Obesity in Patients Younger Than 60 Years Is a Risk Factor for COVID-19 Hospital Admission

To the Editor—Risk factors for infectious disease severity are determined by the pathogen, host, and environment [1]. Coronavirus disease 2019 (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, includes a spectrum of illness, from asymptomatic infection [2] to severe pneumonia characterized by acute respiratory injury in about 20% of patients presenting to medical care [3]. The risk factors associated with disease severity include increased age, diabetes, immunosuppression, and organ failure [3]. Recognition of risk factors for morbidity and mortality is important to determine prevention strategies as well as to target high-risk populations for potential therapeutics.

We performed a retrospective analysis of body mass index (BMI) stratified by age in COVID-19–positive symptomatic patients who presented to a large academic hospital system in New York City. Patients presenting to the emergency department (ED) with signs of respiratory distress were admitted to the hospital in acute care, and 431 (12%) were either directly admitted or transferred to the intensive care unit (ICU) during admission. During analysis, we found significant differences in admission and ICU care only in patients <60 years of age with varying BMIs (Table 1).

Patients aged <60 years with a BMI between 30 and 34 were 2.0 (95% confidence interval [CI], 1.6–2.6; P < .0001) and 1.8 (95% CI, 1.2–2.7; P = .006) times more likely to be admitted to acute and critical care, respectively, compared to individuals with a BMI <30 (Table 1). Likewise, patients with a BMI ≥35 and aged <60 years were 2.2 (95% CI, 1.7–2.9; P < .0001) and 3.6 (95% CI, 2.5–5.3; P < .0001) times more likely to be admitted to acute and critical care than patients in the same age category who had BMI <30.

Though patients aged <60 years are generally considered a lower-risk group of COVID-19 disease severity, based on data from our institution, obesity appears to be a previously unrecognized risk factor for hospital admission and need for critical care. This has important and practical implications, where nearly 40% of adults in the United States are obese with a BMI ≥30 [4]. The BMI range of individuals in this study appears representative of the nation, as 37% of the patients have a BMI ≥30. There is geographic variation in reported mortality, as South Korea, China, and Italy have reported case fatality rates of 0.8, 2.3, and 7.2, respectively [5] and regional risk factors such as prevalence of smoking, pollution, or aging population have been cited. Unfortunately, obesity in people <60 years is a newly identified epidemiologic risk factor that may contribute to increased morbidity rates experienced in the United States.

Table 1. Adult Patients Who Tested Positive for COVID-19 During 3 March–4 April 2020 (N = 3615)

| BMI, kg/m² | No. (%) | Admission to Acute (vs Discharge From ED), OR (95% CI) | PValue | No. (%) | ICU Admission (vs Discharge From ED), OR (95% CI) | PValue |
|-----------|---------|-------------------------------------------------|--------|---------|-------------------------------------------------|--------|
| Age ≥ 60 y |         |                                                 |        |         |                                                 |        |
| BMI 30–34 | 141 (19) | 0.9 (1.6–1.2) | .39 | 57 (22) | 1.1 (0.8–1.7) | .57 |
| BMI ≥35   | 99 (14)  | 0.9 (1.6–1.3) | .59 | 50 (19) | 1.5 (0.9–2.3) | .10 |
| Age < 60 y |         |                                                 |        |         |                                                 |        |
| BMI 30–34 | 173 (29) | 2.0 (1.6–2.6) | <.0001 | 39 (23) | 1.8 (1.2–2.7) | .006 |
| BMI ≥35   | 134 (22) | 2.2 (1.7–2.9) | <.0001 | 56 (33) | 3.6 (2.5–3.3) | <.0001 |

Abbreviations: BMI, body mass index; CI, confidence interval; COVID-19, coronavirus disease 2019; ED, emergency department; ICU, intensive care unit; OR, odds ratio.
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