



Aging and COVID-19 in Minority Populations: a Perfect Storm

Tubanji Walubita¹ · Ariel Beccia¹ · Esther Boama-Nyarko¹ · Melissa Goulding¹ · Carly Herbert¹ · Jessica Kloppenburg¹ · Guadalupe Mabry¹ · Grace Masters¹ · Asli McCullers¹ · Sarah Forrester¹ 

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Abstract

Purpose of Review COVID-19 is a major concern for the health and wellbeing of individuals worldwide. As COVID-19 cases and deaths continue to increase in the USA, aging Black and Hispanic populations have emerged as especially at-risk for increased exposure to COVID-19 and susceptibility to severe health outcomes. The current review discusses the weathering hypothesis and the influence of social inequality on the identified health disparities.

Recent Findings Aging minoritized populations have endured structural and social inequality over the lifecourse. Consequently, these populations experience weathering, a process that results in physiological dysregulation due to stress associated with persistent disadvantage. Through weathering and continued inequity, aging minoritized populations have an increased risk of exposure and poor health outcomes from COVID-19.

Summary Current literature and available data suggests that aging minoritized persons experience high rates of COVID-19 morbidity and mortality. The current review hypothesizes and supports that observed disparities are the result of inequalities that especially affect Black and Hispanic populations over the lifecourse. Future efforts to address these disparities should emphasize research that supports governments in identifying at-risk groups, providing accessible COVID-19-related information to those groups, and implementing policy that addresses the structural and social inequities that perpetuate current COVID-19 disparities.

Keywords COVID-19 · Weathering · Aging · Black · Hispanic · Health disparities · This article is part of the Topical Collection on *Epidemiology of Aging*

Introduction

In December 2019, the novel coronavirus disease (COVID-19), caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), was identified in Wuhan, China [1]. Since then, COVID-19 has emerged as a major global health threat, infecting nearly 107 million people and killing over 2.3 million people worldwide [2]. Currently, the USA is leading globally in the number of confirmed infections and deaths. COVID-19 has killed more than 465,000 people in the USA, with the majority (80%) of those deaths occurring in individuals aged 65 years and older [3]. Evidence suggests that age is an important factor in predicting COVID-19

symptom severity and mortality, though physiological factors such as cardiovascular and metabolic diseases are also implicated, as are behavioral and social factors, including occupation and socioeconomic status [4].

While COVID-19 is of particular concern for older populations, racial and ethnic minority populations are at additionally high risk [5, 6••]. Black individuals and individuals of Hispanic origin have COVID-19 death rates nearly three times higher than non-Hispanic White (hereafter White) individuals [4]. In contrast to White persons, Black and Hispanic persons also have a higher rate of cases and hospitalizations for COVID-19 [4]. Among aging minoritized persons, Black and Hispanic persons over the age of 65 years, the risk of severe illness or death from COVID-19 is especially high.

In response to nationwide increases in COVID-19 cases, local and state governments have implemented temporary restrictions and regulations to decrease person-to-person contact and prevent the spread of COVID-19. Such regulations include stay-at-home orders, non-essential business curfews, and business closures [7]. Despite these efforts, COVID-19

✉ Sarah Forrester
sarah.forrester@umassmed.edu

¹ Department of Population and Quantitative Health Sciences, University of Massachusetts Medical School, 368 Plantation Street, Worcester, MA 01605, USA

continues to spread, with the number of confirmed infections rising by the thousands daily in the USA [3]. Widening disparities further illustrate that government efforts may not be addressing key factors associated with the spread of this disease. Understanding the factors that contribute to existing disparities is essential to preventing further spread and further mortality, particularly among high-risk groups.

In the current review, we examine factors that make aging minoritized persons susceptible to both increased risk of exposure to COVID-19 and severe COVID-19 infection or death. We propose a biopsychosocial model in which we hypothesize that social inequality contributes to observed disparities in COVID-19 morbidity and mortality. Specifically, we define the weathering hypothesis as it relates to aging minoritized populations and discuss the role of weathering in explaining increased risk of exposure and severe infection. Next, we discuss the social and behavioral factors that may contribute to the biological risk factors exhibited for COVID-19. We follow with an exploration of those biological risk factors. Finally, we conclude with some recommendations to mitigate the burden of COVID-19 in these populations.

