EFFECT OF SUPPORTIVE TREATMENT ALONG WITH ANTIBIOTIC IN THE TREATMENT OF COMMUNITY ACQURIED PNEUMONIA (CAP) OF CHILDREN ADMITTED IN A TERTIARY LEVEL HOSPITAL IN DHAKA.

A thesis project submitted to the Department of Pharmacy, East West University, Mohakhali, Bangladesh in conformity with the requirements for the degree of Bachelor of Pharmacy (B.Pharm).

Submitted by

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CERTIFICATE

This is to certify that, the thesis "Effect of supportive treatment along with antibiotic in the treatment of Community Acquired Pneumonia (CAP) of children in a tertiary level Hospital in Dhaka" submitted to the Department of Pharmacy, East West University, Mohakhali, Dhaka in partial fulfillment with the requirements for the degree of Bachelor of Pharmacy (B.Pharm) was carried out by Shahriar Hossain (ID: 2006-2-70-094).

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ACRONYMS AND ABBREVIATION

BCG ——— Bacillus Chalmette-Guerin is a Vaccine against tuberculosis

CAP———Community Acquired Pneumonia

DPT———Diphtheria, pertussis and tetanus

EWU———East West University

ICH———Institute of child health

MMR———Measles, Mumps and Rubella

VAP———Ventilatory Associated pneumonia

SSF———Shishe Sasthya Foundation

ABSTRACT

The Community-Acquired Pneumonia one of the most common illness and can affect people of all ages. The aim of the study was to establish the supportive treatment along with antibiotic which will help doctor to improve disease condition and patient relief from Pneumonia. This is a collaborative study between the Department of Pharmacy, East West University and Institute of Child Health and Shisue Shasthy Foundation (ICH & SSF) which carried out from August 2007 to December 2010. This is a descriptive study in which 70 children suffering from Community-Acquired Pneumonia (2 month-5 years). Among 70 children, 66% & 34% were having Community Acquired Pneumonia (CAP). Among the 70 children 51% children received oxygen inhalation. 76% received Nebulization, 45% NG Fluid, 25% received Bronchodilator and 15% received IV Fluid along with antibiotic treatment in case of suffering from Community Acquired Pneumonia (CAP).This study shows that Among the 70 children 90% children received BCG, 99% children received DPT, 99% children received Polio, 24% children received Measles, 34% children received MMR, 8% children received Hepatitis and 3% children received other vaccines in case of Community Acquired Pneumonia (CAP).

CHAPTER-1

INTRODUCTION

1.1 Background

Pneumonia is the major cause of death worldwide and the most significant cause of infectious death in the United States. Each year, approximately 4 million adults are diagnosed with community-acquired pneumonia, leading to 600,000 hospitalizations. The financial impact of this disease is enormous, and medical costs are conservatively placed at $4 billion per year. Even considering the advancing age of our patient population, the incidence of pneumonia has increased steadily over the past decade. Presentation is most common during the winter months, and the incidence of bacterial Community-Acquired Pneumonia increases following influenza outbreaks. However, pneumonia remains an important concern in all months of the year (Bartlett, [illegible]).

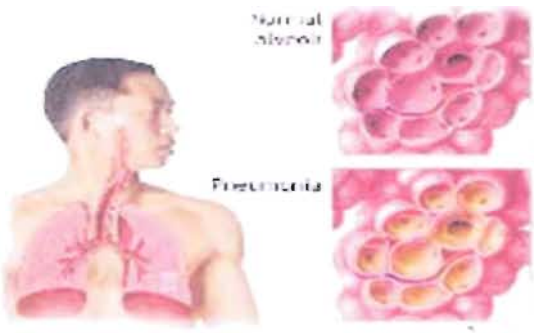


Figure1.1: Comparison between normal alveoli and Pneumonia alveoli

Figure1.2: Hippocrates, the ancient Greek physician.

[illegible] of described pneumonia were described by Hippocrates (406BC-370BC).

[illegible] referred to pneumonia as a disease "named by the ancients". He also reported the [illegible] of surgical drainage of emphysemas. Maimonides (1138-1204 AD) observed "The basic [illegible] which occur in pneumonia and which are never lacking are as follows: acute fever, [illegible] (pleuritic) pain in the side, short rapid breaths, serrated pulse and cough. This clinical [illegible]ion is quite similar to those found in modem textbooks, and it reflected the extant of [illegible] knowledge through the Middle Ages in to the 19th century. Bacteria were first seen in [illegible] airways of individuals who died from pneumonia by Edwin Klebs in 1875. Initial work [illegible]ifying the two bacteria cause *Klebsiella pneumonia* and *streptococcus pneumonia* was [illegible]formed by Carl Friedlander and Albert Frankel in 1882 and 1884, respectively. Friedlander [illegible]al work introduced the Gram stain, a fundamental laboratory test still used to identify and [illegible]egorize bacteria. Christian Gram's paper describing the procedure in 1884 helped differentiate [illegible] two different bacteria and showed that pneumonia could be caused by more than one [illegible]anism (Gram, 1884).

William Osier, known as "the father of modern medicine," appreciated the morbidity and [illegible]ortality of pneumonia, mortality of pneumonia, describing it as the "captain of men of death" in 1918. as it had overtaken tuberculosis as one of the leading cause of death in his time. Several key developments in the 19's improved the outcome for those with pneumonia. With the advent of penicillin and other antibiotics, modern surgical techniques, and intensive the twentieth century, mortality from pneumonia dropped precipitously in the developed country. Vaccination against *Streptococcus pneumonia* adults began in 1977 and in children began in 2000, resulting in a similar decline (Whitney, 1993).

1.3 Pneumonia

Pneumonia is an inflamiratory illness the lung. Frequently, it is described as lung parenchyma or alveolar inflammation and abnormal alveolar filling with fluid (consolidation and exudation).The alveoli are microscopic air-filled sacs in the lungs responsible for absorbing oxygen. Pneumonia

can result from a variety of causes, including infection with bacteria, fungi, or parasite and chemical or physical injury to the lungs. Its cause may also be officially described as idiopathic that is unknown when infectious causes have been excluded. Vaccines to prevent certain types of pneumonia are available (Stedman, 2007).

Pneumonia can happen to people at any age, from tiny babies to really old people. Getting wet doesn't cause Pneumonia instead it is an infection from bacteria or a virus. A cold or flu that gets worse can turn into pneumonia. That's because the cold or flu will irritate the lungs, creating an environment where it's easier for pneumonia germs to move in and start an infection. The bacteria, known as *streptococcus pneumonia* is the main cause of the most typical pneumonia (Milner, 2009).

1.4 Classification

Pneumonias can be classified in several ways. The primary system of classification is the combined clinical classification, which combines factors such as age, risk factors for certain microorganisms, the presence of underlying lung disease or systemic disease, and whether the person has recently been hospitalized. Other classifications include according to the anatomic changes that can be found in the lungs during autopsies, based on the microbial cause, and a radiological classification (Canciani, 2003).

