

# **Assessment of the Efficacy of Vitamin A Supplementation as an Adjuvant Therapy in Children with Pneumonia**

*Thesis*

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

«قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا  
عَلَّمْتَنَا إِنَّكَ أَنْتَ الْعَلِيمُ  
الْحَكِيمُ»

صدق الله العظيم

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## List of Abbreviations

|                      |   |
|----------------------|---|
| <b>AIDS</b>          | Acquired immune deficiency syndrome                         |
| <b>ALRIS</b>         | Acute lower respiratory infection                           |
| <b>BVM</b>           | Broncho vascular marking                                    |
| <b>CAP</b>           | Community acquired pneumonia                                |
| <b>CBC</b>           | Complete blood count  |
| <b>CIE</b>           | Counter immune electrophoresis                              |
| <b>CMV</b>           | Cytomegalo virus  |
| <b>CRP</b>           | Capsular reactive protein                                   |
| <b>e/cy</b>          | Episodes per child-year                                     |
| <b>ESR</b>           | Erythrocyte sedimentation rate                              |
| <b>DOT<br/>ELISA</b> | Dot enzyme linked immune absorbent assay                    |
| <b>GAPP</b>          | Global action plane for prevention and control of pneumonia |
| <b>HB</b>            | Haemoglobin percentage                                      |
| <b>HSV</b>           | Herpes simplex virus  |
| <b>HIB</b>           | Hemophiles influenza type B                                 |
| <b>IRBP</b>          | Inter photo receptor retinol binding protein                |
| <b>LRAT</b>          | Lecithin: retinol acyl transferees                          |
| <b>INF</b>           | Interferon  |
| <b>LA</b>            | Latex agglutination   |
| <b>L</b>             | Lymphocytes   |

|             |                                  |
|-------------|----------------------------------|
| <b>MCH</b>  | Mean corpuscular hemoglobin      |
| <b>MCV</b>  | Mean corpuscular volume          |
| <b>N</b>    | Neutrophiles                     |
| <b>NR</b>   | Natural killer cells             |
| <b>OTC</b>  | Over the counter                 |
| <b>PCP</b>  | Pneumocystitis carinii pneumonia |
| <b>PEM</b>  | Protein energy mal nutrition     |
| <b>RSV</b>  | Respiratory syncytial virus      |
| <b>RES</b>  | Retinoid esteras                 |
| <b>RDA</b>  | Recommended daily intake         |
| <b>RBP</b>  | Retinol binding protein          |
| <b>RARS</b> | Retinoic acid receptors          |
| <b>RXRS</b> | Retinoid x receptors             |
| <b>RA</b>   | Retinoic acid                    |
| <b>RDR</b>  | Relative dose response           |
| <b>SD</b>   | Standard deviation               |
| <b>TLC</b>  | Total leucocytic count           |
| <b>TH</b>   | T-helper                         |
| <b>US</b>   | United states                    |
| <b>VZV</b>  | Varicela zoster virus            |

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## ***Introduction***

Pneumonia is an infection of the lung. It can be caused by many different agents, including bacteria, viruses, fungi and parasites. Its the most common fatal infection acquired by children in the hospitals. In developing countries pneumonia is one of the two most common causes of death, diarrhea is the other (*Stoffman and Phyllis, 1995*).

Incidence of clinical pneumonia in children under five years of age in developing countries is 0.29 episodes per child-year (e/cy). This equates to an annual incidence of 150.7 million new cases, 11-20 million of which are severe enough to require hospital admission (*Rudan et al., 2004*). It was reported that 12% of infants admitted for pneumonia in developing countries died before discharge (*Djelantik et al., 2003*).

Vitamin A deficiency and acute lower respiratory tract infections (**ALRIs**) coexists as an important public health problems in many developing countries. About 190 million preschool children live in areas where they are at risk of vitamin A deficiency whereas 4 million children die each year because of ALRIS (*Fawzi et al., 1998*).

Several reports have suggested benefits of vitamin A in measles, diarrhea, pneumonia, as well as reduction in childhood

mortality. Although a 2000 WHO review concluded that there is no benefit in pneumonia, the current WHO position is that “the official guidelines need to be revised using current evidence” (*Mathew, 2010*).

Vitamin A is an essential micronutrient because it cannot be biogenerated denovo by animals. It must be obtained from plants in the form of provitamin A carotenoids alpha, beta, and gama carotens; and B-cryptoxanthin. These substances can be converted to vitamin A compounds in the body. In USA grains and vegetables supply approximately 55% of vitamin A intake. From food, dairy and meat products supply approximately 30%. Vitamin A as well as provitamin A are fat soluble and there absorption depends on the presence of adequate lipid and protein within the meal (*Nelson, 2008*).

The effects of vitamin A and its metabolites on immunity include potentiation of the antibody response to T-cells-dependant antigens, increase lymphocyte proliferation and cytokine production, restore mucosal function and maintain mucosal integrity (*Semba, 1994*).