



Higher Obesity Trends Among African Americans Are Associated with Increased Mortality in Infected COVID-19 Patients Within the City of Detroit

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Abstract

As the city of Detroit raids itself of deaths by shifting from homicides, COVID-19 infection continues to harrow the city with more deaths. From March 19 to May 15, more Detroiters died in 2 months than were killed in 2 years of city homicides. African Americans or Blacks (highest-risk phenotypes) developing COVID-19 infection are more likely to die disproportionately. The confluence of diabetes, hypertension, cardiovascular disease, and the higher prevalence of obesity among Blacks have provided the needed environment for viruses like COVID-19 to thrive and cause serious infections. The purpose of this study is to connect mortality rates from COVID-19 infection to increasing obesity trends among African Americans within the city of Detroit. Statistical analyses were conducted using SPSS ver. 23. Results showed that the highest mortality rates among African Americans occurred more in the obese individuals infected with COVID-19 in the city of Detroit. Out of 1930 deaths from COVID-19 infections, 733 deaths were due to obesity alone in patients without reported comorbid conditions like diabetes, hypertension, and cardiovascular disease. Mortality rate for both male and female African Americans amounted to a total of 11.9%. Thirty-eight percent of reported COVID-19-infected African Americans were obese.

Keywords COVID-19 virus · Obesity · African Americans · Mortality · Detroit

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Introduction

COVID-19 is an acute infectious respiratory disease caused by infection with coronavirus subtype SARS-CoV-2. Transmission happens through respiratory droplets mainly via sneezing, coughing, not washing of hands after long periods, and rubbing unwashed hands on eyes, just to name a few. The disease has a wide spectrum of severity, starting with mild symptoms that can progress to more severe courses. Patients start presenting with dry cough, difficulty of breathing or dyspnea, fever, headache, fatigue, and with some presenting with loss of smell/taste. Obesity can cause activation and dysregulation of the immune system through the release of cytokines like tumor necrosis factor (TNF- α), IL-1 β , and IL-6 which can cause acute inflammatory response [1]. Inflammation triggers unsustainable immune response to viral infections [1] like COVID-19; hence, these very high levels of cytokines (cytokine storm) [1] can promote organ failure and raise mortality rates among obese African Americans.

Clinical courses can happen between developing mild symptoms and life-threatening complications which can include acute respiratory distress syndrome (ARDS), aseptic shock, and with some patients suffering organ failure. Patients who experience severe disease symptoms often present with dyspnea, cyanosis, mental status changes, chest uneasiness, and increased respiratory rates of $> 22/\text{min}$ along with respiratory distress of $\text{SPO}_2 \leq 93\%$. Severe symptoms need admissions with close monitoring since currently no definite treatment option exists. Men and women are equally affected [2] across all racial groups; however, the African American obese population within the city of Detroit, Michigan, has a higher mortality rate.

SARS-CoV-2 is a subfamily of enveloped nonsegmented positive-sense RNA viruses that cause respiratory tract infections that can range from mild to severe courses [1]. SARS-CoV-2 shares 79.5% identity to the SARS-CoV genome [1]. The virus invades host cells via angiotensin-converting enzyme 2 (ACE2) [1]. Increased concentrations of ACE2, which is expressed in the surface epithelium of the lungs, heart, and mucous membranes of gastrointestinal tract (hence could explain diarrhea symptoms) and upper respiratory tract (could be responsible for continuous viral shedding), play a role in the pathogenesis of COVID-19 [1].

Methodology

From March 19 to May 15, 2020, Detroit City had 16,526 confirmed cases and 1930 deaths from COVID-19 infections in the city of Detroit in Wayne County [3]. Total deaths as of May 15, 2020, in Michigan reported were 4825 [3]. Data for COVID-19 and obese patients with BMI (BMI; weight (in Kg)/height (in m^2) were collected from the official Detroit

City Public Health website starting March 19 to May 15, 2020 [4]. Statistical analyses were conducted using SPSS ver. 23. This public health data also televises all COVID-19 cases, as well as hospitalizations and deaths. Death by race, gender, and ethnicity was updated on May 15, 2020, each day at 3:00 pm EST or when earliest update was available.

