

# Role of Trace Elements, Oxidative Stress and Immune System: a Triad in Premature Ovarian Failure

- [Authors](#)
- [Authors and affiliations](#)

---

- Priyanka Verma
- Aparna K Sharma
- Hari Shankar
- Alpana Sharma
- D. N. Rao

## Abstract

The risk of premature ovarian failure (POF) increases in association with alteration in immunological parameters and oxidative stress (OS). Adequate intake of trace elements is required for antioxidant property and immune defense mechanism. The aim of this study was to explore the involvement of trace elements, OS, and immunological parameters in POF. This was a cross-sectional, case-control study, involving 65 participants divided into the POF ( $n = 35$ ) and control ( $n = 30$ ) groups. Serum levels of Se, Zn, and Cu were determined along with hormonal, OS, and immunological markers. POF group had significantly lower levels of Zn, Cu, Se, and Zn:Cu ratio. However, Se:Cu ratio was not significant between the groups. FSH and LH levels were negatively correlated with Zn and Cu levels and positively correlated with Se levels. Estrogen levels were negatively correlated with all the studied trace elements. Inter-element association between Zn and Se was significant in POF ( $r = -0.39$ ,  $p = 0.02$ ) compared to control group ( $r = -0.078$ ,  $p = 0.65$ ). In all the POF patients, SOD and GPx activities were significantly ( $p < 0.05$ ) lower and MDA level was higher ( $p > 0.05$ ) than control group. B cell marker CD19 was significantly ( $p < 0.0001$ ) high in POF group. There are involvement of trace elements in hormonal regulation and antioxidant defense mechanism, which once gets altered leads to high ROS generation and affect functions of the immune system. Exaggerative immune system causing higher expression of B cell associated markers (CD19) leading to autoimmune condition in POF.