

# A Systematic Review On Factors Influencing The Incidence Of Pneumonia In Children.

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## Abstract

Pneumonia is a burden for child mortality. Pneumonia influenced by various modifiable factors, need to understand a factors and health seeking behaviour to prepare community based intervention on pneumonia.

Objectives: 1. To assess the incidence of community acquired pneumonia in Children.  
2. To identify the risk factors for community acquired pneumonia in Children.

Data Sources and Synthesis: This systematic review collected around 65 studies from various data sources such as PubMed, Biomed Central, Plus One, Helinet, Coherence, Google Scholar and Springer link. Based on the selection criteria 25 studies were analysed. The data synthesized on incidence, risk factors and health seeking behaviour and different aspects of pneumonia.

### Interpretation and Conclusion

Various original research studies interpreted the incidence of pneumonia in children and lack of knowledge and practice, poor health seeking behaviour along with environmental factors are worsen the severity of childhood pneumonia. Complete Vaccination and effective use of health services promote the standard of care.

### Recommendation

There is a need of community based intervention to prevent the occurrence of pneumonia and restore the paediatric health.

**Key words:** Risk factors, Health seeking behaviour, Pneumonia

## INTRODUCTION

Pneumonia is one of the major health concern affect the respiratory system .It is defined as consolidation and exudation of lung parenchyma. Pneumonia also termed as lower respiratory tract infection <sup>1</sup>. Many epidemiological studies reported that Incidence and occurrence of pneumonia influenced by various factors along with viral and bacterial infections. Environmental factors play a major role in the incidence of pneumonia <sup>2</sup>.

This type of pneumonia is coined as Community Based pneumonia or Community acquired Pneumonia acutely injure the lungs. Lungs are made up small alveoli. The Alveoli play an important role in gas exchange. CAP damage the lung alveoli and produces sepsis. Sepsis leads to shortage of oxygen consumption <sup>3</sup>. Fast breathing and in drawing of chest are the major clinical manifestation in children. Other Symptoms are cough, fever, loss of weight, fatigue, Shortness of breath and vomiting or diarrhea<sup>4</sup>. Streptococcal Pneumoniae, Haemophilus influenza and Respiratory Syncytial Virus (RSV) are the commonest cause respectively. Pneumonia is one of the leading causes of mortality and morbidity in under- five children. World Health Organization (WHO-2019) declared Pneumonia and Diarrhea are major reason for child death <sup>5</sup>. UNICEF (United Nation International Child Emergency Fund 2021) reported that every second 39 children die due to pneumonia. Worldwide, Pneumonia leads to 14% (740180) of all deaths under five children (UNICEF-2019) <sup>6</sup>.

### Need for the study

Regardless of viral and bacterial causes various risk factors increases the incidence of Community based Pneumonia . Risk Factors are classified into definite, Likelihood and Possible. Malnutrition, low birth weight, Non exclusive breastfeeding (1-4 weeks) Lack of measles immunization, indoor pollution, and crowding are definite risk factors. Parental Smoking, Zinc deficiency, health seeking behaviour of parents (care taker) and Concomitant diseases such as Diarrhea, heart diseases and Asthma are likelihood factors. Mother's education, humidity, high altitude, Vit A deficiency, Birth order and outdoor air pollution are possible factors <sup>7,8</sup>.

Apart from concomitant diseases and deficiency the circumstances play a leading role causes pneumonia. Primary prevention of these aspects requires specific protection to the children <sup>9</sup>.

A systematic review on Community Acquired Pneumonia reported that major cause for pneumonia is respiratory syncytial virus and Mycobacterium pneumoniae. Clinical manifestations are hypoxemia, increased work of breathing were common sign of pneumonia. Oral and Intra venous amoxicillin clauvinate is best antibiotic choice for the treatment of pneumonia in children. The study concluded that CAP is positively influence with mother's knowledge on acute respiratory infection, Early approach to qualified Medical practioner, Better literacy rate, knowledge attitude and practice of mothers. Worst environment, aggravating factors and complications are negatively influence the Pneumonia <sup>10</sup>.

