

Zinc micronutrient deficiency and its association with Preeclampsia: A Systematic Review.

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Introduction

In the context of micronutrient deficiencies and their association with preeclampsia (PE), this discussion primarily focuses on the role of zinc. Preeclampsia is a significant concern in public health, particularly among women of reproductive age in low and middle-income countries.^{1,2} Globally, PE contributes to the death of approximately 76,000 women and 500,000 babies annually, with a higher risk for women in low-income countries.³ A substantial proportion of gestational deaths are considered preventable. PE can lead to severe complications such as intracranial hemorrhage, placental abruption, HELLP syndrome, acute pulmonary edema, respiratory distress syndrome, and acute renal failure, making it a major cause of maternal mortality.³ Preeclampsia is defined by the International Society for the Study of Hypertension in Pregnancy (ISSHP) as elevated blood pressure (systolic ≥ 140 mmHg and/or diastolic ≥ 90 mmHg) on at least two occasions after 20 weeks' gestation, along with other maternal organ dysfunctions or uteroplacental dysfunction.⁴ While various micronutrients such as calcium, vitamin D, vitamin E, vitamin C, and iodine have been extensively studied in relation to PE, this discussion now turns to zinc. Notably, the Brazilian Federation of Gynecology and

Obstetrics (FEBRASGO) recommends calcium supplementation for pregnant women at risk of PE, but there is insufficient scientific evidence to support the use of vitamin D, vitamin C, or vitamin E in reducing PE prevalence.^{5,6} A systematic review was conducted to analyze the connection between micronutrients and preeclampsia (PE), focusing on zinc.

Results and Discussion

Various databases were searched for clinical studies between January 2000 and April 2022, following PRISMA guidelines and registered in PROSPERO (CRD42022302298). Cochrane's risk of bias tool and Joanna Briggs Critical Appraisal Tools were used to assess study quality, categorizing reports as green (good), yellow (fair), or red (poor) based on quality, and risk of bias as green (low), yellow (moderate), or red (high) based on methodological rigor. Research on the relationship between serum zinc concentration and preeclampsia has produced a wide range of findings, as summarized in Table 1. However, it's important to note that many of these studies exhibit varying degrees of bias and quality issues. Notably, studies conducted by Elmugabil 2016, Lewandowska 2020, and Acikgoz 2006 failed to adequately stratify and define the methods used for measuring patients' blood pressure and

evaluating them properly. This lack of detail introduces a significant source of bias, which subsequently diminishes the overall quality and reliability of their research. The studies mentioned suffer from various biases and methodological flaws. Bakack (2015) shows significant variation between groups without adequate explanation. Kolusari (2008) compares preeclamptic women only with non-pregnant ones, an inappropriate comparison. Jamal (2017) includes a wide age range, potentially masking true causes. These limitations were considered when interpreting their findings.

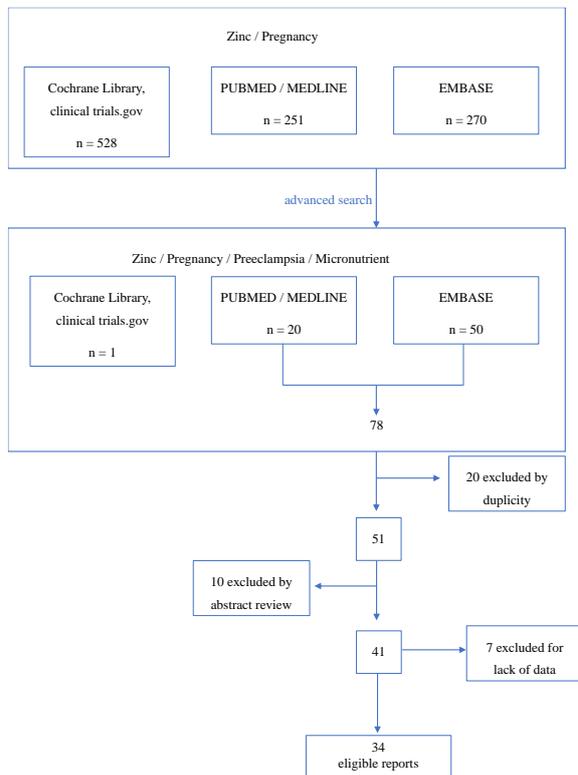


Figure 1. Flowchart for eligible reports

CATEGORY	ARTICLE QUANTITY
GOOD	2
FAIR	18
BAD	14
TOTAL	34

Table 1. Analysis of Article Quality

Conclusions

Most studies on zinc and preeclampsia exhibit high bias risk and lack clarity. As a result, no conclusive recommendation can be made regarding zinc's use during pregnancy. There's a need for rigorous randomized trials. Additionally, accurate blood pressure measurement in pregnant women must be emphasized, including cuff size adjustments for obesity. The meta-analysis is currently being conducted.

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