Weathering

The weathering hypothesis, first coined by Arline Geronimus, is defined as the physiological impact of social inequality compounded with age that leads to health inequities [8]. Understanding how accumulated stress and other social disadvantages over the lifecourse can produce premature biological aging can help elucidate the effects of social inequality, racial discrimination, or bias in exposures to psychosocial or environmental hazards on health [8]. The hypothesis posits that marginalized racial and ethnic groups, such as Black and Hispanic populations, experience early health deterioration by way of cumulative exposure to socio-political inequality [8, 9••].

Currently, literature suggests that the consequences of social inequality may manifest physically through expedited biological aging. Biological age is an abstract concept to express the “true global state” of aging and life expectancy using biomarkers and an algorithm as compared to a person’s chronological age [10]. Allostatic load scores, which operationalize the physiological burden imposed by stress, are higher in Black persons ages 35–64 years old when compared to White persons in the same age range [11]. Other measures of biological aging, such as telomere length, have also indicated greater degrees of weathering in marginalized groups when compared to non-marginalized groups. For example, short telomeres, which indicate more advanced biological age, have been shown to be more prevalent in Black women in comparison to their White counterparts due to unique social, political, and racial indicators of stress [12]. Often by way

of this accelerated biological aging, older minoritized individuals are also more likely to develop severe forms and chronic sequelae of conditions like cardiovascular diseases (CVD), metabolic disorders, and certain cancers [13, 14]. As with COVID-19, Black and Hispanic populations exhibit higher rates of hospitalizations and mortality, which is attributable to bearing a disproportionate burden of underlying comorbidities such as CVD [9••]. As comorbidities and accelerated aging are compounded with persistent inequity over the lifespan, the likelihood of experiencing severe illness and/or death due to COVID-19 increases.

Emerging research has shown that social inequity also plays a major role in increasing one’s risk of exposure to COVID-19. Social determinants of health, including childhood and adult socioeconomic status, neighborhood and physical environment, housing, and access to healthcare and resources, disproportionately affect Black and Hispanic groups and are known to influence risk of exposure to COVID-19 [4, 15]. For example, crowded living environments and overrepresentation in “essential worker” occupations put Black and Hispanic individuals at greater risk for exposure to COVID-19 by limiting ability to social distance [16, 17]. The socially linked factors that increase COVID-19 risk of exposure and severe health outcomes for aging minoritized persons lead us to hypothesize that weathering may have an association with observed COVID-19 disparities (Fig. 1).

Social and Behavioral Factors

A complex web of social and behavioral factors likely contributes to weathering and thus plays a role in the observed disparities in COVID-19 morbidity and mortality for aging minoritized populations. Understanding this web requires attending to the longstanding structural inequities in employment, housing, healthcare, and other critical social determinants of health that shape both infection exposure and treatment access differentially along racial/ethnic lines and across the lifecourse [18]. Furthermore, adopting an intersectional perspective can help shed light on risk heterogeneity *within* aging minoritized populations by socioeconomic status and gender/sex (among other dimensions of social identity and/or position) as a result of multiple and oftentimes compounding axes of structural inequity [19]. In this section, we review some social and behavioral determinants that may be contributing to COVID-19 morbidity and mortality disparities.

Discrimination

To fully understand the effects of COVID-19, the past and current context of discrimination and racism in the USA on the interpersonal and structural levels must be considered.