Health restoration and Specific protection directly related to the parental health seeking behaviour. The Health seeking behaviour is the major concert composed of knowledge, attitude, perception and practice <sup>1,3</sup>. Promoting Parental Health Seeking Behaviour is one of the contemporary approach to prevent the incidence community acquired or based pneumonia. Health seeking behaviour indeed to control the various risk factors. This reduces the mortality and morbidity of under -five children. This study intended to scrutinize determinants of pneumonia in children. As a first step the researcher planned a systematic review on factors and incidence of community acquired pneumonia.

### Statement of the Problem

Systematic review on Factors influencing the incidence of pneumonia in children at community setting

### Objectives

1. To assess the incidence of community acquired pneumonia in Children.
2. To identify the risk factors for community acquired pneumonia in Children.

## METHODOLOGY

Systematic review is a research design adopted in this study. Framing the research questions, Reveal the data sources, select the studies, summarizing the findings based on the evidence and Interpreting the findings are the steps followed in this method.

Data sources: Medline, PubMed, Biomed central, Interventional sciences, Google Scholar, plos one, Research Gate, Dovepress, Helinet, Coherence and Springerlink were data sources utilized to collect the studies in various countries related to pneumonia in children. Few qualitative studies collected to enhance the sensitivity. Totally 65 studies were collected from the various sources.

The studies were selected based on the inclusion and exclusion criteria as follows

### Inclusion Criteria

- Studies related pneumonia.
- Studies belongs to the primary research work.
- Studies conducted in age between 1-5 years Children.
- Quantitative and Qualitative studies.
- Studies reported in English language.
- Studies reported in all countries.
- Studies carried over in home care and Hospital settings.

### Exclusion Criteria

- Studies not communicated evidently about methodology and findings.
- Studies published before 2013.
- Review articles

### Summary of the findings

Overall, 25 studies were appropriate as per the selection criteria related to Pneumonia in Children. Totally 22 quantitative studies and 3 qualitative studies were analyzed. Data was extracted from the findings and extraction tables were formulated. Cross sectional, Prospective, retrospective, Case Control and Community based survey were the different research utilized in the selected reviews. Setting of the various studies were India, Canada, ethyopia, Lebanon, Pakistan, South Arabia, Sudan, Tanzania, and USA.

### Interpretation of studies related to Incidence of Pneumonia in children

The findings of the 25 studies complied and data extracted and tables were formulated. Data extracted in the headings of Incidence, Risk factors and Health seeking behaviour. Both quantitative and qualitative studies were analyzed and interpreted.

A retrospective study among 369 children reported that pro adrenomedulin peptide predict the severity of pneumonia .Severe pneumonia observed 0.70 nmol/L [0.55–1.04] of Proadrenomedulin peptide (Todd.A.et al 2021) <sup>11</sup>. A cross sectional study in Taiwan analyzed that Streptococcus pneumoniae (31.6%) was the most common pathogen produce severe pneumonic children's 2 to 5 years of age and Respiratory syncytial virus below 2 years (Hsin Chi et.al,2020) <sup>12</sup>. Incidence of CAP in Lucknow reported as 86.50/ 1000 year. Another study conducted in Ujjain, India explore that incidence of CAP in 270 children is 64% got severe pneumonia. Factors associated with the incidence of severe pneumonia were premature birth, history of measles, incomplete vaccination, a cyanotic congenital heart disease, home treatment tried,

living in a kuchha house, overcrowding, poor ventilation in living area and practicing open defecation (Sunilkumar Kasundrya et al.2020)<sup>13</sup>.

