LETTER

Ethnicity/race and economics in COVID-19: meta-regression of data from counties in the New York metropolitan area

‘NYC residents from low-income communities have tested positive for COVID-19 antibodies at a higher-than-average rate, underscoring the disproportionate impact of the disease on people of colour, Governor Andrew Cuomo said on Wednesday’ (20 May 2020) (https://www.reuters.com/article/us-health-coronavirus-usa-new-york/new-york-citys-low-income-minority-areas-hit-hardest-by-COVID-19-cuomo-says-idUSKBN22W2IG). Ethnicity/race and economics may affect prevalence/case fatality of COVID-19. To determine whether COVID-19 prevalence/fatality is modulated by ethnicity/race and economics, meta-regression of data from the counties in the New York (NY) metropolitan area was conducted.

We selected 31 counties in the NY metropolitan area (New York–Newark, NY-NJ-CT-PA Combined Statistical Area). (1) Prevalence/case-fatality rates of confirmed COVID-19 cases (20 May 2020) and (2) ethnicity/race and income/poverty estimates were obtained in each county. We performed random-effects meta-regression using OpenMetaAnalyst (http://www.cebm.brown.edu/openmeta/index.html). The covariates were listed in online supplemental table S1. Statistically significant (p=0.05) covariates in the univariable model were together entered into the multivariable model.

Results of the meta-regression are summarised in table 1. A slope (coefficient) of the univariable meta-regression line for COVID-19 prevalence was not significant for household income, whereas the coefficient was significantly positive for black (p=0.015), Hispanic/Latino (p<0.001) and poverty (p=0.026) (figure 1), which indicated that COVID-19 prevalence increased significantly as black, Hispanic/Latino and poverty increased. The multivariable model revealed that the slope was significantly positive for only Hispanic/Latino (p<0.001). The coefficient in the univariable model for COVID-19 fatality, however, was not significant for all the covariates (table 1).

The present meta-regression suggests that black, Hispanic/Latino and poverty may be positively associated with COVID-19 prevalence. Especially, Hispanic/Latino may be ‘independently’ associated with COVID-19 prevalence. According to the most recent (19 May 2020) data of the NYC Health, the age-adjusted case/death rate (/100 000-people) was higher (1.5-/2.0-fold) in Hispanic/Latino and black/African-American than in White. The case/death rate (/100 000-people) was also higher (1.5-/2.3-fold) in very-high poverty than in low poverty. These findings may partially strengthen the present results. It is unclear (1) why

Figure 1 Meta-regression graph depicting the COVID-19 prevalence (plotted as the logarithm transformed prevalence on the y-axis) as a function of a given factor (plotted on the x-axis).
Hispanic/Latino (neither black nor poverty) is independently associated with COVID-19 prevalence or (2) why none of black, Hispanic/Latino and poverty is associated with COVID-19 fatality, which demonstrated in the present study. Disparity of ethnic and racial health should be identified and addressed in the long-term legislation to improve social welfare would be introduced to address vulnerability in subjects with the most economical disadvantage.

In conclusion, black, Hispanic/Latino and poverty, especially Hispanic/Latino independently, may be associated with COVID-19 prevalence. There may be no association of black, Hispanic/Latino, poverty and household income with COVID-19 fatality.


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REFERENCES


Table 1 Summary of meta-regression

<table>
<thead>
<tr>
<th>Outcome</th>
<th>Covariate</th>
<th>Coefficient</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>P value</th>
<th>Multivariable P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence</td>
<td>Black (%)</td>
<td>0.021</td>
<td>0.004</td>
<td>0.038</td>
<td>0.015</td>
<td>0.377</td>
</tr>
<tr>
<td></td>
<td>Hispanic or Latino (%)</td>
<td>0.031</td>
<td>0.019</td>
<td>0.043</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Poverty rates</td>
<td>(%)</td>
<td>0.039</td>
<td>0.005</td>
<td>0.074</td>
<td>0.026</td>
<td>0.229</td>
</tr>
<tr>
<td>Median income (US$)</td>
<td></td>
<td>–0.000</td>
<td>–0.000</td>
<td>0.000</td>
<td>0.639</td>
<td>–</td>
</tr>
<tr>
<td>Case fatality</td>
<td>Black (%)</td>
<td>0.006</td>
<td>–0.005</td>
<td>0.018</td>
<td>0.286</td>
<td>–</td>
</tr>
<tr>
<td></td>
<td>Hispanic or Latino (%)</td>
<td>–0.001</td>
<td>–0.011</td>
<td>0.010</td>
<td>0.916</td>
<td>–</td>
</tr>
<tr>
<td>Poverty rates</td>
<td>(%)</td>
<td>0.003</td>
<td>–0.020</td>
<td>0.026</td>
<td>0.811</td>
<td>–</td>
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<tr>
<td>Median income (US$)</td>
<td></td>
<td>–0.000</td>
<td>–0.000</td>
<td>0.000</td>
<td>0.854</td>
<td>–</td>
</tr>
</tbody>
</table>

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Contributors HT had full access to all of the data and takes responsibility for the integrity of the data and the accuracy of the data analysis. Concept and design: HT; acquisition, analysis or interpretation of data: HT, TK, YH, TA; drafting of the manuscript: HT; critical revision of the manuscript for important intellectual content: TK, YH, TA; statistical analysis: HT, TK, TA; administrative, technical or material support: YY, HU, TM; supervision: TA.

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