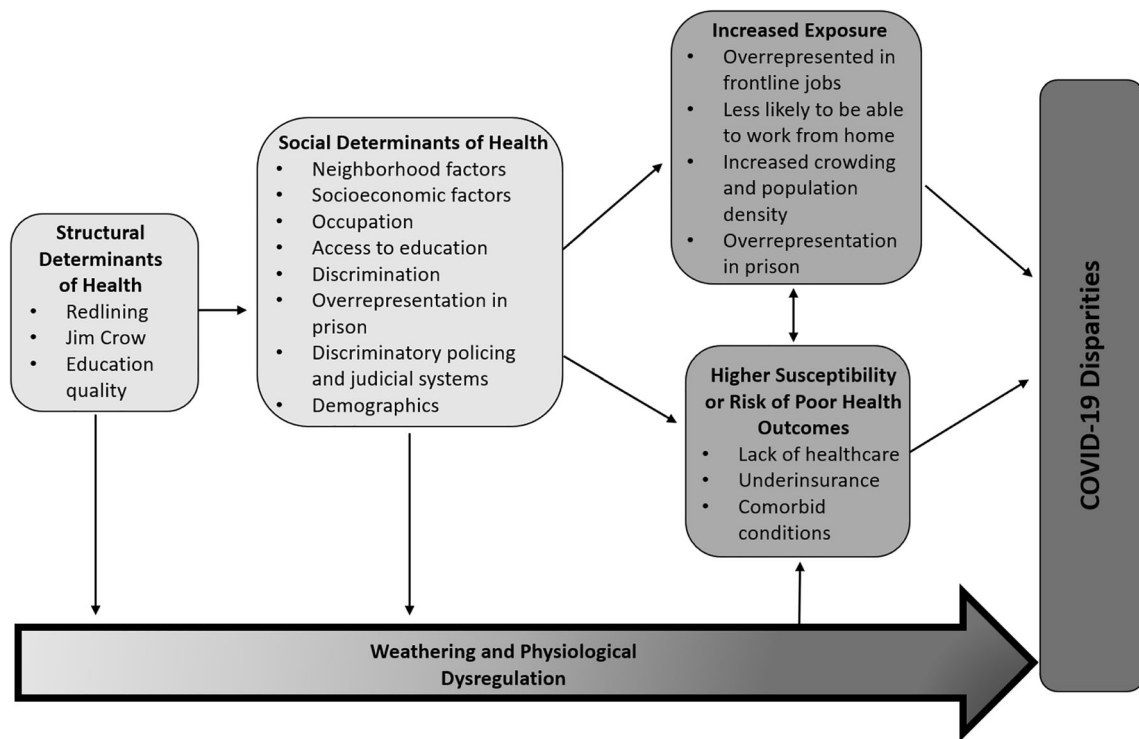


Fig. 1 Weathering and physiological dysregulation

During their lifecourse, older Black individuals have experienced legal discrimination via Jim Crow laws as well as ensuing and current discriminatory policies which are cultivated through structural racism. In relation to COVID-19, policies such as redlining may contribute to inequities as minoritized individuals are more likely to live in areas of high population density and with less resources leaving them vulnerable to infection spread [20]. Similarly, mass incarceration has resulted in overrepresentation of these populations in the US prison system where infection rates have been found to be over 5 times greater than rates in the general population [21]. Moreover, the experience of racial discrimination at the interpersonal level may be contributing to severe COVID-19 illness and mortality in aging minoritized persons through accelerated biological aging and the process of weathering [12].

Cultural Norms and Religion

Culture and religion are critical and often overlooked aspects which may inadvertently contribute to COVID-19 spread. Among others, large family size and close contact greetings are common among Hispanic persons and are cultural norms that may challenge the feasibility of social distancing and increase the risk of COVID-19 infection and transmission [22]. Furthermore, the closure of churches, which play an important role in Black communities often serving as sources of information, resources, social interaction, and emotional support, may disproportionately affect Black communities

[23]. The uniqueness of these factors and their potential to exacerbate the reach and effects of COVID-19 underscore the need for culturally appropriate public health measures and communication. Especially given the historical mistreatment, efforts to empower minoritized populations through appropriate dissemination of information and supportive resources are crucial.

Healthcare and Historical Context

Minoritized persons in the USA experience a fraught relationship with the healthcare system that may exacerbate COVID-19-related risks. Because of centuries of experimentation, mistreatment, discrimination, and dehumanization from the healthcare system and research, many Black and Hispanic people are, understandably, hesitant to trust the system. This may be heightened in aging minoritized persons who acutely remember or experienced overt offenses, though these atrocities continue to this day [24, 25••]. An illustration of these effects is the distrust of the COVID-19 vaccination efforts: though skepticism is present across racial and ethnic lines, if vaccination trends continue [26], marginalized communities may be vaccinated at lower rates, leaving aging minoritized persons at particular risk [27, 28]. Furthermore, immigrants that are undocumented may be largely barred from treatment and prevention efforts, given the poor dissemination of information regarding COVID-19 to non-English speaking populations and rational fears that interaction with the healthcare

system may result in detention, punishment, and/or deportation [29]. Additionally, similar to incarcerated populations, COVID-19 infection rates are growing faster in immigration detention centers than elsewhere in the USA [30].

