



# Health disparities and cardiovascular disease in the era of COVID-19: A brief review from a public health perspective

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## ABSTRACT

The social and economic impact of the COVID-19 pandemic has negatively affected everyone, but lower socioeconomic groups have been hit hardest. A higher likelihood of exposure to socially determined risk factors for Black, Asian, Latino and Native American individuals has been linked to higher incidence of COVID-19 cases and death in these communities. Multi-level and multi-organizational effort is needed to reduce the increased risk of COVID-19 in vulnerable populations that exists due to structural health inequalities.

**Keywords:** COVID-19, Cardiovascular, Social Determinants of Health, Health inequalities

## INTRODUCTION

In March 2020, the World Health Organization declared a Public Health Emergency of International Concern (PHEIC) due to the emergence and global spread of COVID-19.<sup>1</sup> The number of COVID-19 cases has continued to rise since then. By the end of December 2020, the Johns Hopkins University of Medicine's Coronavirus Resource Center was reporting more than 1.6 million deaths worldwide and more than 70 million recorded infections.<sup>2</sup>

World Health Organization guidelines published in 2007<sup>3</sup> and 2014<sup>4</sup> have previously identified positive associations between ventilation, overcrowding and infectious diseases such as COVID-19 that are spread by droplets and airborne transmission. This indicates that places where people reside, attend education, work and socialize influence a wide range of health risks and health outcomes: such places are also key factors in the Social Determinants of Health (SDH).<sup>5</sup>

The social and economic impact of the COVID-19 pandemic has negatively impacted everyone but lower socioeconomic populations are hit hardest by epidemics and pandemics. People of lower socioeconomic status are more likely to experience work-related exposure, as they are more likely to work in occupations where levels of contact with their coworkers and the public are high, which can make

recommendations on social distancing hard to follow; more likely to use public transportation to commute; more likely to live in crowded housing conditions (including in multi-generational homes); and more likely to have pre-existing chronic health conditions including cardiovascular diseases and diabetes. All these factors put individuals at higher risk of infection and higher risk of adverse outcomes. A higher likelihood of exposure to these social determinants for Black, Asian and Latino individuals has been linked to higher incidence of COVID-19 cases and higher numbers of deaths in these communities.<sup>6,7</sup> Native Americans are also reported to be more severely impacted by COVID-19.<sup>8</sup>

The prevalence of cardiovascular diseases and diabetes is associated with obesity. This has also been associated with lower socioeconomic status in the United States, where low-income urban areas have reported food deserts<sup>9</sup>, neighbourhoods where there is reduced access to healthy and unprocessed foods.<sup>10</sup> Ethnic populations might be at higher risk for COVID-19 due to genetic predispositions as well as socioeconomic factors;<sup>11,12</sup> South Asian populations record higher cases of diabetes, heart disease and metabolic syndrome.<sup>13</sup> Men, older adults and the immunocompromised are also at higher risk for adverse outcomes should they contract COVID-19.<sup>14</sup>

GJMEDPH 2020; Vol. 9, issue 2

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Conflict of Interest—none

Funding—none



In the United States, Black, Latino, Asian Pacific Islander and older adults have the higher per capita hospitalization rates for COVID-19 and the higher death rates among those hospitalized.<sup>15, 16</sup>

### CARDIOVASCULAR DISEASE AND COVID-19

Based on data from outbreaks of Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndromes (MERS), cardiovascular disease is a common comorbidity in fatal cases, with a prevalence of 10% in SARS cases and 30% in MERS.<sup>17,18</sup> Cardiovascular disease, hypertension and diabetes mellitus are commonly recorded in patients hospitalized with COVID-19.<sup>19-23</sup> Cardiovascular disease is recorded in higher numbers of COVID-19 patients who become critically ill and are admitted to intensive care units than in those who have less severe disease progression.<sup>24</sup>

COVID-19 has a deleterious effect on the myocardial tissue and myocardial infarction is a common condition in patients hospitalized with COVID-19. Around 12% of these patients suffer from acute myocardial injury with elevated troponin,<sup>25,26</sup> and this has been reported as being higher in critical care settings such as intensive care units.<sup>27</sup> Angiotensin-Converting Enzyme 2 (ACE2), an important receptor for the SARS-Cov2 virus, enters the epithelial cells through the ACE2 receptor.<sup>28</sup> ACE2 receptors are vulnerable to SARS-Cov2 and are found expressed in the oral mucosa, endothelial cells, lungs, esophagus, ileum, colon and bladder.<sup>29,26</sup> Cases studies have reported incidence of myocarditis,<sup>30,31</sup> arrhythmias<sup>32</sup> and heart failure<sup>33</sup> in patients affected by COVID-19.

### MANAGEMENT OF PATIENTS WITH HEART DISEASE DURING THE COVID-19 PANDEMIC

National and international heart associations are updating guidelines on management of COVID-19 in the context of heart disease.<sup>34</sup> However, it is important to remember that robust data is still not available as this is an ongoing pandemic; most of the existing data has been published from observational studies rather than clinical trials. Robust clinical research is needed in this field to help effectively treat patients with cardiovascular disease and COVID-19.

The American Heart Association recommends healthy foods that are low in fat, exercising after consultation with a physician, and maintaining a healthy weight to lower risk for heart disease – and continues to recommend this to patients at higher risk for COVID-19.<sup>35</sup>

The Association recommends that populations at higher risk continue to eat healthily, exercise and take prescribed medications for pre-existing conditions in addition to COVID-19 specific health advice such as maintaining social distancing, handwashing and wearing face coverings when social distancing is not possible.<sup>36</sup>

### PUBLIC HEALTH EFFORTS

National<sup>37,38</sup> and local<sup>39,40</sup> public health organizations are highlighting health disparities due to COVID-19: populations with preexisting conditions, homeless people, certain vulnerable ethnic minorities and socioeconomically disadvantaged communities in general. Professional organizations can recommend policy change and raise awareness on these issues.

By focusing on factors that lead to existing health inequities and recommending steps to mitigate these in the future, such organizations can increase the emphasis on health disparities and can drive funding for research, implementation of health programmes<sup>41</sup> and collaboration<sup>42</sup> between key stakeholders.

### CONCLUSION

Multi-level and multi-organizational effort is needed to reduce the increased risk of COVID-19 in vulnerable populations. This higher risk exists due to structural health inequalities. Lessons learned from previous infectious disease epidemics include increasing funding for robust clinical trials, expanding the dissemination of current knowledge and existing best practices to protect vulnerable populations and thus reduce their likelihood of exposure to risk.

These measures should be highlighted and supported. Local, state and national level governments need to implement policies that help limit the spread of COVID-19 in vulnerable populations at both social and economic levels.

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