A Community Survey in South Korea observed that annual and seasonal pattern changes mycoplasma pneumoniae and Respiratory Syncytial virus increase the severe pneumonia in children with above 2 years and below 2 years respectively (Eun Lee et al.2020)<sup>14</sup>. Retro respective analysis on pneumonia reported that mortality was high in January between 1 month to 14 years children (Daniel S Farrar et al.2019)<sup>15</sup>. Four months cross-sectional survey of 3351 children age between 2 months to 59 months reported 24.58% (824) get in last 12 months. Of all 4% children were hospitalized (Aswathi et al.2019)<sup>16</sup>. A cross sectional survey at Shandong reported that Proadrenomedullin peptide increase severity of Community acquired pneumonia (Jing C, Hang et al. 2018)<sup>17</sup>. Interpretation of various research studies related to the incidence of pneumonia indicated the influence of various risk factors.

### **Interpretation of the studies related to Risk factors**

Risk factors are the major concern in the incidence and severity of community acquired pneumonia. In this study data extracted from the various reviews about the factors influencing the incidence of CAP in children. In Pakistan, Cross sectional evaluation of 94 children conventional culture reported that Mycobacterium pneumonia and Atypical bacteria and viruses were the etiological agents for the pneumonia in children (Sadia Shakeel et al.2021)<sup>18</sup>. Determinants of pneumonia in children are old age mother, house wife, not having separate kitchen, Compliance to diarrhea and acute lower respiratory tract infection in recently two weeks and parental asthma (G.W Baziel et al.2020,Ethiopia)<sup>19</sup>.

In Mysore, Karnataka reported that Pneumonia in children associated with residence near to traffic roads, automobile shop within 200 m, filling station within 100 m and ground floor car parking. Traffic factors increases relationship with childhood pneumonia. Other risk factors are poor ventilation and living in 1 to 3<sup>rd</sup> floors (Kumar KJ et al 2018)<sup>20</sup>. Modifiable risk factors of CAP analyzed in 113 Tanzania children reported that risk factors are under weight, lack of exclusive breast feeding for 6 months and unclean cooking fuel (Parikh.K et al.2019)<sup>21</sup>. Demographic factors analyzed 100 pneumonic children in Sri Gangaram hospital, University of Lahore pointed that 66% were males, 51% low socio economic Status, 69% mothers were inadequate knowledge 42% in poor sanitation and 55% were exposed to tobacco (Iqra Arshad et al 2019)<sup>22</sup>.

Mass cross sectional Survey conducted among 3671 under five children 2929 mothers in 10929 households reported that 0.49% per child per month reported incidence of pneumonia (0.075 child / year) and it is directly associated with unclean fuel usage found, Partial immunization, poor knowledge of mothers in unhygienic child feeding, hand hygiene and child care (J.Gothankhar et al.2018,India)<sup>23</sup>. A case control study reported that Household crowding, lack of immunization are increase the chance of childhood pneumonia and male gender considered to be a protective factor in CAP (EJ Fonseca Lima et al 2016)<sup>24</sup>.

Various findings related to risk factors and etiological characteristics of pneumonia predicted that health seeking behaviour of the parents or caregiver need to be focused to prevent the mortality and morbidity in children.

### **Interpretation of the findings related to Health seeking Behaviour**

Data extracted from the incidence and risk factors of the Community Acquired pneumonia pointed the need of health seeking behaviour of either parents or care giver is essential to focus. The data collected regarding health seeking behaviour collectively interpreted. A qualitative study reported that mother and caregivers having poor health seeking behaviour, use of traditional medicine as first step for the sickness, not understanding the risk of transmission, considering pneumonia as a common cold and brought their children after symptoms worsen (Purwati N et al. 2021)<sup>25</sup>. A descriptive survey on knowledge, attitude and Practice of mothers of pneumonic children implies that 74.3% had poor knowledge, 91% think pneumonia can be treated in home, 50.7% them treated with home remedies and herbs, and 34% using the over the counter medication (Esraa Ali Mahjoub et al.2020)<sup>26</sup>. The Departement of pediatrics, Saint Joseph University, Lebanon pointed that amoxicillin-clavulanate is very effective in the management and guidelines of pneumonia which reduce the length of stay in the hospital and duration of treatment (Rim Thomas et al.2020)<sup>27</sup>.