1.4.1 Type of Pneumonia

- Hospital-Acquired Pneumonia(HAP)
- Community-Acquired Pneumonia(CAP)
- Aspiration pneumonia
- Eosinophilic pneumonia (EP)
- Streptococcus pneumonia
- Viral pneumonia
- Fungal pneumonia

- [illegible] pneumonia
- [illegible] pneumonia
- [illegible] obliteranss organizing pneumonia (BOOP)
- [illegible] pneumonia (cubist, 2003).

1.4.1.1 Hospital-acquired pneumonia

Hospital-Acquired Pneumonia, also called nosocomial pneumonia, is pneumonia acquired during or after hospitalization for another illness or procedure with onset at least 72 hrs after admission. The causes, microbiology, treatment and prognosis are different from those of Community-Acquired Pneumonia. Up to 5% of patients admitted to a hospital for other causes subsequently develop pneumonia. Hospitalized patients may have many risk factors for pneumonia, including mechanical ventilation, prolonged malnutrition, underlying heart and lung diseases, decreased amounts of stomach acid, and immune disturbances. Additionally, the microorganisms a person is exposed to in a hospital are often different from those at home. Hospital-acquired microorganisms may include resistant bacteria such as MRSA, Pseudomonas, Enterobacter, and Serratia. Because individuals with hospital-acquired pneumonia usually have underlying illnesses and are exposed to more dangerous bacteria, it tends to be more deadly than Community-Acquired Pneumonia (Mendel, 2004).

1.4.1.2 Pathogenesis

HAP are likely to occur when a sufficiently large number of organisms are delivered to the lower respiratory tract so that host defenses are overwhelmed (e.g.by aspiration or contaminated respiratory therapy equipment), when host defenses are impaired (e.g. by immunodeficiency or steroids), or if particularly virulent organisms are involved. Gram-negative bacteria (GNB) account for 55% to 85% of HAP infections, and gram-positive cocci account for 20% to 30% (Campbell, 1998).

1.4.1.3 Causes

HAP are caused by a spectrum of bacterial pathogens, may be polymicrobial and rarely due to viral and fungal pathogens (unless immunocompromised patients; e.g. bone marrow transplants).

Common pathogens include aerobic gram-negative bacilli (e.g., *Pseudomonas aeruginosa, Klebsiella pneumoniae, Escherichia coli*) as well as gram-positive organisms such as Staphylococcus aureus (Campbell, 19).

1.4.2 Community-Acquired Pneumonia

Community-Acquired Pneumonia (CAP) is an infection of the alveoli, distal airways, and interstitium of the lungs that occurs outside the hospital setting. Characterized clinically by fever, chills, cough, pleuritic chest pain, sputum production. CAP is a common illness and can affect people of all ages. Manifests as four general patterns: Lobar pneumonia, Bronchopneumonia, Interstitial pneumonia, miliary pneumonia (Bartlett, 2000).

1.4.2.1 Etiology

Although the majority of patients diagnosed with Community-Acquired Pneumonia are treated as outpatients, the vast majority of evidence regarding pathogens derived from hospitalized patients. Etiologies for pneumonia include bacteria, viruses, and chemical contaminants. Common infectious agents are *Streptococcus pneumoniae* was the leader (at 13.2%), *Haemophilus influenzae* was second (at 2.5%), and *Mycoplasma pneumoniae* was third (at 1.5%) (Mandell, 1998).

1.4.2.2 Risk Factors that lead to CPA

Heart or lung disorders, cancer, alcoholism, age older than 65, recent use of antibiotics, and a weakened immune system, for example, because of AIDS, organ transplantation, or use of drugs that suppress the immune system (Bartlett, 2008).

1.4.2.3 Symptoms & Signs of CPA

Most typical signs/symptoms: Fever, Cough (nonproductive or productive of purulent sputum), Pleuritic chest pain, Chills and/or rigors, Dyspnea (Bartlett, 2000).

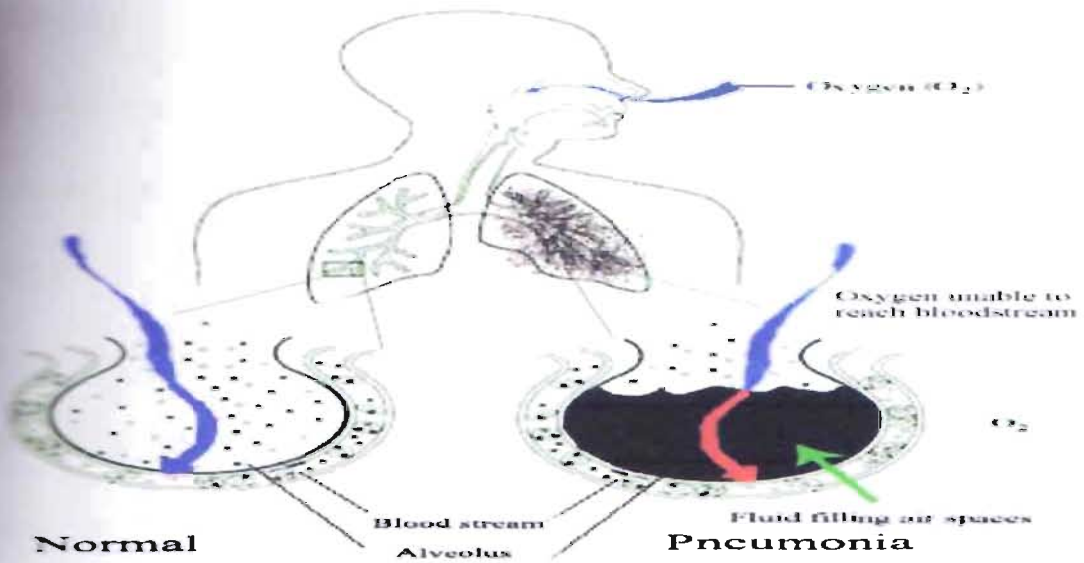


Figure 1.3: Pneumonia fills the lung' alveoli with fluid, keeping oxygen from reaching the bloodstream. The alveolus on the left is normal, while the alveolus on right is full of fluid from pneumonia.

1.5 Symptoms of Pneumonia

1.5.1 General Symptoms: The symptoms of bacterial pneumonia develop very quickly and typically include

- A single episode of shaking chills followed by fever
- Chest pain on the side of the infected lung.
- Severe abdominal pain sometimes occurs in people with pneumonia in the lower lobes of the lung.
- Cough, which may be dry at first, but eventually produces sputum
- Nausea, vomiting, and muscle aches
- Rapid breathing and heartbeat
- Shortness of breath (Barr, 2007).

