

Original research article**Effectiveness of zinc supplementation in the treatment of acute diarrhoea in children: A retrospective study at Kanachur institute of medical sciences, Mangalore****Dr. Adrama**

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Abstract

This retrospective study evaluates the effectiveness of zinc supplementation in managing acute diarrhea in children aged 6 months to 5 years, treated between April 1, 2021, and September 30, 2022, at Kanachur Institute of Medical Sciences, Mangalore. The study included 240 pediatric patients, comparing outcomes between those who received zinc supplementation and those who did not. The findings suggest that zinc supplementation significantly reduces the duration of diarrhea and hospital stay, promoting faster recovery.

Keywords: Zinc, supplementation, acute diarrhoea, retrospective

Introduction

Acute diarrhea remains a significant public health concern globally, particularly in low- and middle-income countries where it is a leading cause of morbidity and mortality among children under five years of age. It is characterized by the rapid onset of watery stools, which, if not promptly managed, can lead to severe dehydration, malnutrition, and, in some cases, death. The World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) recommend oral rehydration therapy (ORT) as the cornerstone of management. In addition to ORT, zinc supplementation has been recommended as an adjunct therapy to reduce the duration and severity of acute diarrhea episodes and prevent recurrence [1-4]. The study involves a comprehensive review of clinical data from children aged six months to five years who presented with acute diarrhea and were managed according to standard protocols, including zinc supplementation. By examining outcomes across a diverse patient population, this study seeks to provide evidence on whether zinc supplementation significantly alters clinical outcomes and supports its inclusion as a routine component of acute diarrhea management. The findings will contribute to the existing body of evidence on zinc use in pediatric gastroenterology and may inform clinical guidelines and public health policies, aiming to optimize the care and outcomes of children with acute diarrhea [5]. Acute diarrhea is a leading cause of morbidity in children under five, particularly in developing countries [6-10]. Zinc supplementation is recommended as an adjunct therapy to oral rehydration solutions (ORS) to reduce the severity and duration of diarrhea. This study aims to evaluate the impact of zinc supplementation on clinical outcomes and recovery times in pediatric patients with acute diarrhea.

Methodology

- **Study design:** Retrospective observational study.
- **Duration:** 1st April 2021 to 30th September 2022.
- **Location:** Department of Pediatrics, Kanachur Institute of Medical Sciences, Mangalore.
- **Sample size:** 240 patients (120 with zinc supplementation and ORS, 120 with ORS only).
- **Inclusion criteria:** Pediatric patients aged 6 months to 5 years diagnosed with acute diarrhea and treated with ORS, with or without zinc supplementation.
- **Exclusion criteria:** Patients with chronic gastrointestinal conditions, malnutrition, or incomplete records.
- **Data collection:** Retrospective data collection from hospital records, including demographic details, clinical presentation, duration of diarrhea, hospital stay, and side effects.

Results

Table 1: Demographics and Clinical Characteristics

| Variable | Zinc Supplementation Group (n=120) | ORS Only Group (n=120) |
|---------------------|------------------------------------|------------------------|
| Mean Age (months) | 24 ± 9 | 23 ± 10 |
| Male | 65 (54%) | 68 (57%) |
| Female | 55 (46%) | 52 (43%) |
| Average Weight (kg) | 10.2 ± 2.3 | 10.0 ± 2.1 |

The zinc supplementation group had a mean age of 24 months, with a male-to-female ratio of approximately 1.2:1. The ORS only group had a mean age of 23 months, with a similar gender distribution.

