IV. Reproducing inequalities

INEQUALITY SHAPING EPIDEMICS, EPIDEMICS REPRODUCING INEQUALITY: INTERSECTIONALITY AND COVID-19

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Since the first case of COVID-19 emerged in December 2019, infection levels and death rates from the virus have steadily risen across the globe. These sobering trends, however, have not been evenly distributed. Clear patterns of variation in population distribution, severity and medical complications have emerged. Internationally, both being older and being male are associated with higher levels of vulnerability, with a greater risk of both disease severity and mortality (Peckham et al. 2020). In the UK and US, it has also been found that ethnic minorities bear a disproportionate burden of disease incidence and severity; in the UK, as of July 2020, Black and South Asian (British Indians, Bangladeshis and Pakistanis) patients had a 48% and 45% higher chance of death respectively compared to White people after controlling for factors such as age, sex, underlying medical conditions and smoking status (Williamson et al. 2020). Similar patterns have been observed in the US, where African Americans and Hispanics/Latinos suffered triple and nearly double the mortality rates of whites respectively (Gross et al. 2020). Individuals suffering conditions of poverty also face greater risks of being infected and developing complications, with socioeconomic deprivation increasing both infection and mortality rates in multiple countries, including the US (Hawkins et al. 2020), Chile (Mena et al. 2021) and South Korea (Oh et al. 2021).

Furthermore, these risk categories frequently intersect with each other, rendering specific populations particularly vulnerable. Elderly ethnic minorities, especially those in care homes (Booth 2020; Care Quality Commission 2020; Comas-Herrera et al. 2020), and ethnic minorities in lower socioeconomic classes, especially those with frontline occupations (McLaren 2020; Williamson et al. 2020), are the two intersectional populations of vulnerability focused on in this essay. Therefore, as much as medical researchers strive to identify medical revelations to counter COVID-19, interdisciplinary researchers must pay equal heed to the socio-cultural underpinnings of COVID-19 and the intersectional populations of vulnerability that bear the greatest brunt of the pandemic.

Intersectionality is a conceptual framework for understanding and examining how the overlapping characteristics of an individual's perceived identity intersect, where privilege or discrimination may be based on traits such as age, gender, physical appearance, ethnicity or social

class (Hill Collins and Bilge 2020). Intersectionality was first described in the late 1980s by Kimberlé Crenshaw, a black feminist and activist, and the concept has attracted expansive use and gained great analytical power since then. It is an important concept for tackling inequalities in public health (Kapilashrami and Hankivisky 2018). We draw on this framework here to examine how a global pandemic, government structures and policies, and poverty collide to reproduce socioeconomic inequality. We focus in particular on the UK, but will also draw upon examples from the US and other developed and developing countries. There is a large body of empirical work illustrating how inequality is reproduced and exacerbated by public-health disasters such as the COVID-19 pandemic.

Early on, an unexpected observation emerged: young children who are usually vulnerable to disease were much less likely to contract COVID-19 or suffer severe symptoms from it than anyone else (Fischer 2020). It is still unclear why this is so. While our children were seemingly safe, our elderly were bearing a much larger burden of mortality than expected. Being over the age of 65 was the earliest predictable risk factor to be identified for COVID-19. Large-scale studies from Spain, England and a number of other European countries revealed that age was by far the strongest predictor of mortality risk (O'Driscoll et al. 2020; Pastor-Barriuso et al. 2020; Ward et al. 2020): as of April 2021, 80% of COVID-19 related deaths in the US occurred among people aged 65 or over (CDC 2021). Similar patterns have been observed globally, with the WHO's 5 October 2020 Epidemiological Update revealing that approximately 75% of deaths were occurring amongst those aged 65 years and above (WHO 2020). Increased age coincides not only with a greater likelihood of multiple comorbidities, but also with a greater reliance on polypharmacy, which may interact with the viral pathogenesis in harmful ways (Romero Starke et al. 2020). Furthermore, greater susceptibility and severity of the disease in the elderly can be attributed to compromised immunity, which is common in old age (Franceschi et al. 2000; Gruver et al. 2007).

