Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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LETTER TO EDITOR

G6PD deficiency in the COVID-19 pandemic: ''Ghost within Ghost''

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To the Editor,

There are about 350 million people with glucose-6-phosphate dehydrogenase (G6PD) deficiency worldwide [1]. The highest prevalence of G6PD deficiency is in the Arabian Peninsula and tropical Africa [1]. The highest prevalence of G6PD-Mediterranean, WHO class II severe deficiency (<10% activity), is in the Arabian Peninsula and the west Asia [1]. In Al-Ahsa area in Saudi Arabia, the G6PD deficiency prevalence is about 23% in males and 13% in females, of which 85% is due to G6PD-Mediterranean [2].

An *ex vivo* study has shown that G6PD-deficient cells are more vulnerable to human coronavirus infection than G6PD-normal cells [3]. Up to the time of writing this letter, the association between G6PD deficiency and novel coronavirus disease (COVID-19) is absent in COVID-19 reports. This absence could be because G6PD deficiency was overlooked during the current COVID-19 pandemic. One may argue that using hydroxychloroquine to treat COVID-19 was less likely, as hydroxychloroquine needs to be used cautiously in G6PD deficiency [4,5]. Another reason for this absence could be that G6PD deficiency in the countries most affected by COVID-19 is rare and/or of the mild type. In Hubei province in China, the origin of COVID-19, the incidence of G6PD deficiency is only 0.098% and about 50% of these are due to WHO class III mild type [6]. We are anticipating that a report outlining the association between G6PD deficiency and COVID-19 may come from countries in which severe G6PD deficiency is very common. Such report is needed urgently. In Saudi Arabia, G6PD deficiency is not included in the list of diseases requiring additional precautionary measures to reduce risk of COVID-19. As per the traditional notion, ''absence of evidence is not evidence of absence", it may be prudent to include G6PD deficiency in this list.

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G6PD deficiency can be a challenge during the COVID-19 pandemic. The above-cited *ex vivo* study has found that α-lipoic acid can attenuate the vulnerability of G6PD-deficient cells [3]. Thus, α-lipoic acid has been proposed as a treatment option for infection with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) that causes COVID-19 [4]. Hydroxychloroquine has been proposed as a treatment for COVID-19 and clinical trials have been started evaluating this proposal. Hydroxychloroquine has oxidative properties that could decrease glutathione levels and may cause severe hemolysis in G6PD-deficient patients [5]. If hydroxychloroquine is found to be the silver bullet for COVID-19, then this may be a big challenge in treating COVID-19 in G6PD-deficient patients. Accordingly, it is prudent to use additional precautionary measures to prevent COVID-19 from reaching G6PD-deficient individuals.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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