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.

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 Pakistan,
tan, the disease is responsible for 20 – 30% of all child
death in this age group. 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. 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. Other trials of zinc in children with pneumonia have also shown that adjuvant
treatment with zinc accelerates recovery from severe pneumonia in children. 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 ARI definition and crepitatio
ton auscultation were registered for the study. WHO
classifies acute respiratory tract illness as “Severe pneu-
monia, 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 pneu-
monia, suspected tuberculosis (fever > 2 weeks dura-
tion, cough > 30 days of duration, family history of contact tuberculosis), and children on ventilator sup-
port were excluded from study.

Among total, 75 children with pneumonia supple-
mented 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 recor-
ded 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).

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

Table 2: Outcome Measure.

<table>
<thead>
<tr>
<th>Mean Duration of hospitalization</th>
<th>Group A</th>
<th>Group B</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.3 days</td>
<td></td>
<td>6.2 days</td>
<td>0.04</td>
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</table>

Discussion

Zinc plays an important role in the development and maintenance of host defense against infections. The therapeutic benefit of oral zinc is reported to lower the risk of acute respiratory infections and clinical pneumonia in children. 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 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 also reported similar results from Pakistani children. In contrast, two trials from Nepal 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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References