Age as a risk factor for disease is not unexpected, and the mechanisms are quite well-understood: interferons play a critical role in the early stages of an infection by triggering an immediate, intense local response to viral invasion (Zhang et al. 2020). The surprising thing is the extent to which this risk is compounded by other factors. Being male also quickly emerged as a risk factor in the sense of a higher risk of both severe COVID-19 and death. Interferon response again provides a plausible explanation for this difference. Bastard et al. (2020) found that 94% of patients with interferon-attacking antibodies were male. Other immune differences, such as the presence of more robust T-cell activation and larger amounts of neutralizing antibodies in women, may also explain the gender differences.

As well as differences in immune function associated with age and gender, behavioural variation associated with gender norms play a part too. Men are more likely to engage in higher levels of alcohol consumption and smoking due in part to the socializing pressures of hegemonic masculinity, which tend to valorize the denial of pain, weakness and health concerns (Mahalik et al. 2007). For instance, 50% of men in China smoke compared to only 2% of women due to the greater acceptability of smoking according to dominant notions of Chinese masculinity (Abate et al. 2020). Similarly, in pre-pandemic Italy, women at the age of 43.3 (sample mean) were less likely than men to smoke or consume alcohol, apparently due to their greater valuation of fitness and bodily health (Oncini and Guetto 2018). Smoking clearly increased one's chances of adverse COVID-19 outcomes, with smokers being 1.4 times more likely to develop severe COVID-19 symptoms compared to non-smokers (Vardavas and Nikitara, 2020). Given the critical role of ACE-2 as the main receptor for SARS-CoV-2 cellular entry, this may be explained by the increased expression of ACE-2 receptors among smokers (Cai 2020). Similarly, alcohol consumption has been associated with increased cardiovascular risk, which is a predominant driver of cardiomyocyte-specific increased transcription of ACE2 (Tucker et al., 2020). Social and behavioural factors therefore intersect with the physiological in producing higher male risk of comorbidities and ACE-2 expression, which increases their chances of catching and/or dying from severe COVID-19.

Interactions linking the biology of COVID-19 with age and gender are further exacerbated when socioeconomic deprivation is a factor. A large body of empirical evidence has shown the stark inequalities in the incidence and severity of COVID-19 across the socioeconomic spectrum. For instance, Williamson et al.'s (2020) large-scale study of COVID-19 patients in the UK found a consistent pattern of increased mortality with greater deprivation measured in terms of income, employment, health, education and deprived living environments, as well as crime and barriers to housing. Compared to the least deprived quintile, the most deprived quintile of patients were 79% more likely to pass away from COVID-19 (ibid.). Similar patterns were observed in South Korea, where lower income levels were associated with an increased risk of COVID-19 infection – a reduction in income of 5% was associated with an increase of 1% in COVID-19 risk (Oh et al. 2021). In Chile too, infection fatality rates due to COVID-19 were significantly higher in low-income municipalities, with the socioeconomic status of municipalities being directly related to disease incidence and mortality (Mena et al. 2021).

Given that person-to-person transmission occurs primarily via contact with the mucosae or conjunctiva of infected individuals, decreasing social interaction and maintaining physical distance can significantly reduce infection rates (Matrajt 2020). However, the most deprived

members of society, who largely work in manual jobs and the service industry (Drury et al. 2020), are unable to participate fully in such distancing and thus benefit from it. This limits the work and life choices available to lower-income households. Although many in such categories are aware of the need for safe distancing, the ability to work from home and engage in tele-working is directly related to income level (Papageorge et al. 2020: 11). Lower-income individuals tend to work in high-contact jobs for which teleworking is not an option, placing them at a significantly greater risk of exposure and infection (Drury et al. 2020: 689).

The limiting confines of socioeconomic structures and their interaction with transmission dynamics is especially evident in the poor living conditions of lower-income neighbourhoods, where high population densities, poor ventilation, inadequate sanitation and a limited water supply create the perfect conditions for 'super-spreading events' and secondary transmission (Nishiura et al. 2020). This 'slum effect' has been widely reported in existing epidemiological research on communicable diseases (Butala et al. 2010; Turley et al. 2013), and it can reasonably be applied to COVID-19, which has seen similar concentrations of infections in geographically bounded communities of poverty, such as the refugee camps of Idlib (Conway 2020), overcrowded migrant-worker dormitories in Singapore (Reuters 2020) and the urban *favelas* of Brazil (Reeves 2020).