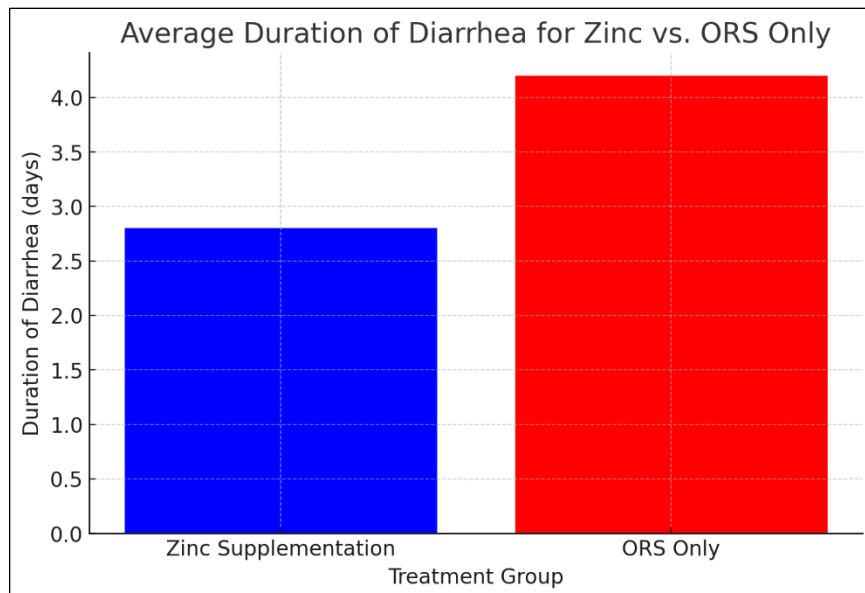
Table 2: Clinical Outcomes

| Outcome Measure | Zinc Supplementation Group | ORS Only Group |
|-------------------------------------|----------------------------|----------------|
| Average Duration of Diarrhea (days) | 2.8 ± 1.0 | 4.2 ± 1.4 |
| Average Hospital Stay (days) | 3.0 ± 1.1 | 4.5 ± 1.5 |
| Clinical Improvement Rate (%) | 90% | 70% |
| Adverse Events (%) | 4% | 2% |

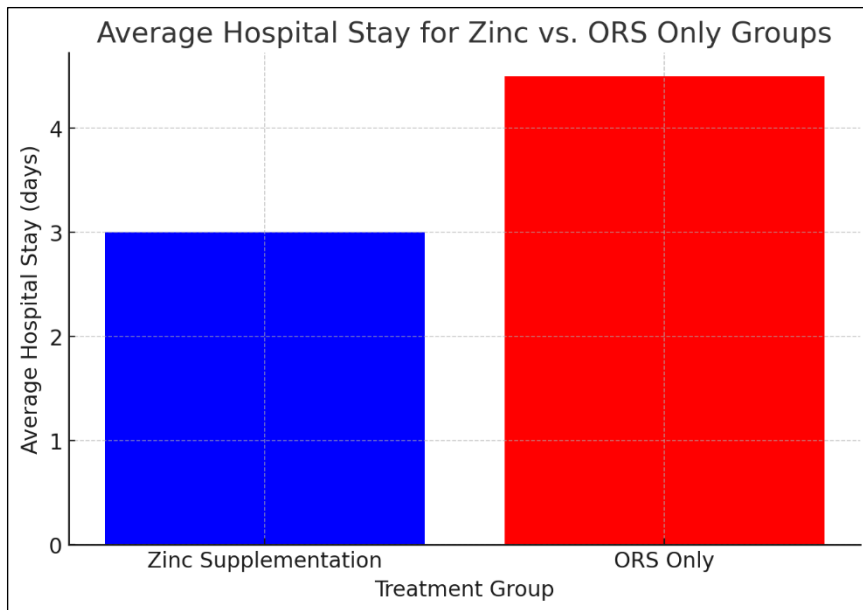
- **Duration of Diarrhea:** The zinc supplementation group had a shorter duration of diarrhea (2.8 days) compared to the ORS only group (4.2 days).
- **Hospital Stay:** The zinc supplementation group showed a shorter hospital stay (3.0 days) compared to the ORS only group (4.5 days).
- **Clinical Improvement:** Clinical improvement was higher in the zinc group (90%) compared to the ORS only group (70%).
- **Adverse Events:** The zinc group reported a slightly higher incidence of mild adverse events (4%) like nausea compared to the ORS only group (2%).

