Warning signs

Concerns about a possible association between ethnicity and outcome were raised after the first 10 doctors in the UK to die from covid-19 were identified as being from ethnic minorities.[3] These concerns were confirmed by observational data from the Intensive Care National Audit and Research Centre, showing that a third of covid-19 patients admitted to critical care units are from an ethnic minority background.[4] Of 2249 patients admitted to 201 critical care units in England, 64.8% were white, 13.8% were Asian, 13.6% were black, and 7.8% were from other or mixed ethnic groups. Patients had a mean age of 60.1 years. Importantly these unadjusted descriptive data take no account of factors other than ethnicity that could influence the risk of critical care admission.

Ethnic minority groups have also been disproportionately affected by covid-19 in the US, highlighting potential racial, economic, and other inequalities.[5] An analysis by the *Washington Post* reports that that counties with black majorities have three times the rate of covid-19 cases, and almost six times the rate of deaths, compared with counties where white residents are in the majority.[6] The US experience may be influenced, however, by the lack of universal healthcare, unlike the UK, and caution is required when extrapolating across different health systems.

To get a clearer picture of ethnic disparities in incidence and outcome in the UK, we need detailed national data reported by ethnic group. This could be done through linking ethnicity data from Hospital Episode Statistics or Public Health England to mortality data from the Office of National Statistics. We welcome the announcement that the NHS and Public Health England will lead a review of the evidence on why ethnic minority populations seem to be disproportionately affected by covid-19.

Potential reasons

The higher observed incidence and severity in minority groups may be associated with socioeconomic, cultural, or lifestyle factors, genetic predisposition, or pathophysiological differences in susceptibility or response to infection. Possible susceptibilities include an increased risk of admission for acute respiratory tract infections,[7] an increased prevalence of Vitamin D deficiency,[8] vaccination policies in their country of birth and immune effects,[9] increased inflammatory burden, and higher prevalence of cardiovascular risk factors such as insulin resistance and obesity than white populations.[10] Some of these are also risk factors for increased disease severity in covid-19.[11]

Interest has also focused on the possibility of ethnic differences in the the expression of angiotensin converting enzyme 2 (the host receptor for SARS-CoV-2),[12] and risk of both acute kidney injury[13] and cardiac complications[14] because of a higher prevalence of cardiovascular risk factors in ethnic minority populations.

Ethnic minority communities are also more likely to be socioeconomically disadvantaged than white communities and often live in extended cohabiting families, potentially increasing the risk of virus transmission. Ethnic minorities in the UK and US have been shown to face several disadvantanges, including poor housing, overcrowding, and being more likely to be employed in low paid essential jobs,[3][15] all of which make social distancing more challenging.

These suggestions require urgent exploration through robust analysis of routinely collected prospective data on covid-19, including age, sex, underlying morbidity, place of residence, area clustering, sociodemographic factors, laboratory measures, and burden of undiagnosed disease to determine if the observed signal between ethnicity and covid-19 outcomes is real or an artefact. Some of these data are already available. However, mixed methods research will be required to fully understand the complex interplay between the various biological, social, and cultural factors underlying these early findings.