Original Article

Placebo Controlled Trial of Zinc Supplementation on duration of Hospital Stay in Children with Pneumonia

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Abstract

Background: Pneumonia is one of the leading causes of morbidity and mortality in children younger than 5 years of age. Zinc may have an important protective role in cases of childhood pneumonia.

Objectives: To study the effect of zinc supplementation on duration of hospital stay in children (6 months to 5 years) with pneumonia.

Methodology: This Randomized control trial was conducted in the Department of Paediatrics Unit – I, King Edward Medical University / Mayo Hospital, Lahore from January to December 2011. After consent, 150 children from 6 months to 5 years of age with pneumonia consistent with WHO ARI definition along with crepitations on auscultation were registered by non-probability purposive sampling and were randomized into treatment group (Group A) and placebo group (Group B). Seventy five children supplemented with zinc for 14 days while 75 children were supplemented with placebo. Outcome measure was duration of hospital stay. T-test was used to compare the groups.

Results: Out of total study population of 150, majority (35%) of children were below 2 years. There was male predominance (64%). Mean duration of hospital stay was significantly reduced in treatment group (p value < 0.05).

Conclusion: Zinc supplementation results in statistically significant reduction in the duration of hospital stay in children (6 months to 5 years) with pneumonia.

Key words: Children, Duration of hospital stay, Pneumonia, Zinc supplementation.

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Introduction

Pneumonia is a leading cause of childhood morbidity and mortality accounting for an estimated 1.9 million deaths worldwide under the age of 5 years.[1] In Pakis-

tan, the disease is responsible for 20 – 30% of all child death in this age group.[2]

Over the past couple of decades, zinc is being recognized as an important element in maintaining immune function, reducing infections, and enhancing growth. Various international and local studies supported its role in the management of acute and persistent diarrhea.[3,4] This led investigators to evaluate the role of zinc in childhood pneumonia through a series of research trials. In Bangladesh, zinc supplementation of children suffering from pneumonia resulted in mean reduction of 25% in hospital stay.[5] Other trials of zinc in children with pneumonia have also shown that adjuvant treatment with zinc accelerates recovery from severe pneumonia in children.[6,7] The present study was conducted to find out the effect of zinc supplementation on duration of hospital stay in children (6 months to 5 years) with pneumonia.

Material and Methods

This randomized control trial was conducted in the Department of Paediatrics Unit – I, King Edward Medical University / Mayo Hospital, Lahore from January to December 2011. Sample was collected by non-probability purposive sampling. After consent, 150 children from 6 months to 5 years of age with pneumonia consistent with WHO[8] ARI definition and crepitations on auscultation were registered for the study. WHO classifies acute respiratory tract illness as "Severe pneumonia, Pneumonia, No pneumonia: cough or cold". Severe pneumonia is defined as cough or difficult breathing, and at least one of the following; any general danger sign, (ability to breastfeed or drink, vomiting everything, convulsions, lethargy or unconsciousness), chest indrawing or stridor in calm child. Pneumonia is defined as cough or difficult breathing, and fast breathing rate (2 months upto 12 months ≥ 50 / minute, 12 months upto 5 years ≥ 40 / minute). Upper respiratory infection, common cold, otitis media, pharyngitis, acute tonsillitis, foreign body aspiration, aspiration pneumonia, suspected tuberculosis (fever > 2 weeks duration, cough > 30 days of duration, family history of contact tuberculosis), and children on ventilator support were excluded from study.

Among total, 75 children with pneumonia supplemented with zinc with dose of 10 mg / day for ≤ 10 kg or 20 mg / kg for > 10 kg once daily for 14 days, while 75 children suffering from pneumonia were offered placebo. Outcome measure was duration of hospital stay. Each child was treated according to the individual merit. Demographic and clinical data was recorded on pretested proforma and was entered into SPSS

version 17 program for analysis. Descriptive statistics were expressed as frequency tables. T-test was used to compare the groups for outcome measure.

Results

Out of total study population of 150, majority (35%) of children were below 2 years. There was male predominance (64%) (Table 1). Three (4%) children had history of allergy. Mean duration of hospital stay was statistically significantly reduced in treatment group A (p value < 0.05) (Table 2).

Table 1: Distribution of cases by Age and Sex (n = 150).

Variable	Group A n (%)	Group B n (%)
Age		
6m – 2 year	26 (34.7)	26 (34.7)
2 – 3 year	17 (22.7)	17 (22.7)
3 – 4 year	19 (25.3)	19 (25.3)
4 – 5 year	13 (17.3)	13 (17.3)
(Mean ± SD 3.1 ± 0.5 years)		
Sex		
Male	48 (64)	48 (64)
Female	27 (36)	27 (36)

Table 2: Outcome Measure.

Mean Duration of hospitalization	Group A	Group B	p-value
	4.3 days	6.2 days	0.04

Discussion

Zinc plays an important role in the development and maintenance of host defense against infections.[9] The therapeutic benefit of oral zinc is reported to lower the risk of acute respiratory infections and clinical pneumonia in children.[10] Keeping these considerations, the present study was carried out to find out the effect of co-administration of zinc with standard antimicrobial therapy in a double blind randomized controlled clinical trial with duration of hospital stay as primary outcome measure in children with pneumonia. Age and sex were comparable between zinc and placebo groups. We found statistically significant reduction in hospital stay in treatment group in comparison to placebo group along with standard antimicrobial therapy.

Results of present study are comparable with the trial by Brooks et al[6] from Bangladesh that zinc supplementation given with empiric antimicrobial therapy significantly shortened the duration of hospital stay for young children with pneumonia. Iqbal et al[7] also reported similar results from Pakistani children. In contrast, two trials from Nepal[10,11] demonstrated that adjuvant zinc neither reduced the risk of treatment failure nor hasten the recovery from non-severe or severe pneumonia in Nepalese children in the age group of 2 – 35 months of age. The difference in outcome in different trials could be better explained if pre and post- treatment plasma zinc levels estimation would have been done. Present study has also the same limitation that we did not measured serum levels for Zinc.

Conclusion

Zinc supplementation results in statistically significant reduction in the duration of hospital stay in children (6 months to 5 years) with pneumonia.

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