Emergency Symptoms: Symptoms of pneumonia indicating a medical emergency include the following:

- Blood in sputum
- Bluish-toned (cyanotic) skin
- High fever
- Labored and heavy breathing
- Mental confusion or reduced mental function in the elderly
- Rapid heart rate
- Weight loss (Barr, 2007).

1.5.3 Symptoms in the Elderly

It is important to note that older people may have fewer or different symptoms than younger people. Symptoms may come on much more slowly. An elderly person who experiences even a minor cough and weakness for more than a day should seek medical help. Some elderly people may be confused, lethargic, and show general deterioration (Barr, 2007).

1.6 Causes of Pneumonia

Many germs can cause pneumonia. Examples include different kinds of bacteria, viruses, and, less often, fungi. Most of the time, the body filters germs out of the air that we breathe to protect the lungs from infection (Chong, 2008).

1.6.1 Bacteria

Bacteria are the most common cause of pneumonia in adults. Many types of bacteria can cause pneumonia. Bacterial pneumonia can occur on its own or develop after you've had a cold or the flu. This type of pneumonia often affects one lobe, or area, of a lung. The most common bacterium that cause of pneumonia is *Streptococcus pneumoniae*, or *pneumococcus* (Chong, 2008).

1.6.2 Viruses

Respiratory viruses are the most common cause of pneumonia in children younger than 5 years old. Most cases of viral pneumonia are mild. They get better in about 1 to 3 weeks without treatment. Some cases are more serious and may require treatment in a hospital. The flu virus is the most common cause of viral pneumonia in adults (Chong, 2008).

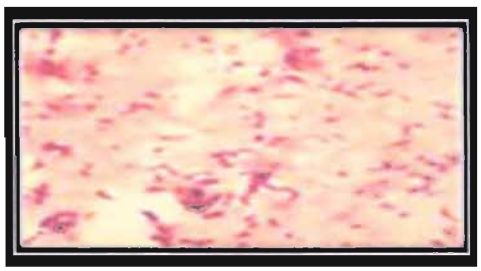


Figure 1.4: virus that cause of pneumonia

1.6.3 Fungi

Not common cause of pneumonia, but serious fungal infections is most common in people who have weak immune systems due to the long-term use of medicines to suppress their immune systems or having HIV/AIDS (Chong, 2008).

1.6.4 Others that involve in CAP

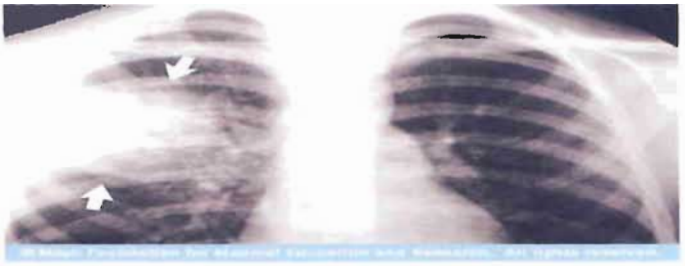
Inhaling liquid, chemicals or dust into the lungs, Overcrowding & un-hygienic living, Poor environment, Indoor pollution-charcoal or wood fumes (Chong, 2008).

1.7 Diagnosis of Pneumonia

It is important to determine whether the cause of CAP is a bacterium, atypical bacterium, or virus, because they require different treatments. In children, for example, S. pneumonia is the most common cause of pneumonia, but respiratory syncytial virus may also cause the disease. Although symptoms may differ, they often overlap, which can make it difficult to identify the organism by symptoms alone. The physician is able to diagnose and treat pneumonia based solely on a history and physical examination (Gilbert, 2001).

[illegible]: During the exam, your doctor listens to your lungs with a stethoscope to [illegible] bubbling or crackling sounds (rales) and for rumblings (rhonchi) that signal [illegible] of thick liquid (Durrington,2008).

[illegible] **X-rays:** X-rays can confirm the presence of pneumonia and determine the extent and [illegible] infection (Durrington, 2008).



[illegible] 1.5: This chest X-ray shows an area of lung inflammation indicating the presence of Pneumonia.

[illegible] **Blood and mucus tests:** You may have a blood test to measure your white cell count and [illegible] for the presence of viruses, bacteria or other organisms. Your doctor also may examine a [illegible] of your mucus or your blood to help identify the particular microorganism that's causing [illegible] illness (Durrington, 2008).

[illegible] Risk factors

[illegible].1 Age: If age 65 or older, particularly if have other conditions that make more prone to [illegible]eloping pneumonia. Very young children, whose immune systems aren't fully developed, also [illegible] at increased risk of pneumonia (Menendez, 2007).

1.8.2 Certain diseases: These include immune deficiency diseases such as HIV/AIDS and chronic illnesses such as cardiovascular disease, emphysema and other lung diseases, and diabetes also at increased risk. And Immune system has been impaired by chemotherapy or long-term use of immunosuppressant drugs (Menendez, 2007).

1.8.3 Smoking, alcohol abuse: Millions of microscopic hairs (cilia) cover the surface of the cells lining your bronchial tubes. The hairs beat in a wave-like fashion to clear your airways of normal secretions, but irritants such as tobacco smoke paralyze the cilia, causing secretions to

accumulate. If these secretions contain bacteria, they can develop into pneumonia. Alcohol interferes with your normal gag reflex as well as with the action of the white blood cells that fight infection (Menendez, 2007).

1.8.4 **Hospitalization in an intensive care unit:** Pneumonia acquired in the hospital tends to be more serious than other types of pneumonia. People who need mechanical ventilation are particularly at risk because the breathing tube bypasses the normal defenses of the upper respiratory tract, prevent coughing, may allow the stomach's contents to back up into the esophagus where they can be inhaled (aspirated), and can harbor bacteria and other harmful organisms (Menendez, 2007).

1.8.5 **Exposure to certain chemicals or pollutants:** Risk of developing some uncommon types of pneumonia may be increased if any one works in agriculture, in construction or around certain industrial chemicals or animals. Exposure to air pollution or toxic fumes can also contribute to lung inflammation, which makes it harder for the lungs to clear themselves (Menendez, 2007).

1.9 Complications of Pneumonia

How serious pneumonia is usually depends on your overall health and the type and extent of pneumonia. If young and healthy, pneumonia often can be treated successfully. If have heart failure or lung ailments, especially smoke, or older, pneumonia may be harder to treat successfully. That can develop complications, some of which can be life-threatening (Menendez, 2007).

1.9.1 Abscesses: Abscesses in lung are thick-walled, pus-filled cavities that are formed when infection has destroyed lung tissue. They, frequently, are a result of aspiration pneumonia if a mixture of organisms is carried into the lung. Abscesses can cause hemorrhage (bleeding) in the lungs. Abscesses are most common with *Staphylococcus aureus* or *Klebsiella pneumoniae*, and uncommon with *Streptococcus pneumonia* (Singh, 2009).