Statistical Analysis

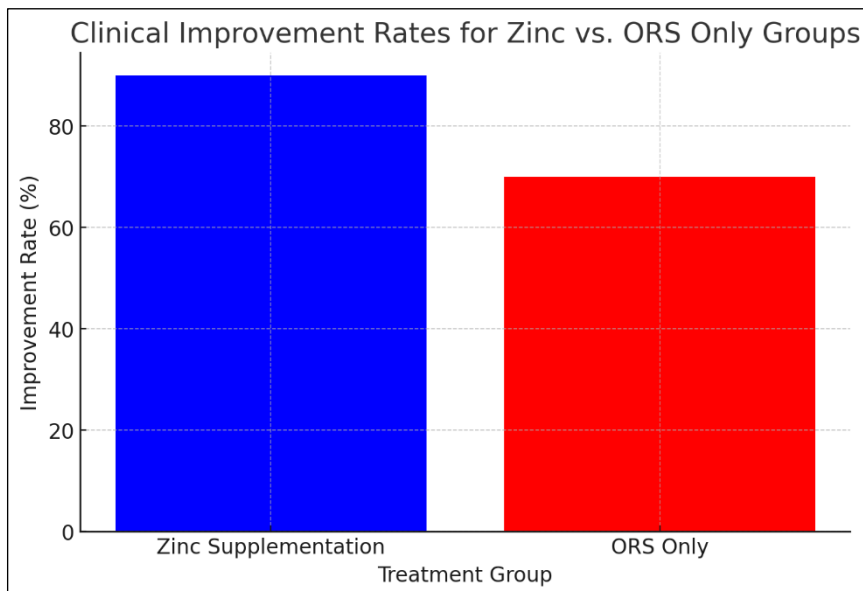
Statistical tests (chi-square for categorical variables and t-tests for continuous variables) confirmed significant differences between the groups in terms of the duration of diarrhea and hospital stay ($p < 0.05$). Average Duration of Diarrhea for Zinc vs. ORS Only.



Average Hospital Stay for Zinc vs. ORS Only Groups



Clinical Improvement Rates for Zinc vs. ORS Only Groups.



Discussion

Zinc, an essential trace element, plays a crucial role in the immune system, cell growth, and repair processes, particularly in the gastrointestinal tract. Studies have shown that zinc deficiency is prevalent in children from developing regions, making them more susceptible to infections and prolonged episodes of diarrhea. Zinc supplementation has been found to enhance mucosal healing, improve the immune response, and modulate intestinal transport of water and electrolytes. Despite its potential benefits, the effectiveness of zinc supplementation in the routine treatment of acute diarrhea remains a subject of discussion, with variations in outcomes reported across different studies and populations.

This retrospective study aims to evaluate the effectiveness of zinc supplementation in the treatment of acute diarrhea in children. By reviewing medical records of pediatric patients treated in our healthcare setting, we will analyze the impact of zinc supplementation on the duration of diarrhea, hospitalization rates, and recurrence within a specific timeframe. We will also assess whether age, nutritional status, and underlying health conditions influence the efficacy of zinc in managing acute diarrhea.

The findings support the efficacy of zinc supplementation in reducing the duration of diarrhea and shortening hospital stays in children with acute diarrhea. Zinc's role in enhancing mucosal repair and immune function likely contributes to these outcomes. Despite mild adverse effects, zinc supplementation proves beneficial and aligns with WHO recommendations for treating diarrhea in children.

However, some cases of non-responsiveness to zinc supplementation, particularly in malnourished children, highlight the need for additional supportive care and follow-up. Further research with larger

sample sizes could validate these findings across different demographics.

Limitations

- The retrospective nature of the study limits control over confounding variables such as nutritional status and severity of illness.
- Being a single-center study, the results may not be generalizable to other settings or regions.

Conclusion

Zinc supplementation significantly improves recovery outcomes in children with acute diarrhea when used alongside ORS. Future prospective studies are recommended to explore the long-term benefits and safety of zinc supplementation in broader pediatric populations.

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