Minoritized persons are un- or underinsured at higher rates than White people [31, 32], such that healthcare utilization may present insurmountable costs. Federal legislation has been enacted to cover many of the COVID-19-related costs for those uninsured [33], but few people likely know about this [34]. Given the complexity of our multi-payer system, it is often unclear what is covered and can be particularly difficult to navigate as an older person. Finally, access presents another barrier to healthcare for aging minoritized populations, who tend to have less access to transportation, are unable to take time off from work, and have other difficulties [31, 32].

Socioeconomic Status

Socioeconomic status is often a proxy for social determinants of health. It represents a critical array of factors that impact acute and chronic disease risk; here, we will discuss housing and employment. Populations that live in lower-quality or hazardous housing, are homeless or have housing instability, live in multigenerational homes, and/or tightly packed public housing complexes are among the highest risk for coronavirus transmission and COVID-19 for a multitude of reasons [32, 35]. These also tend to be disproportionately made up of minoritized communities. Minoritized communities are less likely to receive financial deferments for housing payments and, thus, face eviction [36]. A particularly poignant illustration of how this intersects with and compounds health inequities in aging minoritized populations is in short- and long-term care facilities, where people are contracting and dying of COVID-19 at extraordinary rates [37, 38]. In particular, nursing homes that have greater proportions of minoritized persons are some of those that are experiencing the most severe outbreaks [38–41].

Employment inequities are also exacerbating COVID-19-related morbidity and mortality. Aging persons and minoritized persons are among groups that may be more likely to be laid off or are already living at or below the poverty line [32], which itself is linked to health outcomes. Black and Hispanic persons are also much more likely to be essential workers in the service industry [16, 32, 35], where social distancing is difficult and working from home is not an option. Many live paycheck-to-paycheck or without paid sick leave [32], eliminating ability to take time off if sick and effectively encouraging coronavirus spread through no fault of their own.

Gender/Sex

Another important dimension of social identity/position potentially contributing to heterogeneity in COVID-19

morbidity and mortality risk within aging minoritized populations is gender/sex. It is now well-described that, relative to cisgender men, cisgender women are less likely to have severe cases and/or die yet may be more likely to experience long-term or chronic symptoms of the disease (i.e., “long COVID”) [42, 43]. Furthermore, researchers have postulated that there are important interactions between gender/sex and age, given the non-uniformity of the observed gender/sex morbidity and mortality ratios across age groups [44]. Unfortunately, COVID-19 data is rarely disaggregated by gender/sex, race/ethnicity, and age simultaneously [45], and thus, how these dimensions of social identity/position intersect to shape risk across the lifecourse is largely unknown. However, research into the unique forms of structural disadvantage experienced by populations marginalized by sexism, racism, and ageism is suggestive of meaningful intersectionality. For example, minoritized women (especially Black, Hispanic, and Indigenous women) are disproportionately represented among frontline workers and in occupations that do not provide paid sick days [46, 47], which may contribute to a higher risk of COVID-19 exposure. Minoritized women are also more likely than their male and/or White counterparts to suffer from conditions associated with severe COVID-19 symptoms (e.g., asthma, diabetes) and experience considerable medical discrimination [48, 49], potentially leading to poor outcomes once infected. Collectively, these social and health inequities, in addition to the biological impacts of weathering, suggest that aging minoritized women may experience distinctive disparities in COVID-19 morbidity and mortality. More research in this area, especially research that includes gender minority populations who have been largely excluded from extant surveillance efforts, is critically needed.