1.9.2 Respiratory Failure: Respiratory failure is one of the main causes of death in people with pneumococcal pneumonia. Failure could occur if pneumonia leads to mechanical changes in the lungs (called ventilatory failure) or O_2 loss in the arteries (called hypoxemic respiratory failure) (Singh, 2009).

Bacteremia: Bacteremia (bacteria in blood) is the most and prevalent complication of infection, although it rarely spreads to others sites. Bacteremia is a frequent complication of infection from other gram-negative organisms, including *Haemophilus* (Singh, 2009).

Empyema and Pleural Effusions: The pleura are 2 thin membranes:

- Lungs are covered by visceral pleura.
- Chest wall are covered by parietal pleura.

In few cases of pneumonia, the pleura become inflamed, that can result in breathlessness and acute chest ache when breathing. And, in about 20% of pneumonia cases, there is build-up of the fluid between the pleural membranes that lubricates the lung (Singh, 2009).

1.9.5 Collapsed Lung: In few cases, air may fill up the space between the pleural membranes, causing the lungs to collapse, a condition called pneumothorax. It can be a complication of pneumonia (specifically *Streptococcus pneumoniae*) or of some of the invasive procedures used to treat pleural effusion (Singh, 2009).

Figure 1.6: Pneumonia and collapsed Lung

1.9.6 Other Complications of Pneumonia: In unique cases, infection may spread from the lungs to the heart and can even spread throughout the body, sometimes causing abscesses in the brain and other organs. Coughing up blood is another potentially serious complication of pneumonia, particularly in persons with other lung problems such as cystic fibrosis (Singh, 2009).

CHAPTER-2

TREATMENT AND MANAGMANT

2.1 Antibiotic use in Pneumonia

2.1.1 Penicillin

The most common penicillin used to treat pneumonia is:

- Amoxicillin
- Amoxicillin-Clavulanate
- Ampicillin-Sulbactam

These antibiotics are often prescribed for people with pneumonia. They can have some side effects. They can damage your liver, but this doesn't happen very often. If any one takes them for a long time, should have regular tests to make sure his/her liver is working normally (Clay, 2003).

2.1.2 Macrolides

The most common Macrolides used to treat pneumonia is

- Azithromycin
- Erythromycin (Clay, 2003).

2.1.3 Cephalosporin

The cephalosporin used to treat pneumonia is either second-generation drugs or third-generation drugs. This means they are a newer type of antibiotic. Some second-generation cephalosporin used to treat pneumonia is

- Cefdinir
- Cefuroxime (Clay, 2003).

Some third-generation cephalosporin's, which are usually used only in the hospital, are:

- Cefotaxime
- Ceftriaxone (Clay, 2003)

2.2.4 Fluoroquinolones

Some fluoroquinolones used to treat pneumonia are:

- Levofloxacin
- Ofloxacin
- Tetracyclines (Clay, 2003).

2.3 Supportive treatment

2.3.1 Oxygen therapy

Moderate to severe pneumonia may result in low levels of oxygen in the blood and require hospitalization and intravenous antibiotic administration if the cause is a bacterial infection. Treatment often includes oxygen therapy, in which extra oxygen is given through nasal prongs or a mask. Supplemental oxygen can help relieve the shortness of breath and ensure that the vital organs, such as the heart and the brain, get enough oxygen. Concentrations of oxygen and the types of devices used vary depending on the severity of an individual's condition, a breathing tube may be inserted into the lungs through the mouth to keep the airway open (intubation). Breathing is then supported by mechanical ventilation. The primary goal of oxygen therapy is to correct alveolar and/or tissue hypoxia. Oxygen therapy increases the amount of oxygen in the lung and the bloodstream (Shankar, 1980).

2.2.1.1 Oxygen delivery systems

Oxygen can be administered conveniently by oro- nasal devices like nasal catheters, cannulae and different types of masks. These are simple, less expensive, and comfortable (Shankar, 1980).

- **Nasal catheter**

The light rubber nasal catheter is inserted after lubricating its tip with liquid paraffin until the tip is visible behind the uvula in the oropharynx (Shankar, 1980).

- **Nasal cannulae**

In hospitalized patients, these cannulae with two soft pronged plastic tubes are inserted about 1 cm in each naris. These are comfortable and well tolerated. These are used in patients without hypercapnia who require supplementary oxygen up to 40%. These can be easily used for domiciliary oxygen therapy. Oxygen has to be humidified while using these (Shankar, 1980).

- **Venturi mask**

It fits lightly over the nose and mouth. Oxygen flowing at a high velocity in the form of a jet through a narrow orifice to the base of the mask creates negative pressure, entraining atmospheric air through the perforations in the face piece. They are available in different forms and can deliver low fixed concentrations of oxygen at 24%, 28%, 35%, and 40%. These are somewhat uncomfortable and have to be removed while eating or drinking. By using oxygen at flow rate of 1, 2, 3 L/min, we can achieve roughly 24%, 28%, and 35% with mask, catheter, or cannulae (Shankar, 1980).

2.2.2 Intravenous Fluid therapy

Coughing may be annoying but it is therapeutic and, when it comes to pneumonia, we want to encourage it, not suppress it. Coughing brings up the pus, mucus, and inflammatory cell products that make our patient sick. If the secretions of the lung are allowed to dry up, the patient will never be able to cough them up. For this reason, IV fluids must be maintained to keep our patient hydrated and keep the respiratory secretions wet (Limper, 2007).

2.2.3 Nebulization

Nebulization is similar to vaporization and involves a piece of equipment called a nebulizer. The nebulizer creates a mist of fine fluid droplets which can be combined with antibiotics or airway dilators. Unlike vaporized droplets, though, these droplets are small enough to penetrate down into the lung. (Vaporizers make larger droplets which mostly penetrate to the sinuses only. They are used to moisten upper airway secretions while nebulizers moisten lower airway secretions). Nebulizer saline or water may carry antibiotics with it thus providing an additional source of moisture and antibiotic for the sick lung thus deeply treating the infection (Limper, 2007).

Figure 2.1: Example of a Nebulizer

2.2.4 Bronchodilator

These drugs work by opening (or dilating) the lung passages, and offering relief of symptoms, including shortness of breath. These drugs are typically given by inhalation (aerosol), but are also available in pill form. If you have bronchitis with your pneumonia, you may receive inhalers for a short period of time. Example of bronchodilator is albuterol, epinephrine, and metaproteroterenol (Limper, 2007).

2.2.5 Zinc Supplementation

Children who lack sufficient amounts of specific micronutrients, particularly zinc, face additional risks of developing and dying from pneumonia. A growing body of research highlights the importance of zinc to child survival and to specifically reducing deaths from pneumonia. Zinc intake helps reduce the incidence of pneumonia and the severity of the disease. Specifically, research has shown that zinc intake during the acute phase of severe pneumonia decreased the duration and severity of pneumonia and reduced treatment failure rates when compared with a placebo intervention improving the zinc status of children is currently being considered by public health and nutrition experts (Bryce, 2005).