A prospective study conducted in Germany reported that comprehensive epidemiological, clinical and biological analyses reported that Decision making of parents, prevention strategies and awareness about the childhood pneumonia improve the care and reduce the mortality rate (Martin Wetzke et al. 2019)<sup>28</sup>. An interventional study related to structured awareness session on pneumonia reported is effective to promote the health seeking behaviour among care givers. Results reveals that 93.0% were adherence towards the intervention. Also, 79.3% raise of awareness from baseline towards the utilization treatment of pneumonia in government health center facilities. (Shally .A et al 2019)<sup>29</sup>.

In Karachi, Pakistan Community Based Survey reported that care giver health seeking behaviour is associated with mothers education, awareness on breast feeding and vaccination. There is a high utilization private sector health services for the standard care. (Salima Kerai, et al.2019)<sup>30</sup>.

A study in Romania reported that pneumonia vaccine coverage was inadequate, 34.5% have not fed the babies exclusively with breast milk even for 4 months, 32% were started complimentary feeding before 4 months ,38.87% parents given self medication , 61.3% used analgesics and antipyretics and only 69.07 % of parents recognized the seriousness of pneumonia ( Pantelimon et.al.2018) <sup>31</sup>.

A qualitative study conducted on the rural north India to evaluate the effectiveness of culturally sensitive messages reported that there is a need to promote the awareness to treat the childhood pneumonia to reduce the morbidity (S.Aswathi et.al 2017) <sup>32</sup>. A Multicentre collaborative care implemented in 53 hospitals in Lebanon among pneumonic children for 1 year reported that it is effective in the care of CAP (Parikh Ket.al.2017) <sup>33</sup>. Early approach to health care services and mothers literacy rate positively associated with less incidence of CAP( Bham SQ et.al.2016) <sup>34</sup>. A qualitative study implies that reduction of mortality due to CAP associated with early recognition of danger signs by the caregiver and confidence in government health services ( Ashwathi.S.et.al.2015) <sup>35</sup>.

Awareness and Health Education about the danger signs pneumonia, utilization of appropriate health services ,Collabrative strategies, Decision making ,promoting exclusive breast feeding for six months, promoting vaccination status and mothers knowledge, attitude and practice are the various components Health seeking behaviour.

Various studies findings explored the health seeking behaviour of care giver urged the need for mass studies to promote this educational aspects to prevent CAP in children.

## CONCLUSION

The studies from India and other countries concluded that implementation of preventive strategies, promotion of parental health seeking behaviour, awareness and Control of modifiable risk factors, effective line of management and Quality care of CAP in order to reduce the mortality and morbidity in children. Risk factors able to modify and eliminated need a attention by the health care professionals .This Systematic review findings enlisted lack of breast feeding and immunization, Delay in the management and recognition of danger signs of pneumonia ,Lack of knowledge ,myths and poor health practices are the risk factors associated with care givers. These risk factors need to be modified by promoting health seeking behaviour. Nurses are the back bone of community health services. Various educational strategies could be implemented to prevent the Burden of Childhood pneumonia in the Community.

## RECOMMENDATIONS.

This systematic review drawn recommendations need to be focused in India .These recommendations focused the preventive Aspects of Childhood pneumonia. Enhancing the health seeking behaviour one of the main component in the contemporary care of Childhood pneumonia.

Evaluate the quality of care provided by the government sector.

Information, Education and Communication programmes could be conducted at both urban and rural areas.

Pneumococcal vaccination awareness needs to be promoted through culture sensitive messages.

Pulse immunization coverage by the government Collaborative research to assess, evaluate and promote the Health seeking behaviour of the caregiver.

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