Health-Related and Biological Factors

Only a subset of those infected with COVID-19 develop severe infection, characterized by hypoxemia, progressive respiratory failure, systemic organ failure, and/or death [50]. Pre-existing chronic conditions including hypertension, diabetes, elevated body mass index (BMI), chronic kidney disease (CKD), and cardiovascular disease have been consistently associated with severe COVID-19 infection [51, 52]. These pre-existing conditions disproportionately impact Black and Hispanic populations as a consequence of social, economic, and historic factors, including the marginalization and abuse of these populations by the medical community [6••]. As proposed above, the weathering hypothesis may help to explain why marginalized populations bear a disproportionate share of the chronic health disease burden: exposure to racial discrimination results in persistent exposure to stress and a chronic inflammatory state. Consistent with this hypothesis, aging minoritized populations have higher levels of inflammatory

markers, and elevated inflammatory markers strongly predict hypertension, diabetes, and cardiovascular disease [53]. It is also important to acknowledge the interrelated nature and co-occurrence of these conditions. Indeed, multimorbidity (the co-existence of two or more chronic conditions) is the norm in adults over age 65 years, with a prevalence of 55–98% [54, 55].

Hypertension, Cardiovascular Disease, and Chronic Kidney Disease

COVID-19 patients with hypertension or cardiovascular disease are 3–4 times more likely to develop severe disease compared to those without pre-existing conditions [56, 57]. Additionally, patients with chronic kidney disease (CKD) have COVID-19 hospitalization and mortality rates 11 and 14 times higher than the general population, respectively [58, 59]. Black individuals have the highest prevalence of hypertension and CKD of any racial and ethnic group in the USA, with 57.1% of Black adults reporting hypertension in 2018 [60–62]. Hypertension is a significant risk factor for cardiovascular disease and CKD, and Black patients are twice as likely to die of preventable heart disease and kidney failure than white individuals [63, 64]. Consistent with our understanding of weathering, Black populations have been shown to develop hypertension and cardiovascular disease on average 10 years before White populations, even after accounting for differences in demographic and health-related factors [65]. Lifetime discrimination has also been associated with hypertension among Black women in the USA, and income inequality and neighborhood racial segregation are associated with increased mortality among Black patients with advanced CKD [64, 66]. The increased risk of severe COVID-19 infection among individuals with hypertension, cardiovascular disease, and/or CKD demonstrates another way COVID-19 is sharpening pre-existing disparities.

Diabetes

Individuals with COVID-19 and diabetes have twofold and threefold increased risks of intensive care unit (ICU) admission and mortality respectively, after adjusting for confounders [57, 67]. Racial minority groups are disproportionately impacted by diabetes compared to Whites, and Native Americans have the highest prevalence of diabetes of any racial or ethnic group [68]. Minority populations also experience more diabetes-related complications and worse diabetes outcomes [69]. Diabetes risk and control has been associated with low socioeconomic status and lower educational attainment, which emphasizes the important role of social factors on diabetes risk and management [70, 71]. Food insecurity, a phenomenon more than twice as common in Black and Hispanic households than white households, is also linked to poor glycemic control [72]. Interestingly, Bello-Chavolla

et al. found that while diabetes predicted COVID-19 mortality, high BMI mediated 49.5% of this effect, underscoring the relationship between many pre-existing conditions [73].

Body Mass Index and Weight Stigma

High body mass index (BMI) has also been associated with severe disease and death among COVID-19 patients [52, 74]. In 2018, Black adults had the highest age-adjusted prevalence of BMI > 30 kg/m², and Hispanic adults also had age-adjusted prevalence above the national average [75]. In a review on racial disparities in BMI, Byrd and colleagues point to factors related to food deserts and the associated consumption of calorically dense but nutritionally poor foods, residence in neighborhoods with inadequate access to places to be physically active, decreased access to medical care, stress, income, sleep, and racism as drivers of the observed differences among racial and ethnic groups in both the prevalence and management of obesity [76].