CHAPTER-3

PREVENTION

3.1 Pneumonia Prevention

Reducing pneumonia deaths also requires implementing effective prevention measures so that children are healthier and less likely to develop pneumonia in the first place. The prevention measures listed below all show at least some evidence of reducing pneumonia mortality among under-fives. Some research has also suggested that hand washing and lowering indoor air pollution play a role in reducing pneumonia deaths among children in the developing world (Jones, 2003).

3.1.1 Immunization

Immunizations help reduce childhood deaths from pneumonia in two ways. First, vaccinations help prevent children from developing infections that directly cause pneumonia, such as *Haemophilus influenzae* type b (Hib). Second, immunizations may prevent infections that can lead to pneumonia as a complication (e.g. measles and pertussis). Three vaccines have the potential to significantly reduce child deaths from pneumonia. These vaccines include the measles, Hib and pneumococcal conjugate vaccines (Bryce, 2005).

3.1.2 Adequate nutrition

Under nutrition may place children at an increased risk of developing pneumonia in two ways. First, malnutrition weakens a child's overall immune system, as an adequate amount of protein and energy is needed for proper immune system functioning. Second, undernourished children have weakened respiratory muscles, which inhibits them from adequately clearing secretions found in their respiratory tract (Bryce, 2005).

3.1.3 Exclusive breastfeeding

It is widely recognized that children who are exclusively breastfed develop fewer infections and have less severe illnesses than those who are not. Breast milk contains the nutrients, antioxidants, hormones and antibodies needed by the child to survive and develop, and specifically for a child's immune system to function properly. Yet only about one third of infants in the developing world are exclusively breastfed for the first six months of life Infants less than six months old who are not breastfed are at five times the risk of dying from pneumonia as infants who are exclusively breastfed for the first six months of life. Furthermore, infants 6 - 11 months

who are not breastfed are also at an increased risk of dying from pneumonia compared to those who are breastfed (Bryce, 2005).

3.1.4 **Wash hands:** Hands are in almost constant contact with germs that can cause pneumonia. These germs enter body when you touch your eyes or rub the inside of your nose. Washing your hands often and thoroughly and can help reduce your risk. When washing isn't possible, use an alcohol-based hand sanitizer, which can be more effective than soap and water in destroying the bacteria and viruses that cause disease. What's more, most hand sanitizers contain ingredients that keep your skin moist. Carry one in your purse or in your pocket (Singh, 2009).

3.1.5 **Restrict of smoke:** Smoking damages lungs' natural defenses against respiratory infections (Singh, 2009).

3.1.5 **Take care:** Proper rest and a diet rich in fruits, vegetables and whole grains along with moderate exercise can help keep immune system strong(Singh, 2009).

2.1.6 **Get treatment for GERD:** Treat symptomatic GERD, and lose weight if you're overweight (Singh, 2009).

3.1.7 Protect others from infection: If pneumonia is occurring, try to stay away from anyone with a compromised immune system. When that isn't possible, help protect others by wearing a face mask and always coughing into a tissue (Singh, 2009).

3.1.8 Vitamins

Although some research supports the use of vitamin C for the prevention and treatment of pneumonia, most research says it's too early to recommend vitamin C supplements for the general population. These supplements may be helpful for pneumonia patients who are deficient in the vitamin, however (Lee, 2000).

3.2 Vaccines schedule for children

3.2.1 Birth to age 18 months

During Birth period

- Hepatitis B vaccine

The first dose of the hepatitis B vaccine is usually given at birth. A second dose is given at least one month after the first dose (Durrington, 2010).

Age 2 months

- Rotavirus vaccine (RV)
- Diphtheria toxoid, tetanus toxoid and acellular pertussis (DTaP) vaccine
- Haemophilus influenzae type b (Hib) conjugate vaccine
- Pneumococcal conjugate vaccine (PCV)
- Inactivated poliovirus vaccine (IPV)

At age 2 months, a series of several vaccinations usually begins. Combination vaccines are generally recommended to reduce the number of shots (Durrington, 2010).

Age 4 months

- Rotavirus vaccine (RV)
- Diphtheria toxoid, tetanus toxoid and acellular pertussis (DTaP) vaccine
- Haemophilus influenzae type b (Hib) conjugate vaccine
- Pneumococcal conjugate vaccine (PCV)
- Inactivated poliovirus vaccine (IPV)

At age 4 months, follow-up doses to those vaccines received at age 2 months are usually given (Durrington, 2010).

Age 6 months

- Hepatitis B vaccine
- Rotavirus vaccine (RV)
- Diphtheria toxoid, tetanus toxoid and acellular pertussis (DTaP) vaccine

- Haemophilus influenzae type b (Hib) conjugate vaccine
- Pneumococcal conjugate vaccine (PCV)
- Inactivated poliovirus vaccine (IPV) (Durrington, 2010).

Age 12 months

- Haemophilus influenzae type b (Hib) conjugate vaccine
- Pneumococcal conjugate vaccine (PCV)
- Measles-mumps-rubella (MMR) vaccine
- Chickenpox (varicella) vaccine
- Hepatitis A vaccine (Durrington, 2010).

Age 15 months

- Diphtheria toxoid, tetanus toxoid and acellular pertussis (DTaP) vaccine. (Durrington, 2010).

3.2.2 Age 2 years

- Pneumococcal conjugate vaccine (PCV)
- Pneumococcal polysaccharide vaccine (PPSV)
- Hepatitis A vaccine
- Meningococcal conjugate vaccine (MCV4)
- Influenza (Durrington, 2010).

3.2.3 Ages 4 to 5 years

- Diphtheria toxoid, tetanus toxoid and acellular pertussis (DTaP) vaccine
- Haemophilus influenzae type b (Hib) conjugate vaccine
- Pneumococcal conjugate vaccine (PCV)

- Inactivated poliovirus vaccine (IPV)
- Measles-mumps-rubella (MMR) vaccine
- Chickenpox (varicella) vaccine
- Influenza (Durrington, 2010).

3.2.4 Age 7 years

- Meningococcal conjugate vaccine (MCV4)
- Tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine
- Pneumococcal conjugate vaccine (PCV)
- Pneumococcal polysaccharide vaccine (PPSV)
- Hepatitis A vaccine
- Influenza (Durrington, 2010).

3.2.5 Age 11 years

- Tetanus toxoid, reduced diphtheria toxoid and acellular pertussis (Tdap) vaccine
- Human Papillomavirus (HPV) vaccine
- Meningococcal conjugate vaccine (MCV4)
- Influenza (Durrington, 2010).

The aim and objective of this study

The aim or aspiration of this study is following: -

- To find out the treatment pattern of CAP.
- To find out the effectiveness of supportive treatment in pneumonia along with antibiotic treatment.
- To observe the improvement of patient after taking the supportive treatment.

