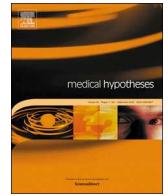




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## Infection-iron interaction during COVID-19 pandemic: Time to re-design iron supplementation programs



To the Editor,

Several countries with high prevalence of nutritional anaemia implement population based iron supplementation programs for anaemia reduction. With large population sections in these countries likely to be infected with COVID-19 in the coming months, weighing the potential benefits vs risks of iron supplementation during the pandemic is important to ensure that the program causes no unintended harm.

Although iron supplementation in iron deficient individuals offers immune enhancing benefits, it can also exacerbate infections and inflammation [1]. Evidence in the context of SARS-CoV and MERS-CoV suggests that iron is important for viral replication [2]. In addition, inflammation during SARS-CoV2 infection (Appendix 1) could promote hepcidin production which inhibits iron uptake in the gut (limiting the impact of supplemental iron) and can lead to iron sequestration in macrophages, enterocytes and hepatocytes. Due to presence of Angiotensin Converting Enzyme-2 receptors, SARS-CoV2 may colonize these cells, and the sequestered iron could be utilized for viral replication. Enhanced hepcidin production favouring viral persistence has been demonstrated in Hepatitis C [3]. In SARS-COV-2, a hepcidin mimetic action of viral spike protein has also been reported [4]. Moreover, iron chelators are considered to be promising adjuvants to treat the disease [2]. Furthermore, oral iron supplementation in the presence of inflammation may lead to enhanced oxidative stress and adverse gut microbiome [1].

We are, therefore, concerned about the safety and effectiveness of iron supplementation programs during COVID-19 pandemic. Temporary cessation of the program would deprive millions of beneficiaries from the immune enhancing benefit of iron. Screening for iron deficiency before iron supplementation may not work because markers such as ferritin may be elevated during viral infection despite low body iron stores. Strategies like screening for hepcidin (to predict iron absorption) and / or C-reactive protein (to identify inflammation) using point-of-care tests followed by supplementation, therefore, merit evaluation.

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### Declaration of Competing Interest

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### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.mehy.2020.110173>.

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