With media coverage emphasizing high BMI as a risk factor for severe COVID-19, larger bodied individuals are likely to experience increased weight stigma within and outside of the medical system [77]. Approximately 19–42% of individuals with high BMI report experiencing weight discrimination and 40–50% report internalizing weight bias [78]. Conscious and unconscious bias from medical professionals can create an unwelcoming and at times hostile environment for larger bodied individuals, leading to delays in both COVID and non-COVID-related care due to weight concerns [79]. Weight stigma, which can be internalized as chronic stress, may exacerbate the underlying predisposition toward inflammation and dysregulated immune response, which has been proposed as a mechanism of severe COVID-19 among people with elevated BMI [80–82]. Since minority populations bear a disproportionate burden of the incidence and subsequent health consequences of elevated BMI, it is likely that there is significant intersectionality between race, ethnicity, BMI, and weight stigma with COVID-19 infection and outcomes.

Conclusion

The observed disparities in COVID-19 risk, morbidity, and mortality mirror prior inequalities in disease burden that continue to negatively impact Black and Hispanic persons, particularly those who are older adults. Per the weathering hypothesis, increased exposure to social inequality over the lifecourse places these older minoritized individuals at greater risk for physiological “wear and tear” [9••]. As these physiological disruptions continue, diseases, including COVID-19, can disproportionately harm those who are already vulnerable to poor health outcomes [15, 83]. Understanding the role that structural racism has in shaping the impact of the COVID-19

pandemic is necessary if addressing disparities and preventing further infection and death is the goal for COVID-19 stakeholders. This review highlights the unique challenges that aging minoritized populations face and presents opportunities for addressing the needs of those populations.

Rather than proposing behavioral changes that often fail to address the true sources of population health inequity, we provide local- and state-level recommendations to mitigate the burden of COVID-19 in older Black and Hispanic populations. First, a key to preventing not only the spread but also the fatal impacts of COVID-19 is having proper access to testing, as individuals are made aware of their ability to infect others and are able to seek medical care before symptoms worsen [1]. This could include increasing the number of COVID-19 testing sites in minority communities, creating targeted dissemination efforts to make communities aware of available resources and testing sites, and providing testing to individuals while also limiting barriers such as the cost, the need for health insurance, and the accessibility of results. Second, and related to the issue of testing, is the need for governments to continue to observe COVID-19 disparities through extensive data on the number of confirmed COVID-19 cases, hospitalizations, and deaths across a wide range of sociodemographic categories, while emphasizing that tracking will not result in penalization for persons such as undocumented immigrants [84]. Third, policymakers must recognize that universal policies may not be as universally beneficial as they intend to be. For instance, while Stay-at-Home orders may be issued to prevent further disease spread, some Black and Hispanic individuals, many of whom comprise the frontline and essential workforce, are unable to simply stay at home or socially distance [17]. Policymakers must also ensure that policies do not have inimical effects on older minoritized populations [84, 85]. Fourth, it is imperative that local and state governments address the financial inequalities that existed prior to COVID-19 and have since been exacerbated. These economic challenges may be addressed with adequate and consistent economic relief efforts, which would be especially beneficial to older Black and Hispanic individuals who have lower median wealth than older Whites [86]. Additionally, as vaccines continue to be dispensed throughout the USA, a pattern of disproportionate vaccination has emerged, as Black and Hispanic populations are getting vaccinated at lower rates than White populations, despite having higher rates of cases, hospitalizations, and deaths from COVID-19 [87, 88]. To ensure that the most at-risk individuals receive the vaccine, equitable vaccine distribution must be prioritized, and efforts must be made to address challenges with vaccine hesitancy and access in these populations.

As researchers, we can support state and local governments in their efforts to address growing racial and ethnic disparities in COVID-19 morbidity and mortality. One approach could be expanding current research on the process of weathering

and the health effects of experiencing social inequality over the lifecourse. Such studies would be helpful in illustrating that current COVID-19 disparities are the consequence of inequities that can be at least partially mitigated through policy changes. Moreover, researchers can continue to do research that explores and highlights disparities in COVID-19 morbidity, mortality, and vaccination to further identify at-risk groups and provide support for currently identified at-risk groups. Other efforts could include publishing more data on COVID-19 that is accessible to minoritized and older minoritized populations to help increase knowledge and awareness of COVID-19 while possibly increasing trust and addressing vaccine hesitancy.

Compliance with Ethical Standards

Conflict of Interest The authors declare no competing interests.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by any of the authors.

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