Significance of the study

Pneumonia kills more children less than five years of age than any other illness in every region of the world. Of the estimated 9 million child deaths in 2007, around 20% or 1.8 million were due to pneumonia. In spite of its huge toll on human life, relatively few global resources are dedicated to tackling this problem. Mortality due to childhood pneumonia is strongly linked to malnutrition, poverty and inadequate access to health care. Consequently, more than 98% of pneumonia deaths in children occur in 68 countries where progress in reducing under-five mortality is most critical. This research significantly shows the important of supportive treatment. More over it will help the physician to treat patient with Oxygen therapy, Nebulization, various fluids, Zinc supplementation and Bronchodilator. Patient having pneumonia naturally they have less immunity. After taking the primary medication patient cannot survive due to the lack of supportive treatment.

CHAPTER-4

MATERIALS AND METHOD

4.2 Research Design

The study was a descriptive study; in which 70 patients with Community Acquired Pneumonia (CAP) were taken (2 months to 5 years old).

4.2 Sample Characteristic's and data collection

The sample was collected from the Institutes of Child Health & Shisu Sasthay Foundation Hospital Mirpur; Dhaka from August 2008 to December 2010.

4.2.1 Inclusion Criteria

Pneumonia patient: Patient only with viral and bacterial pneumonia was taken for research.

Age of patient: Children from 2 months up to 5 years were included in the study.

Sex of patient: Both male and female patient was included in the study.

4.2.2 Exclusion Criteria

Children with additional clinical complications were excluded from the study.

All the case histories were collected only with consent from the patient's respective attendants.

4.3 Demographic Data

The demographic data generally contains a patient's personal information, his or her family history and use of antibiotics and history of present illness at admission. History of vaccination and data about demographic characteristics of children and their family was collected at the beginning of the study. A follow up questionnaire developed.

4.3.1 Patient's personal information

Patient's personal information contains the

- Name
- Age in month
- Date of birth

- Place of birth
- Address
- Date of admission
- Date of discharge
- Immunization status
- Breast feeding practices
- Exclusive breast feeding
- Total breast feeding
- Age, when weaning started

4.3.2 Patient's family history

The family history of patient contain

- Family structure
- Number of brothers and sister s
- Parent's education status
- Occupation of parents
- Gross monthly income
- Socio-economic condition
- Smoking habit of patient

4.3.3 Chief of complaints

- Fever
- Cough

- Running nose
- Vomiting
- Fast breathing
- Convulsion
- Ear pain
- Appetite
- Feeding
- H/O medication during the presence illness
- Previous clinical history of similar episode (last 1 year)

4.3.4 Physical Examination

- Temperature
- Respiratory rate
- Pulse rate/min
- Chest in drawing
- Lethargy
- Breath sound
- Rronchi
- Crepts
- Heart sounds
- Gallop

4.3.5 Patients Investigation

- Complete blood
- Chest X ray
- Blood culture (if done)
- Sputum culture (if done)
- Electrolysis

4.4 Hospital course

Since most cases of Community Acquiring Pneumonia are due to *Haemphilus influenza* and *Streptococcus Pneumonia*, the choice of antibiotic is largely empirical, while also consider the age of child severity, sensitivity of drug. The patient who received mainly affordable antibiotic (Ampiclln or gentamicin or cephradine or amoxicillin were included).

Selection of antibiotics depends on age severity, spectrum and also sensitivity of drug. Single and combination of antibiotics both are used for treatment of patients. Here ceftriaxone were excluded as it has high efficacy. Other supportive treatment such as nebulizer and oxygen therapy, IV infusion, Bronchodilator was given to patients.

4.5 Follow Up

Day 3, after discharge

Day 7, after discharge.

CHAPTER-5

RESULTS

5.1 Percent Distribution of children according to sex who were having Community Acquired Pneumonia (CAP)

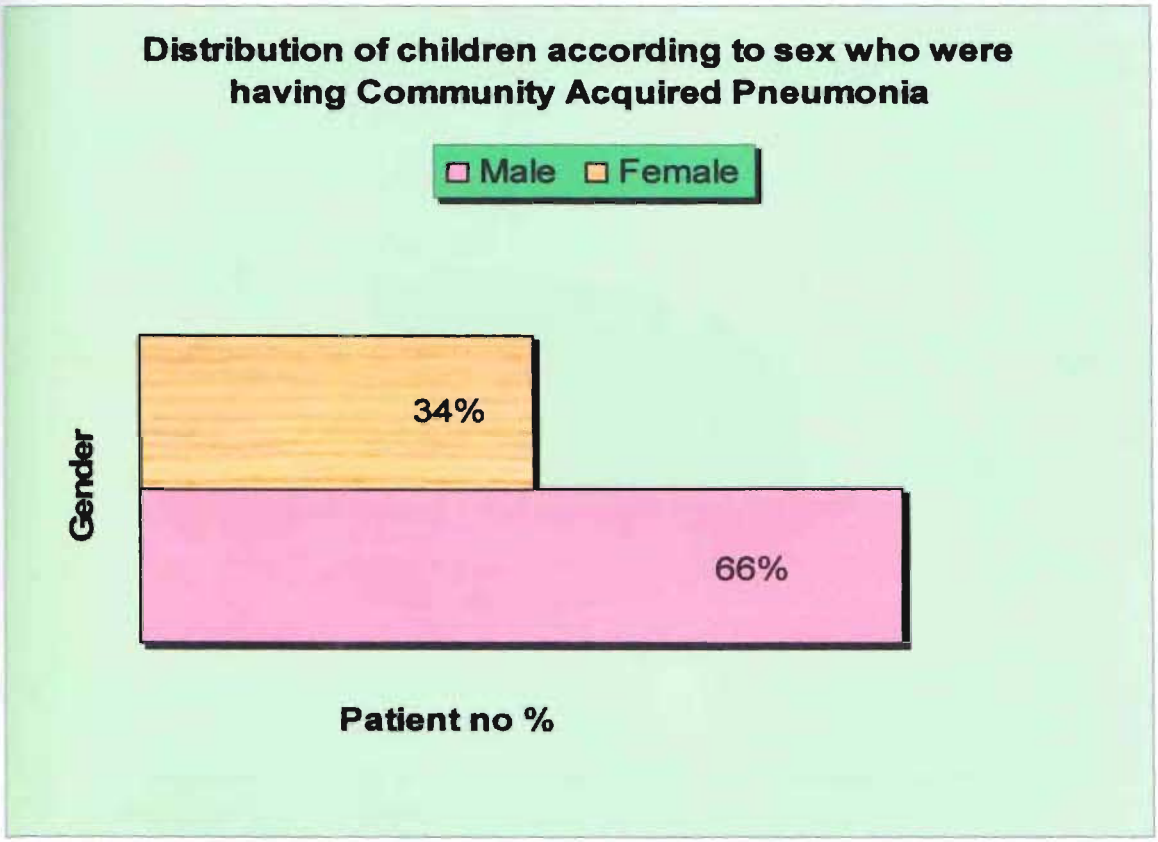


Figure 5.1: Distribution of children according to sex who were having Community Acquired Pneumonia (CAP).

