

Socio-economic deprivation and the risk of death after ICU admission with COVID-19: The poor relation

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To the Editor,

The mortality of coronavirus-2019 disease (COVID-19) in hospitalised patients is currently reported as being 26% in the United Kingdom.¹ Increased severity of COVID-19 has been associated with advanced age, male gender, obesity, and comorbidities such as diabetes and chronic cardiac disease.¹ In addition, the incidence of COVID-19 is higher in those who are socio-economically disadvantaged.² The relationship between deprivation and health inequality is established, with a national study of admissions to critical care in the United Kingdom demonstrating an association between increased mortality and greater degree of socioeconomic deprivation.³ To date, little is known about the effect of existing deprivation on the outcomes of patients admitted to ICU with COVID-19. Here, we report from Glasgow, a city with some of the highest levels of socio-economic deprivation in Western Europe.⁴

We studied all consecutive patients admitted to the ICU of the Queen Elizabeth II University Hospital, Glasgow, with confirmed SARS-CoV-2 infection, between 19 March 2020, and 15 June 2020. Data were collected on patient demographics, pre-morbid health status, clinical parameters, and laboratory variables. Each patient was assigned to a Scottish Index of Multiple Deprivation (SIMD) quintile based on the location of their primary residence.⁵ To explore the relationship between severe deprivation and outcome, we used a Cox proportional hazards regression model. This estimated the association of deprivation with 30-day mortality in those in the bottom quintile (quintile 1, most deprived) versus those who were less deprived (quintiles 2–5). Age at admission, sex, and APACHE II score in the first 24 hours of ICU, were included as potential confounders. P values <0.05 were considered significant. Analyses were conducted in R (R Core Team, 2017).

In total, 62 patients were admitted to ICU with COVID-19. The majority were male (n=47, 75.8%), with a median age of 58 (IQR 52–63) years. All received invasive mechanical ventilation, with a median PaO₂/FiO₂ ratio of 15 (IQR 10.6–20.8) kPa

at commencement. The median APACHE II score in the first 24 hours was 19 (IQR 15–24). The most deprived SIMD quintile accounted for 29 (46.8%) of patients. Overall, the 30-day mortality was 50% (SIMD Q1 62% vs. SIMD Q2–5 39%). The association between SIMD on 30-day mortality is presented in Figure 1. After adjusting for age, sex, and APACHE II score, socio-economic deprivation was associated with an almost 3 times higher hazard in this cohort (HR 2.9, 95% CI 1.3–6.5, p=0.04). Age and sex were also independently associated with an increased hazard of death.

These data are limited by several factors, including the number of patients, the single-centre nature of this study, and the presence of other potential

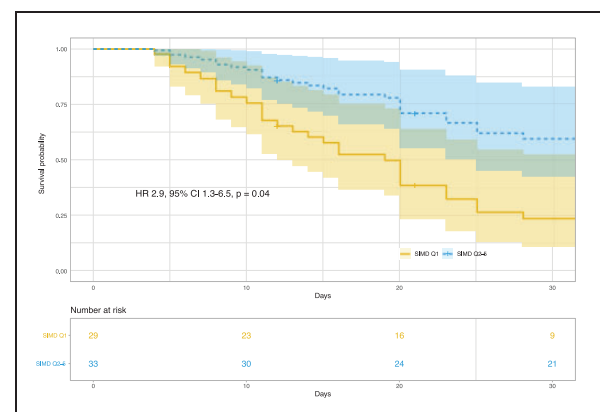


Figure 1. Kaplan-Meier plot of SIMD (Quintile 1 vs. Quintile 2–5) and 30-day mortality following ICU admission adjusted for age, sex and APACHE II score at admission. Shaded areas indicate the 95% confidence intervals.

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confounders, such as pre-existing conditions, which have not been corrected for. However, the possibility that some of the most vulnerable in society remain at increased risk of adverse outcomes after COVID-19, when age, sex, and disease severity are accounted for, should provoke urgent investigation. Socio-economic deprivation should not remain the poor relation of COVID-19 risk factors.

Ethics approval

This study was deemed not to require formal ethical approval by NHS Greater & Glasgow Clyde Research & Development under a public health exception. Permission for the study was sought from and granted by the local Caldicott Guardian.

Availability of data and material

The authors will share de-identified data on reasonable request.

Code availability

The authors will share reproducible R code for the study analyses on reasonable request.

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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