Masks Reduce Viral Inoculum of SARS-CoV-2

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In their article, Gandhi et al.¹ underscored the importance of wearing face masks for reducing transmission of SARS-CoV-2 virus, and for keeping infection levels low among patients whereby they remain asymptomatic. The main pathway through which the latter is achieved is argued to be via reductions in virus inoculum. However, the evidence seems to have been narrowly interpreted in that there was little mention of the importance of patients' nutritional and health status and genomics for SARS-CoV-2 viral load dynamics that ultimately determines disease severity and the chances of death.

First, the authors seem unsure of the ethics of human challenge trials that plan to infect healthy volunteers with SARS-CoV-2 virus.² An implication of the Gandhi et al. hypothesis is that deliberately infected volunteers should wear face masks though this seems an inadequate strategy. More importantly, it is critical to assess volunteers' micronutrient and health status and markers for inflammation such as C-reactive protein levels that are likely to affect the dynamics of plasma RNA levels.³

Second, in a related vein, it has been suggested that higher plasma 25 (OH) D concentrations can enhance immunity against SARS-CoV-2,⁴ presumably due to reduced vitamin D synthesis among bats from where such viruses originate. Thus, in addition to wearing face masks, it would seem prudent to provide nutritional supplements especially in poor countries where micronutrient deficiencies are widely prevalent.³ Furthermore, viral load dynamics needs to be modelled using data on patients rather than at the country level. For example, while Gandhi et al. note that individuals in East Asian countries may be more easily persuaded to wear face masks, social distancing is not practicable in densely populated slums of south Asia so that face masks are likely to provide lower protection against the virus.

Lastly, SARS-CoV-2 infections appear to induce "imbalanced" host responses in cytokine production especially among patients with co-morbidities.⁵ Thus, it is plausible that

the SARS-CoV-2 virus rapidly multiplies in certain individuals despite low virus inoculum. Such individuals are likely to become severely ill and often end up in intensive care units. Overall, while wearing face masks should be an essential component of public health strategies for preventing SARS-CoV-2 spread, it is important to devise broader policies that incorporate the role of individual health and nutritional status and socio-demographic factors.

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