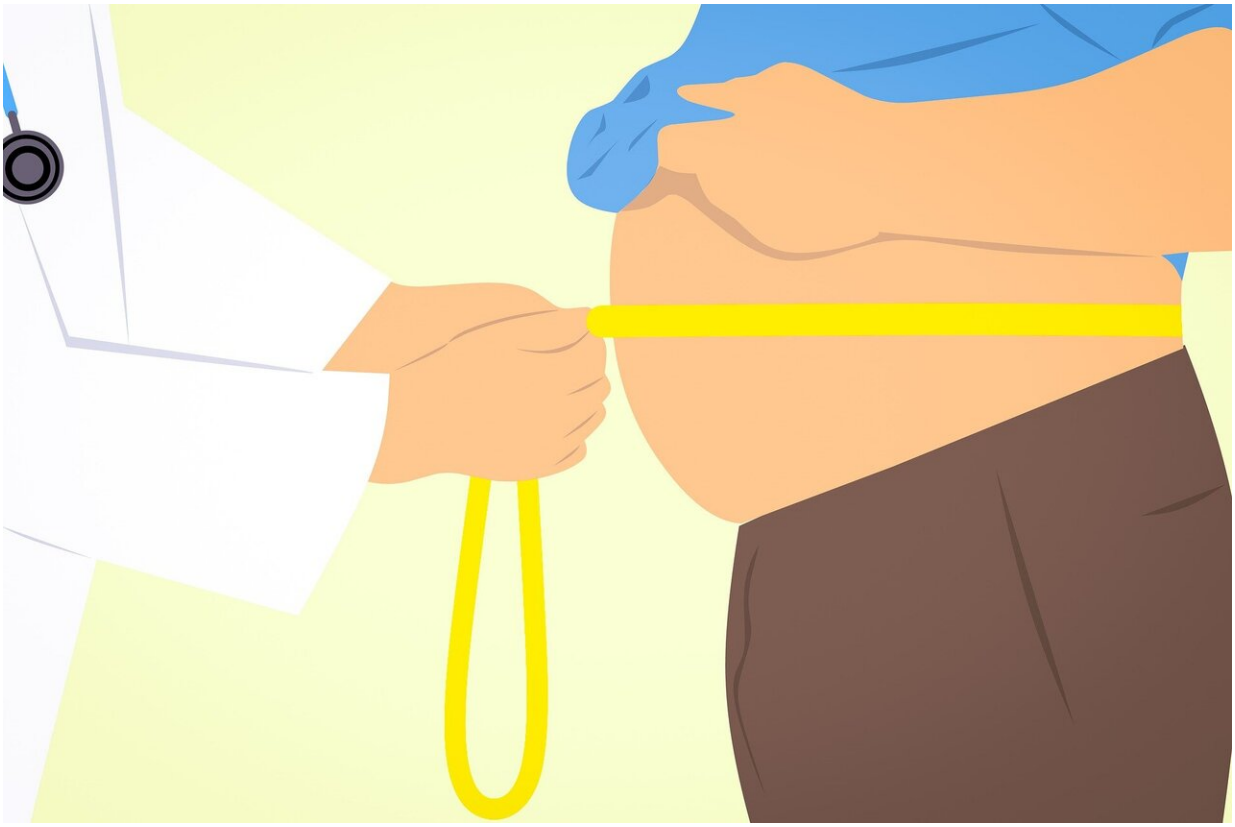
Patients with COVID-19 and obesity have poor outcomes not driven by inflammation

December 16 2020



Credit: CC0 Public Domain

Obesity is associated with poor COVID-19 outcomes but a new study suggests this is not due to increased inflammation, but instead may be driven by respiratory issues or other factors.

Multiple studies suggest those who are overweight or have obesity are more likely to experience invasive mechanical ventilation, intensive care unit (ICU) admission or death. Population-level studies also suggest a higher COVID-19 mortality rate in countries with greater prevalence of obesity. What was not known before was whether patients with obesity had more inflammation, the so-called cytokine storm of COVID.

According to the researchers, additional factors may explain the unexpected finding of lower inflammatory markers in patients with obesity. "Though definitive reasons for poor COVID-19 outcomes in obesity remain uncertain, patients with obesity are uniquely vulnerable. They may have independent risk factors (type-2 diabetes, hypertension and coronary artery disease) for poor outcomes in COVID-19, conditions that are inflammatory and immune-mediated," explained Ana Mostaghim, MD, the lead author for the study who conducted the work while an internal medicine resident at Boston Medical Center (BMC).

In an effort to better understand these potential factors, the researchers compared outcomes and inflammatory markers in patients with and without obesity who were hospitalized with COVID-19 at BMC, a safety-net hospital. They found that body mass index (BMI) greater or equal to 35 was associated with a two-fold increased risk of ICU transfer and a four-fold risk of all-cause mortality; BMI in the 30-34.9 range (Class I obesity) was also associated with increased risk of ICU transfer, but not significantly associated with increased mortality. They also found that patients with obesity had mostly lower inflammatory markers on the first and second hospital days compared to those without obesity.

"While patients with obesity had worse clinical outcomes than those without obesity in our study, this effect does not appear to be mediated by a higher degree of inflammation," added Natasha Hochberg, MD, associate professor of medicine at Boston University School of Medicine and an infectious disease physician at BMC. "Patients with obesity are at

higher risk of fatty liver disease and greater viral invasion with organ dysfunction may contribute to the increased mortality seen in these patients. Alternately, patients with obesity may have reduced respiratory reserve."

The researchers believe further studies are needed to determine whether this decreased inflammatory response persists during hospitalization, whether pro-inflammatory complications are seen less commonly among patients with obesity and whether anti-inflammatory therapy should be utilized differently in patients with obesity.

These findings appear online in the journal *PLOS ONE*.

Provided by Boston University School of Medicine