In addition, it has been well-established that micronutrient deficiencies contribute to an increased risk of infection by dampening the body's immune response (Bourke et al. 2016) and that such nutrient deficiencies are widely apparent in low-income groups (Nikolić et al. 2014). This not only enhances susceptibility to COVID-19, it also increases disease severity, as elevated nutrition risks have been positively associated with adverse clinical outcomes in COVID-19 patients (Zhao et al. 2020). Chronic stress and pollution from environmental and endocrine-disrupting chemicals, both prevalent in impoverished neighbourhoods, have also been linked to mitochondrial damage that is potentially worsened by the cellular invasion of SARS-CoV-2, increasing the risk of complications such as organ failure due to sepsis (Yao and Lawrence 2020). In addition, people living in poverty face reduced access to healthcare, which can significantly impair the timeliness of their treatment. This is a known critical factor in combating disease progression and complications.

Conditions of poverty hence overlap and intersect with ethnicity in increasing the risk of COVID-19 incidence and severity. Age and gender also layer risk upon poverty and ethnic vulnerability, as the physiological and behavioural attributes of older men further increase the risks of immune impairment and comorbidities associated with higher fatalities. These syndemics of COVID-19 and obesity, diabetes and cardiovascular disease, among others, reveal the critical roles

of age, gender, ethnic and socioeconomic inequalities underlying ill-health at multiple intertwined levels.

Intersecting vulnerabilities

The evidence is clear that disease risks are compounded by multiple intersectional characteristics such as those discussed above. Although this is not new, what is particular to the COVID-19 pandemic is that global lockdowns have meant that essential, front-line workers bear the brunt of the risks and that these very workers are very often from minority and lower income groups. In his analysis of COVID-19 mortality rates, McLaren (2020) draws important links between occupation, ethnicity and socioeconomically linked modes of transportation. He notes a strong correlation between health-supporting occupations, such as home health aides, nursing assistants and hospital orderlies, and increased mortality rates, which account for a significant degree of the relationship between ethnicity and COVID-19 mortality amongst Hispanic, Latino and Asian American populations. A similar relationship is observed with personal care and support occupations, such as barbers, manicurists and fitness instructors. We therefore see how these minority communities tend to occupy essential occupations in both the service and health-care industry that place them at a greater risk of mortality given the higher risks of transmission in such high-contact settings. At the same time, McLaren notes how Hispanic, Latino and Asian Americans rely disproportionately upon public transportation for their daily commuting, which accounts for another significant proportion of the correlation between ethnicity and COVID-19 mortality. Ethnicity thus intersects with occupation and transport mode, which are both functions of and contributors to lower socioeconomic status, producing higher rates of COVID-19 mortality among minority essential workers in America.

A similar layering of risk is observed among care-home residents in the UK, where the density of transmission within institutional settings builds upon age and ethnicity in creating an intersectional population of extreme vulnerability. Indeed, recent reports from the Care Quality Commission (2020) in the UK reveal a worrying disparity in COVID-19 deaths between white and non-white care-home residents. While COVID-19 was responsible for 44% of the deaths among White residents living in care homes, highlighting the already high mortality rate among seniors, it accounted for 54% and 49% of deaths among their Black and Asian counterparts. Admittedly the causal links remain speculative, but such alarming statistics nonetheless point to the ways in which ethnicity and age intersect within the highly concentrated populations of care homes, creating death rates that should not and must not be perpetuated. In this way, COVID-19 has acted to increase social inequalities and, as described by Spellman (this collection), the media, the

authorities and the public have to some extent justified this by elevating front-line workers to hero status.

Conclusion

There is overwhelming evidence that the exigencies of the COVID-19 crisis cannot be separated from the ongoing structural inequalities within society. Socioeconomic, sex- and age-based and ethnic disparities that produced different levels of suffering in pre-COVID times are being perpetuated, reproduced and reinforced in the current crisis, manifesting themselves in different infection and mortality rates. These work together in producing particularly vulnerable intersectional populations, whose outsized burden of COVID-19 mortality begs further action in research, understanding and political action.

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