This figure shows that among the 70 children male & female patients was 46 & 24. The percentage (%) was 66% & 34% who were having Community Acquired Pneumonia (CAP).

5.2 Percent distribution of children according to age who were suffering Community Acquired Pneumonia (CAP)

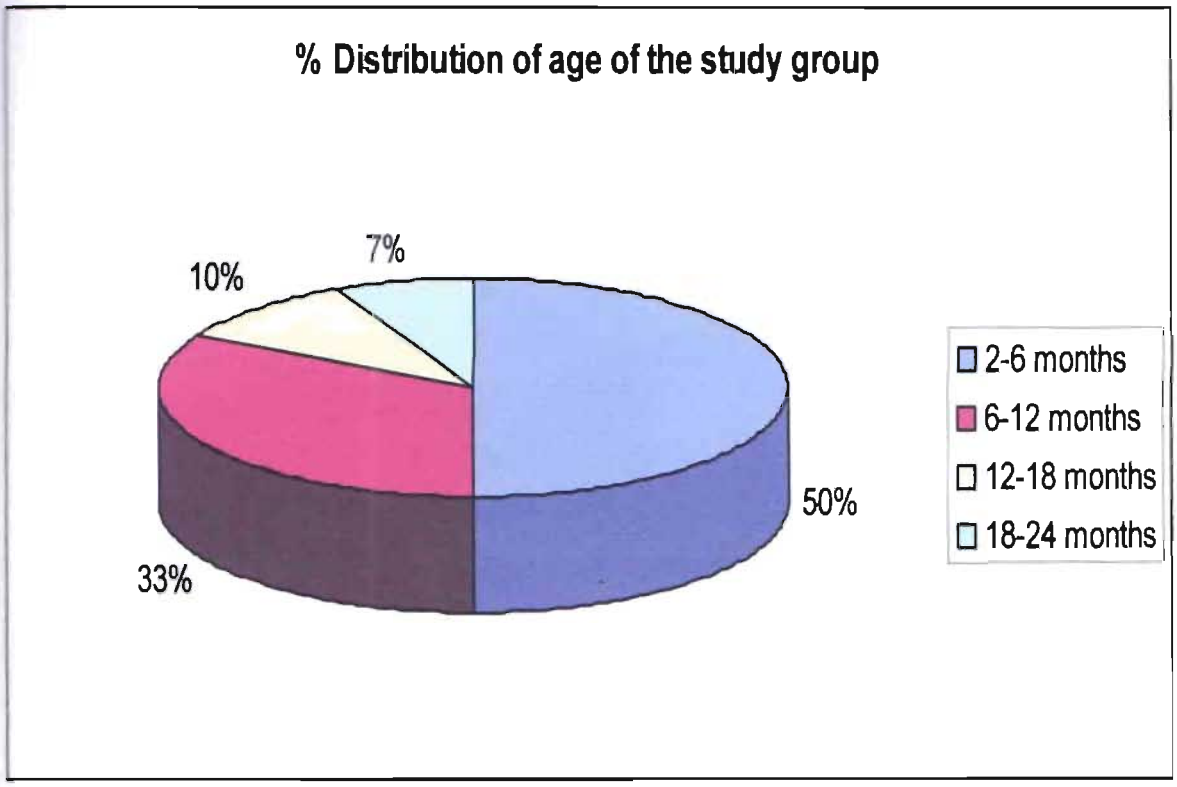


Figure 5.2: Percent distribution of children according to age who were suffering Community Acquired Pneumonia (CAP).

This figure shows that the infected children were divided in to four groups. Among them 50 % was in 2-6 months, 33% was in 6-12 months, 10% was in 12-18 months and 7% of 18-24 months of old who were suffering Community Acquired Pneumonia (CAP).

5.3 **Percent distribution of children weight who were suffering Community Acquired Pneumonia (CAP)**

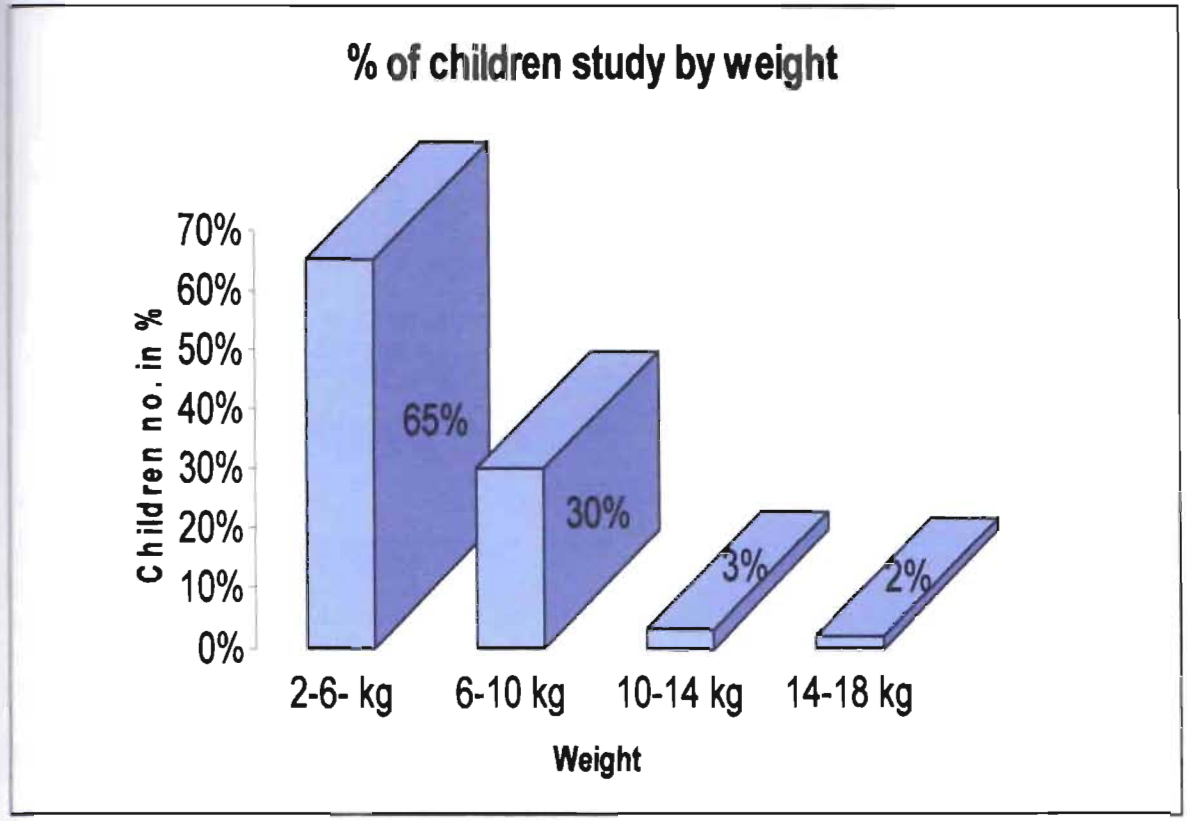


Figure 5.3: Percent distribution of children weight who was suffering Community Acquired Pneumonia (CAP).

