

Obesity and Hypertension in the Time of COVID-19

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In this issue of JAMA, 2 reports^{1,2} present cross-sectional data on the prevalence and trends for obesity and controlled hypertension from 1999 through 2018 based on data from the National Health and Nutrition Examination Survey, a federal program of nationally representative surveys designed to monitor the health and nutrition of adults and children in the US.³

At first glance, these 2 studies may appear to be addressing different issues. Ogden et al¹ describe the seemingly inexorable increase in obesity prevalence among both children and adults, a condition that has few preventive strategies that have proven



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effective on a population basis despite recognition of its adverse effect on health.

Muntner et al² document a substantial decrease in the successful control of hypertension among US adults, a disease for which effective medical treatments exist. Hypertension increases the risk for heart disease, stroke, and chronic kidney disease, which are 3 leading causes of death for US residents, and effective treatment of hypertension can reduce the risk of these diseases.⁴ In addition to its contribution to cardiovascular and kidney diseases, obesity increases the risk for diseases affecting almost every organ system, including type 2 diabetes, nonalcoholic fatty liver disease, and certain types of cancer.⁵ The prevalence of both obesity and uncontrolled hypertension remains disturbingly high. As documented in both studies, these health indicators are moving in the wrong direction in all populations but occur disproportionately in racial and ethnic minority groups.

In the study by Ogden et al,¹ the prevalence of childhood obesity (body mass index [BMI; calculated as weight in kilograms divided by height in meters squared] \geq 95th percentile for age) increased between 1999-2000 and 2017-2018 among both 6- and 11-year-olds (from 15.8% to 19.3%) and adolescents (from 16.0% to 20.9%), with greater increases in non-Hispanic Black and Mexican American adolescents than in non-Hispanic White adolescents. In addition, severe obesity (defined as BMI \geq 120% of the 95th percentile) was more than twice as prevalent in non-Hispanic Black adolescents (13.0%) and Mexican American adolescents (12.9%) than in non-Hispanic White adolescents (4.9%). This is particularly concerning because adolescents with severe obesity are at high risk for the development of serious comorbidities, including type 2 diabetes, which has a more malignant course and is less amenable to therapies than type 2 diabetes acquired later in life.⁶

Among adults, the prevalence of obesity (BMI \geq 30) increased between 1999-2000 and 2017-2018 from 27.5% to 43% for men and from 33.4% to 41.1% for women, and the prevalence of severe obesity (BMI \geq 40) also increased from 3.1% to

6.9% for men and from 6.2% to 9.7% for women. The greatest increases in obesity prevalence have been among Mexican American men compared with non-Hispanic White men. Although obesity and severe obesity increased in all subgroups, the prevalence of both are greater among non-Hispanic Black women (56.9% and 18.9%, respectively) and Mexican American women (49.6% and 14.5%) compared with non-Hispanic White women (39.8% and 11.3%).

In the study by Muntner et al,² the estimated proportion of adults with hypertension who had controlled blood pressure increased from 31.8% in 1999-2000 to 48.5% in 2007-2008, and then remained stable until 2013-2014, but significantly declined to 43.7% in 2017-2018. This observation underlines the importance of regular health care. A major difference in controlled hypertension was observed between those who had a health care visit in the past year vs those who had not (49.1% vs 8%, respectively). As noted in past studies, non-Hispanic Black adults vs non-Hispanic White adults continued to have a lower blood pressure control rate (41.5% vs 48.2%, respectively). The increasing prevalence of obesity and subsequent development of type 2 diabetes, and the lack of progress in hypertension control, may contribute to the apparent slowing of further progress in reducing cardiovascular mortality that has occurred since 2011, as well as a failure to ameliorate racial disparities in cardiovascular disease mortality.⁷

In addition to race/ethnicity and health care use, geographic location (eg, the stroke belt in the Southeastern US), rurality, and low socioeconomic status are also associated with increased risk of obesity and poor control of cardiovascular disease risk factors.^{8,9} What brings these disparities into sharper focus, and provides increased urgency for addressing them, is the ongoing severe acute respiratory syndrome coronavirus 2 pandemic and the risk for potentially life-threatening outcomes from coronavirus disease 2019 (COVID-19).

