KSN 2022
SEOUL, KOREA MAY 26 - 29

Abstract Submission No. : 1361

EFFECT OF ZINC SUPPLEMENTATION ON NUTRITIONAL STATUS IN CHILDREN WITH CHRONIC KIDNEY DISEASE : A SYSTEMATIC REVIEW

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Objectives: Chronic Kidney Disease (CKD) is a chronic disease with severe long-term consequences. There are some issues in children with CKD not evident in adults, such as the impact of the disease on growth. Malnutrition, metabolic acidosis, mineral and bone disorders, anemia and fluid and electrolyte abnormalities in CKD are risk factors that contribute to impaired growth. Zinc is a multifunctional metal compatible with satisfactory growth, health and well-being. Zinc deficiency (ZnD) worsens kidney complications. This systematic review evaluates the effect of zinc supplementation on children with CKD.

Methods: We conducted a systematic review of all studies published between 2012 – 2022, on outcome of zinc supplementation on children with CKD. Through a comprehensive search on PubMed and Cochrane Library. Terms used in this research were included MeSH headings for zinc and pediatric CKD. We identified one eligible study. Risk of bias analysis was performed using the Cochrane Risk of Bias Tool.

Results: 48 CKD patients aged between 1-18 years were included in our systematic review. 24 patients took 30 mg/day zinc supplementation (Group A) and 24 patients took 15 mg/day zinc supplementation (Group B) for 12 months. There were more patients with positive change in BMI Z-score ($p = 0.020$), serum albumin ($p = 0.032$), CRP levels ($p < 0.0001$) and SZC ($p = 0,032$) in group A compared with group B. In contrast, there were more patients with a negative change in H/A Z-score and CRP levels ($p < 0.050$) in group B and serum albumin ($p < 0.050$) in group A.

Conclusions: Zinc supplementation may be beneficial for nutritional status in children with CKD due to the fact that participants may have improved their nutritional status through the slight but significant gain in their body mass, especially with 30 mg/day of zinc supplementation.

Table 2. Review of study

NO	TITLE	AUTHOR (YEAR)	STUDY DESIGN	STUDY POPULATION	INTERVENTION	OUTCOME
1	Effects of Zinc Supplementation on Nutritional Status in Children with Chronic Kidney Disease: A Randomized Trial	Marlene Fabiola Escobedo-Monge , Guido Ayala-Macedo, Graciela Sakihara, Silvia Peralta, Ana Almaraz-Gómez, Enrique Barrado and J. M. Marugán-Miguelsanz	A randomized-trial multicentric study	48 CKD (23 females) patients under 18-years-old, for a year	24 patients took 30 mg/day zinc supplementation (ZS) (Group A) and 24 patients took 15 mg/day zinc supplementation (Group B) for 12 months. Anthropometric measurements and biochemical analysis were performed. Hypozincemia was determined by serum zinc concentration (SZC) using atomic absorption spectrophotometry. The positive or negative change in patients' body mass index (BMI) Z-score, serum albumin, zinc and C-reactive protein (CRP) levels were used to evaluate the effect of ZS.	Mean SZC was normal before and after ZS. Despite ZS, there were no significant changes in serum albumin, zinc and CRP levels. A positive and significant association was observed between SZC and serum albumin before ($p = 0.000$) and after ($p = 0.007$) ZS. In both groups of ZS, there was a small but positive and significant change in body mass and normalization in BMI Z-score, hypoalbuminemia, hypozincemia and high CRP, especially with 30 mg/day of ZS.

Table 1. Review

Figure 1. systematic review flowchart

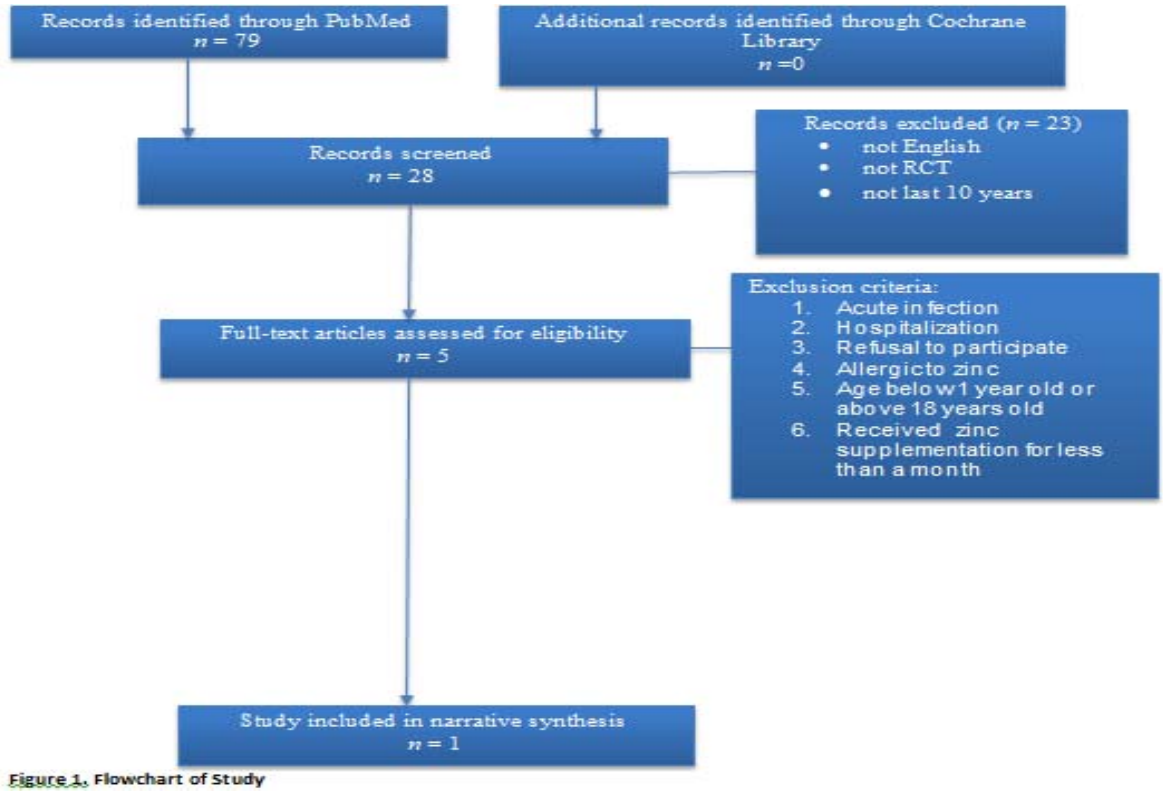

Figure 1. Flowchart of Study