



# Micronutrients as a Possible and Modifiable Risk Factor for COVID-19 During Pregnancy

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Received: 19 March 2022 / Accepted: 1 April 2022 / Published online: 7 April 2022  
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I read with great interest the article written by Anuk et al. that aimed at determining trace element status (zinc, copper and magnesium) on pregnant women with COVID-19 [1]. The COVID-19 pandemic has affected the entire population including pregnant women [2]. A review of literature has highlighted that the potential complications due to the COVID-19 infection during pregnancy should not be underestimated because these complications can threaten both the health of mothers and neonates [3]. The authors reported that serum zinc concentration decreased, while serum magnesium and copper concentrations increased in pregnant women diagnosed with COVID-19 when compared to pregnant women not diagnosed with COVID-19 (as control group) [1].

Due to the complicated clinical condition of COVID-19 in pregnant women, the management of COVID-19 during pregnancy is difficult and challenging [3]. This is because during pregnancy, the immunological and physiological changes in pregnant women increase susceptibility to viral infections. Due to increased transverse diameter of the thorax and the elevation of the diaphragm, this decreases the tolerance to hypoxia in pregnant women [4]. As a result of the changes in lung volume and vasodilation, this causes mucosal edema and increased secretion in the respiratory tract of pregnant women [4]. Several adverse pregnancy outcomes including intrauterine growth restriction, spontaneous abortion and preterm birth have been reported in pregnant women with COVID-19 [3].

Several risk factors that have been identified to be related to COVID-19 have underlying relationship with nutritional status. This is because some specific nutrients including Zn, Cu, Se and Fe are known to play an important role in ensuring an adequate immune response [5–8]. Deficiencies and/

or excessive levels of these micronutrients may be associated with reduced resistance of the body immune system to SARS-CoV-2 infection and COVID-19 [9]. The findings by the authors were also consistent with the literature [1]. It may be a reasonable hypothesis that in addition to meeting increased maternal micronutrient requirements, adequate nutrient supplementation of these micronutrients in pregnant women with moderate or marginal nutrient deficiencies of these micronutrients may be beneficial in improving COVID-19 cure rate.

However, it is imperative that the clinicians and health-care professionals should not overstate these findings. This is because other possible confounding factors such as age, presence of chronic diseases and nutrient deficiencies, quality of healthcare facilities and COVID-19 treatment were not taken into consideration. For example, advanced age and comorbid diseases (such as diabetes and hypertension) have been reported as important risk factors for mortality associated with COVID-19. Therefore, this would then allow for a more comprehensive and detailed analysis investigating the possible association between COVID-19 cure rate and nutritional (micronutrient) status. Further clinical studies conducted in population groups positive for COVID-19 with moderate or marginal nutrient deficiencies are warranted to produce more convincing results. The evolving information will contribute to the evidence base for the roles of micronutrients in supporting normal functions of immune system in populations, including pregnant women.

## Declarations

**Conflict of interest** The author declares no competing interests.

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## References

1. Anuk AT, Polat N, Akdas S, Erol SA, Tanacan A, Biriken D, Keskin HL, Tekin OM, Yazihan N, Sahin, (2021) The relation between trace element status (zinc, copper, magnesium) and clinical outcomes in COVID-19 infection during pregnancy. *Biol Trace Elem Res* 199:3608–3617
2. Zhang Y, Ma ZF (2021) Psychological responses and lifestyle changes among pregnant women with respect to the early stages of COVID-19 pandemic. *Int J Soc Psychiatry* 67:344–350
3. Asmussen SA, Smulian JC, Lednicky JA, Wen TS, Jamieson DJ (2020) Coronavirus disease 2019 (COVID-19) and pregnancy: what obstetricians need to know. *Am J Obstet Gynecol* 222:415–426
4. LoMauro A, Aliverti A (2015) Respiratory physiology of pregnancy: physiology masterclass. *Breathe (Sheff)* 11:297–301
5. Taheri M, Bahrami A, Habibi P, Nouri F (2021) A review on the serum electrolytes and trace elements role in the pathophysiology of COVID-19. *Biol Trace Elem Res* 199:2475–2481
6. Tsuchiya H (2022) Gustatory and saliva secretory dysfunctions in COVID-19 patients with zinc deficiency. *Life* 12:353
7. Kieliszek M (2022) Selenium in the prevention of SARS-CoV-2 and other viruses. *Biol Trace Elem Res*. <https://doi.org/10.1007/s12011-022-03208-4>
8. Ivanova ID, Pal A, Simonelli I, Atanasova B, Ventriglia M, Rongioletti M, Squitti R (2022) Evaluation of zinc, copper, and Cu: Zn ratio in serum, and their implications in the course of COVID-19. *J Trace Elem Med Biol* 71:126944
9. Richardson D, Lovegrove J (2021) Nutritional status of micronutrients as a possible and modifiable risk factor for COVID-19: a UK perspective. *Br J Nutr* 125:678–684

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