The presence of obesity, type 2 diabetes, chronic kidney disease, or cardiovascular disease are known risk factors for severe illness from COVID-19 in persons of any age.¹⁰ Black, Hispanic/Latino, American Indian/Alaska Native, and Pacific Islander individuals also have increased rates of infection and disproportionately poor outcomes from COVID-19, including higher risk of death than non-Hispanic White individuals.¹¹

The confluence of these disturbing trends in obesity, hypertension, and COVID-19 within communities of color appears to reflect a complex interplay of contributing factors that are rooted in the social determinants of health and structural racism. *Structural racism* can be defined as the totality of ways (ie, policies, cultural norms) that society fosters racial discrimination via inequitable systems (eg, housing, education,

employment, earnings, credit, and health care) that mutually reinforce and systematically perpetuate racial inequities.¹²

There is substantial evidence that the propensity to develop obesity across the lifespan is strongly shaped by the built environment and social context in which a child is born, grows, and ages. Studies indicate that minority children who are born and raised in racially segregated communities characterized by a high density of fast food outlets, limited access to fresh fruits and vegetables, and poor walkability are more likely to develop obesity and hypertension. These communities of color with high health disparities are part of the legacy of structural racism shaped by governmental policies such as redlining that discouraged capital investment needed to build vibrant and healthy communities.

The devastating effects of COVID-19 on communities of color is tightly related to this same intersectionality between race and class that increases exposure to the COVID-19 pandemic related to employment in essential service sectors and limited capacity to physically distance in crowded housing conditions. Addressing these complex drivers of health disparities will necessitate an approach that recognizes the multidimensional nature of contextual factors that led to structural racism, and advances the understanding of how these social factors promote comorbidities such as obesity and hypertension.

The National Institutes of Health (NIH) is firmly committed to supporting research to understand and ameliorate the causes and consequences of diseases that disproportionately affect minority and other underserved populations. Inequities in the social determinants of health early in life can have lifelong biological, behavioral, and psychosocial consequences, including increased likelihood of obesity, type 2 diabetes, and cardiovascular disease.¹³ Therefore, a life-course approach to addressing health disparities from the prenatal period through older adulthood offers multiple opportunities to develop and implement effective prevention and treatment strategies. Because many diseases within the missions of the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) and the National Heart, Lung, and Blood Institute (NHLBI) place disparate burdens on minority and economically disadvantaged populations, both institutes have worked together to implement a life-course approach in diverse populations with high levels of disparities.^{14,15}

Approaches targeting individual health behaviors to reduce the risk of obesity and cardiovascular disease in isolation of the broader social and environmental context may be less likely to have meaningful benefit than those that intervene at multiple levels. Multilevel approaches include policy, environmental, and community interventions¹⁵ and those engaging nontraditional partners outside the health care system to address areas such as early care and education, housing insecurity, and income inequality.¹⁶ In addition, research to reduce health disparities also benefits from a spectrum of approaches, ranging

from basic studies to elucidate the biological factors that may increase susceptibility to disease or response to treatment, through precision prevention strategies using big data sources with omics data linked to phenotypic information to identify, for example, nutritional approaches for disease prevention.¹⁷⁻¹⁹ Increased use of big data resources and platforms could enable better development and implementable strategies for more effective and targeted prevention and treatment of both obesity and hypertension. The NIH is also committed to research programs designed to understand and ameliorate the racial/ethnic disparities in COVID-19. Both the NIDDK and the NHLBI also support digital health care interventional research to address social, economic, and behavioral outcomes associated with COVID-19 in vulnerable populations.²⁰

Engaging patients, health advocacy organizations, families, community members, and others in research is another important approach to reduce health disparities. Including these groups as study partners from design and implementation through returning results to participants could help ensure that the research conducted addresses meaningful outcomes and strengthens all aspects of the research. The NIDDK and the NHLBI are working to increase broad engagement in research. Both institutes are also committed to promoting a talented and diverse scientific workforce through programs to support the training and career development of underrepresented scientists at all career stages. Both of these themes are highlighted in the strategic planning of the NIDDK, the NHLBI, and other institutes.^{21,22}

The NIH is committed to evaluating the success of interventional studies to reduce the risk factors that contribute to mortality among racial/ethnic minority groups, including uncontrolled blood pressure and obesity, and to monitor the magnitude of these contributing factors and subsequent outcomes in epidemiological studies. A robust effort is also underway to evaluate NIH policies and practices that may act as barriers or facilitators in the creation of a diverse scientific workforce at all career levels and to monitor and report on the success or failure of underrepresented racial/ethnic minority investigators when competing for NIH funding.²³

If the US is committed to changing the trend line of health disparities in obesity and hypertension, it is critical to acknowledge the important contributions of systemic racism and the social determinants of health in the context of the current COVID-19 crisis. It will take a collective, committed effort at every level, including policy makers, frontline community organizations, health care workers at safety-net clinics, and those conducting behavioral and biomedical scientific research, to address these potentially remediable contributors to some of the nation's most complex health challenges. Only then will it be possible to achieve a vision of health equity in which each child born in the US is destined to live a full and healthy life regardless of their family's zip code.

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