Proceedings of the Nutrition Society (2023), **82 (OCE4)**, E248 doi:10.1017/S0029665123003245

Irish Section Conference 2023, 14–16 June 2023, Understanding the role of sex and gender in nutrition research

A pilot study investigating the relationship between serum Se concentrations and Selenoprotein P activity at 28wks gestation in a high fish-eating sub-cohort of Seychellois pregnant women

M. Wesolowska[1], A.J. Yeates[1], E.M. McSorley[1], J.J. Strain[1], E. van Wijngaarden[2], G.J. Myers[2] and M.S. Mulhern[1]

[1]*Nutrition Innovation Centre for Food and Health, Ulster University, Coleraine and*
[2]*The Department of Community and Preventive Medicine, University of Rochester School of Medicine and Dentistry, Rochester, New York, United States*

Sufficient selenium (Se) is crucial for a healthy pregnancy, and Se insufficiency has been linked to numerous pregnancy complications[(1)]. Se, which is incorporated into selenoproteins, including Selenoprotein P (SePP), is necessary for the activation of thyroid hormones, for maintaining oxidative balance, and for antioxidant defence[(2)]. SePP is primarily involved in the transfer of Se throughout the body including the trans-placental transport of Se to the foetus during pregnancy[(3)]. It is suggested that SePP expression is optimal when circulating serum Se concentrations are between 90–140 μg/L[(4)], albeit the optimal range for pregnant women is still uncertain. As SePP has antioxidant properties that protect the foetus from oxidative stress and promotes healthy foetal development, optimal SePP expression is essential throughout pregnancy. During gestation, a pregnant woman's daily requirement for Se increases to 70 μg/day[(5)]. Fish is a rich source of Se, and fish consumption is positively correlated with serum Se status in pregnancy[6]. However, research on SePP activity in the pregnant population is limited, particularly those with high fish consumption.

The objective of this pilot study is to determine SePP activity and to investigate the relationship between serum Se concentrations and SePP activity in a high fish-eating pregnant population by using a sub-cohort of pregnant Seychellois women.

A total of n = 1536 pregnant women were enrolled onto the Seychelles Child Development Study Nutrition Cohort 2 between 2008 and 2011. Women provided at 28 weeks' gestation a non-fasting blood sample, which was assessed for total serum Se concentrations using inductively coupled plasma mass spectrometry (ICP-MS) at Ulster University. A validated commercial sandwich ELISA kit (selenOtestTM, selenOmed GmbH, Berlin, Germany) was used in accordance with the manufacturer's instructions to measure maternal serum SEPP concentrations.

The median (IQR) total serum Se concentration of the SCDS NC2 cohort was 102 (92, 115) μg/L (n = 1,491) and median (IQR) SePP activity was 4.7 (3.85, 6.34) mg/L for a randomly selected sub-cohort (n = 214). Spearman correlation analysis showed a significant positive relationship between serum Se concentration and SePP activity ($r = 0.470$, $P < 0.001$).

Owing to higher fish consumption of an average 8.5 fish meals/wk, the serum Se concentrations observed in this study are higher than that observed in other pregnancy cohorts[7] such as the UK's SCOPE cohort, where the median plasma Se concentration and SePP activity during early pregnancy were 79.6 (73.1, 86.8) μg/L and 3.4 (3.0, 3.8) mg/L respectively[8]. Whilst serum Se concentrations between 90 and 140 μg/L[(4)], are considered the optimal range for maximising SePP expression, there is currently no optimal reference range during pregnancy and furthermore a limited knowledge on SePP activity in pregnant populations. Further research is needed to determine the ideal range of selenium concentrations required for maximal SePP expression in pregnancy.

Acknowledgments

The authors gratefully acknowledge the contribution of the Child Development Study team in Seychelles, which includes nurses, nutritionists, laboratory and other support personnel. This work was supported by grants from the US National Institute of Environmental Health Sciences, the National Institutes of Health and the Government of Seychelles.

References

1. Duntas (2020) *Thyroid Res* **13**(1), 16.
2. Mehdi (2013) *Molecules* **18**(3), 3292–3311.
3. Kasik & Rice (1995) *Placenta* **16**(1), 67–74.
4. Hurst (2013) *Crit Rev Food Sci Nutr* **53**(10), 1077–1096.
5. EFSA (2014) *EFSA Journal* **12**(10), 3846.

Article updated 27 September 2023.