

Comment: Do Maternal Micronutrient Deficiencies Program the Body Composition and Behavior of the Offspring? Probable Underlying Mechanisms

Dolat Singh Shekhawat¹ Pratibha Singh² Praveen Sharma³ Kuldeep Singh¹

¹Department of Pediatrics, All India Institute of Medical Sciences Jodhpur, Jodhpur, Rajasthan, India

²Department of Obstetrics and Gynaecology, All India Institute of Medical Sciences Jodhpur, Jodhpur, Rajasthan, India

³Department of Biochemistry, All India Institute of Medical Sciences Jodhpur, Jodhpur, Rajasthan, India

Address for correspondence Kuldeep Singh, MD, Department of Pediatrics, All India Institute of Medical Sciences Jodhpur, Jodhpur 342005, Rajasthan, India (e-mail: kulpra@hotmail.com).

Ann Natl Acad Med Sci (India)

We read with great interest article titled “Do Maternal Micronutrient Deficiencies Program the Body Composition and Behavior of the Offspring? Probable Underlying Mechanism.”¹ We wish to congratulate the authors for the extensive review. While authors have focused on selective micronutrients indicating that prenatal micronutrients restriction leads to altered body composition, epigenetic phenomenon, change in lipid/fat metabolism, and anxiety like behavior in mother and offspring in rodent model. However, some additional information may also be highlighted in their review.

Micronutrient access can also be associated with adverse effects on developing fetus. Rahimi et al found that though moderate dose folic acid supplementation reduced DNA methylation variance at certain imprinted genes in embryonic and placental tissues, high dose supplementation exacerbated the negative effects of assisted reproductive technology (ART) at imprinted loci. A high dose of folic acid during pregnancy in mice showed deleterious outcomes such as DNA hypomethylation, epigenetic abnormalities, and delay in embryonic development.²

Further, micronutrient selenium (Se) plays a critical role in fetal development that needs to be highlighted. The researchers, using C57BL/6 mice model, demonstrated that maternal Se deficiency leads to reduced fetal weight and increased plasma tetraiodothyronine and triiodothyronine concentrations. This was associated with reduced expression of seleno-dependent deiodinases, DIO2, and DIO3. Se defi-

ciency reduced fetal glucose concentrations, leading to reduced fetal weight³ evidence supported by another study on human conception and pregnancy.⁴ Current research, however, does not recommend use of Se during pregnancy due to insufficient evidence, lack of measurable markers to assess the effect of Se supplementation on the human metabolism, and Se’s narrow therapeutic index.⁵

Conflict of Interest

None declared.

References

- 1 Anand KK, Shampa G, Anju ET, Raghunath M. Do maternal micronutrient deficiencies program the body composition and behavior of the offspring? Probable underlying mechanisms. *Ann Natl Acad Med Sci (India)* 2019;55(04):170–181
- 2 Rahimi S, Martel J, Karahan G, et al. Moderate maternal folic acid supplementation ameliorates adverse embryonic and epigenetic outcomes associated with assisted reproduction in a mouse model. *Hum Reprod* 2019;34(05):851–862
- 3 Hofstee P, Bartho LA, McKeating DR, et al. Maternal selenium deficiency during pregnancy in mice increases thyroid hormone concentrations, alters placental function and reduces fetal growth. *J Physiol* 2019;597(23):5597–5617
- 4 Pieczyńska J, Grajeta H. The role of selenium in human conception and pregnancy. *J Trace Elem Med Biol* 2015;29:31–38
- 5 Hubalewska-Dydejczyk A, Duntas L, Gilis-Januszewska A. Pregnancy, thyroid, and the potential use of selenium. *Hormones (Athens)* 2020;19(01):47–53

DOI <https://doi.org/10.1055/s-0042-1743135>.
ISSN 0379-038X.

© 2022. National Academy of Medical Sciences (India). All rights reserved.

This is an open access article published by Thieme under the terms of the Creative Commons Attribution-NonDerivative-NonCommercial-License, permitting copying and reproduction so long as the original work is given appropriate credit. Contents may not be used for commercial purposes, or adapted, remixed, transformed or built upon. (<https://creativecommons.org/licenses/by-nc-nd/4.0/>)

Thieme Medical and Scientific Publishers Pvt. Ltd., A-12, 2nd Floor, Sector 2, Noida-201301 UP, India