

COVID-19 and the Patient with Obesity – the Editors Speak Out

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The pandemic of COVID-19 is bringing public health to the forefront for all members of The Obesity Society. COVID-19 emerged in Wuhan, China in December 2019 and is thought to be a betacoronavirus related to the SARS virus.¹ The manifestations of the COVID-19 infection run the spectrum from asymptomatic disease to severe acute respiratory infection. Lacking herd immunity and in the absence of effective vaccines or antiviral therapies, countries around the world are witnessing an unprecedented strain on health systems and disruption of economies as we start to understand the biology and mode of transmission of COVID-19. At issue is that while most people with COVID-19 develop no symptoms or have only mild illness, the evidence from China indicates that approximately 14% develop severe disease that requires hospitalization and oxygen support, while 5% require admission to an intensive care unit.¹ For those 5%, acute respiratory distress syndrome (ARDS), sepsis and septic shock, multiorgan failure, including acute kidney injury and cardiac injury can all occur.² Older age and co-morbid disease have been reported as risk factors for death while the present European experience seems to indicate more and more severe cases among younger age groups.^{3,4} The prevalence of diabetes was 20% and of hypertension 30% in the first cases analyzed for risk factors for severe disease.^{3,4}

Persons with obesity around the world are already at high risk for severe complications of COVID-19, by virtue of the increased risk of the chronic diseases that obesity drives. While China does not have the high incidence of obesity as that in the US when obesity is defined by BMI, China has been experiencing an epidemic of type 2 diabetes, with prevalence rates similar to the US.⁵ The reason for this is that individuals of Asian descent have a propensity for ectopic and visceral fat storage, while those of European descent are storing more of the excess fat in subcutaneous depots, which has a lesser lipotoxic profile. The Chinese experience needs to inform the health system response in other countries around the world.

Yes, Americans have higher BMIs than those from China – the prevalence of obesity in the US was 42.4% in 2017-2018 – but Americans also have a high burden of class III obesity, with 9.2% of the population with BMI >40 kg/m².⁶ This has serious implications for our health care system. Persons with severe obesity who become ill and require intensive care (5% of infections) present challenges in patient management – more bariatric hospital beds, more challenging intubations, more difficult to obtain imaging diagnosis (there are weight limits on imaging machines), more difficult to position and transport by nursing staff. And like pregnant patients in ICUs, they may not do well when prone. Special beds and positioning/transport equipment are available mostly in specialized bariatric surgery units but may not be widely available elsewhere in hospitals. We are likely to see a collision of the two public health epidemics in the US with obesity and COVID-19 interacting to further strain our health system.

The impact of COVID-19 will also be felt outside of the intensive care unit. There is a psychological toll of the viral pandemic. Persons with obesity who are self-isolating and avoiding social contact are already stigmatized and already experiencing higher rates of depression. Social isolation is at the heart of obesity stigma. More than ever, our health care providers need to fight obesity bias.

Finally, we have learned much from influenza in patients with obesity and there will almost certainly be parallels to COVID-19. The Centers for Disease Control considers those with BMI ≥ 40 kg/m² as being at risk for flu complications.⁷ During the 2009 H1N1 pandemic, obesity was recognized as an independent risk factor for complications from influenza.⁸ Thus, it is likely that obesity shall be an independent risk factor for COVID-19. Of great concern also is the fact that persons with obesity have diminished protection from influenza immunization with a study showing that adult recipients of IIV3 with obesity have two times greater incidence of influenza and/or influenza like illness despite being vaccinated.⁹

The COVID-19 pandemic is challenging the world in unprecedented ways. We at Obesity have been sounding the alarm about the obesity epidemic and now must take up the cause for our patients with obesity in the face of this dual pandemic threat.

1. Team NCPERE. Vital surveillances: the epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) – China. *China CDC Weekly*. 2020;2(8):113-22.
2. Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med*. 2020. Epub 2020/02/28. doi: 10.1016/S2213-2600(20)30079-5. PubMed PMID: 32105632.
3. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497-506. Epub 2020/01/28. doi: 10.1016/S01406736(20)30183-5. PubMed PMID: 31986264.
4. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective study. *Lancet*, 2020. doi: 1016/S0140-6736(20)30566-3.

5. Hu C, Jia W. Diabetes in China: epidemiology and genetic risk factors and their clinical utility in personalized medication. *Diabetes* 2018 Jan; 67(1): 3-11. <https://doi.org/10.2337/dbi17-0013>
6. <https://www.cdc.gov/obesity/data/adult.html>. Accessed March 18, 2020.
7. <https://www.cdc.gov/flu/highrisk/index.htm>. Accessed March 19, 2020
8. Louie JK, Acosta M, Winter K, et al. Factors associated with death or hospitalization due to pandemic 2009 influenza A(H1N1) infection in California. *JAMA*. 2009; 302:1896–1902.
9. Neidich SD, Green WD, Rebeles J, et al. Increased risk of influenza among vaccinated adults who are obese. *Int J Obes (Lond)*. 2017;41(9):1324–1330. doi:10.1038/ijo.2017.131