Discussion

Blacks	Males	Females	Totals
Ages	25–65 years	25–65 years	
Sex population	8265	8261	16,526
Obese sex population	3142	3138	6280
BMI	≥ 30 but ≤ 34.9	≥ 30 but ≤ 34.9	≥ 30 but ≤ 34.9
Obesity (% for both sexes)	38%	38%	38%
Mortality rate percentage (%)	5.95%	5.94%	11.90%
<i>P</i> value for obese	< 0.005	< 0.006	

Italic data signify pertinent points about the paper

Based on data collection and analysis using SPSS ver. 23, the results showed that out of 50,079 cases confirmed in the state of Michigan, 16,526 Blacks had confirmed COVID-19 cases in Detroit, Wayne County. Males and females were 8265 and 8261, respectively. A total of 6280 individuals of the 16,526 were obese with 3142 representing obese males and 3138 being obese females. Out of 1930 Blacks death, 733 of these patients were obese, that is, $\text{BMI} \geq 30 \leq 34.9$ for both males and females. This accounts for 38% of total deaths being associated with obesity alone. The remaining 62% had COVID-19 with other comorbidities like renal failure just to name a few and do not specifically fit the classification of obesity. Mortality rates are closely related for males and females with the total for both sexes being 11.90%.

Though some studies have proposed that severely obese patients with $\text{BMI} \geq 40$ are at a high risk for severe courses of COVID-19 infection, our results showed that African Americans in particular with $\text{BMI} \geq 30 \leq 34.9$ not only had severe courses of COVID-19 infection but also higher mortality rates. Seven hundred thirty-three deaths out of 1930 total Blacks' death occurred in COVID-19-infected obese group.

Reasons could be management and compliance options available for obese and severe obese patients and not seeking care with fear of being reinfected with COVID-19. That is, severely obese patients tend to benefit from multiple medication regimens to control their obesity, while some patients who are obese might be managed with supportive care. Life situations can occur where, for example, regular exercising can be skipped especially during COVID-19 pandemic. Some patients might be under stress and be depressed, as well

as lack financial support to seek adequate care and as such patients can become vulnerable for cytokine storm (obesity and COVID-19 overly revving up immunoglobulins) and organ failure which raises their mortality. Physiologic effects of hormones where cortisol levels shoot up especially under immense stress cannot be ruled out. It has been medically established that hormones like cortisol put a person's immune system at higher risk for infections since it reduces the body's ability to fight viruses like COVID-19.

Mortality rates are greatly heightened for African Americans with age >60 years with the most lethal rates occurring among obese individuals with age >80 years [5]. Some studies reported a 15% mortality rate for the general public [5]. Our study and analysis resulted in 11.90% mortality for the African American community in Detroit. In the state of Michigan, 33% of COVID-19 cases and 40% of deaths have occurred among Black individuals, who represent 14% of the population [6]. These glaring numbers calls for more research and emphasis in the African American community across the USA.

Conclusion

Clinical science flow has set the platform for more learning about which individuals and groups experience the direst complications. Blacks residing in poor communities in Detroit have high housing densities, high crime rates, poor access to healthy foods, and low socioeconomic status. Obesity alone is a risk factor for mortality regardless of the previously mentioned factors. Not obesity alone but now obese African Americans who get infected with COVID-19 are at an even higher risk for mortality.

Data Availability 1. From the official Detroit City Public Health website free of charge. Updated almost 3:00 pm EST. This information can be verified at any time, and it is free.

2. Also from Michigan data website free of charge updated almost 3:00 pm EST.

Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Research Involving Human Participants and/or Animals This article does not contain any studies with human participants or animals performed by any of the authors.

Informed Consent Informed consent was obtained from all individual participants included in the data that was collected for the study.

Code Availability Not Applicable.

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