This figure shows that weight of the children of 2-6 kg 65%, 6-10kg was30%, 10-14 kg was3%, 14-18 kg was 2% who were suffering Community Acquired Pneumonia (CAP).

5.4 Percent distribution of Antibiotics used to treat among the children suffering from Community Acquired Pneumonia (CAP)

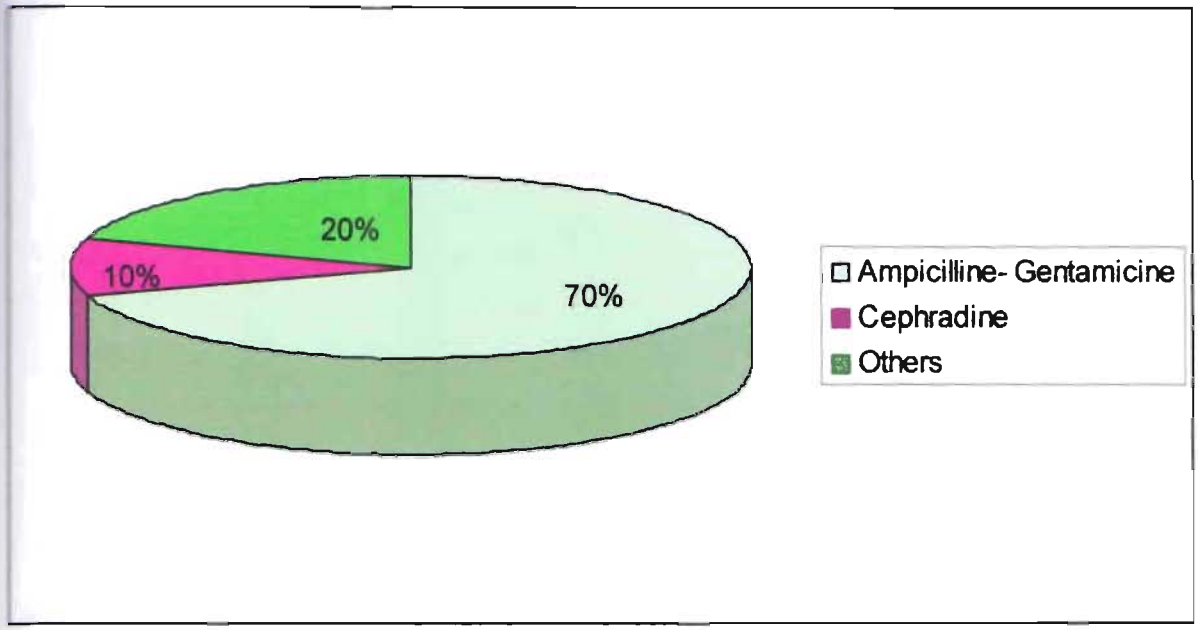


Figure 5.4: Percent distribution of Antibiotics used to treat among the children suffering from Community Acquired Pneumonia (CAP).

This figure shows that 70% children received Ampicilline+Gentamycine, 10% received cephradine and 22% received other antibiotics to treat among the children suffering from Community Acquired Pneumonia (CAP).

5.5 Percent distribution of children received different type of supportive treatment in case of suffering from Community Acquired Pneumonia (CAP)

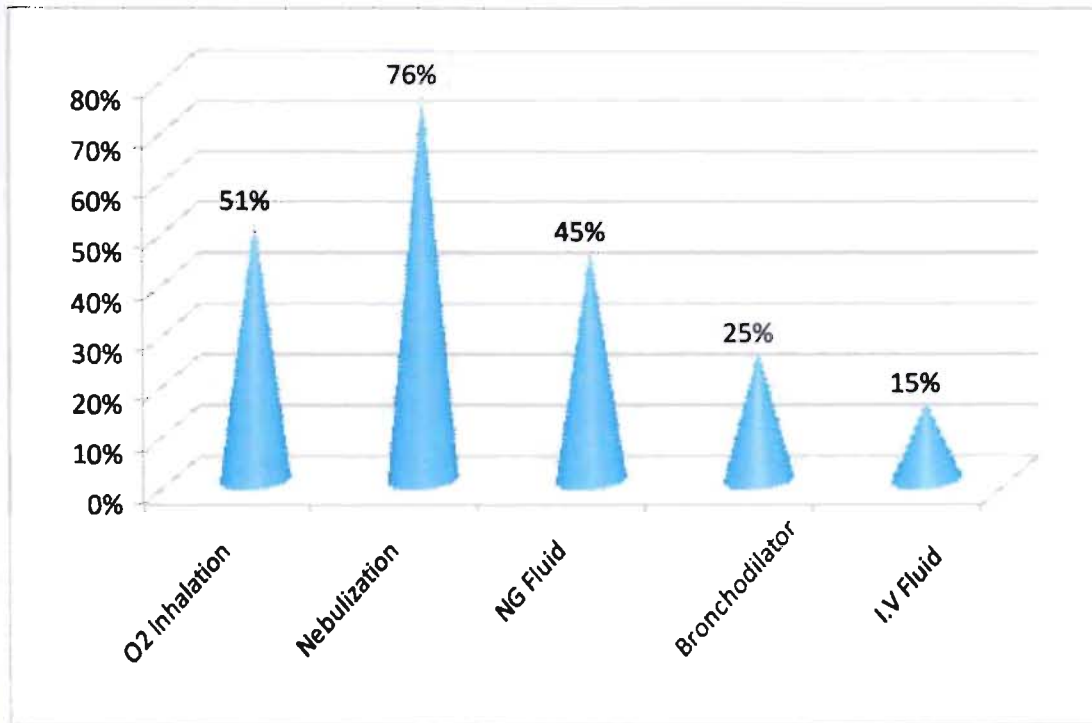


Figure 5.5: Percent distribution of children received different type of supportive treatment in case of suffering from Community Acquired Pneumonia (CAP).

This figure shows that 51% children received oxygen inhalation, 76% received Nebulization, 45% NG Fluid, 25% received Bronchodilator and 15% received IV Fluid in case of suffering from Community Acquired Pneumonia (CAP).

5.6 Percent distribution of O_2 inhalation according to days among children of suffering from Community Acquired Pneumonia (CAP)

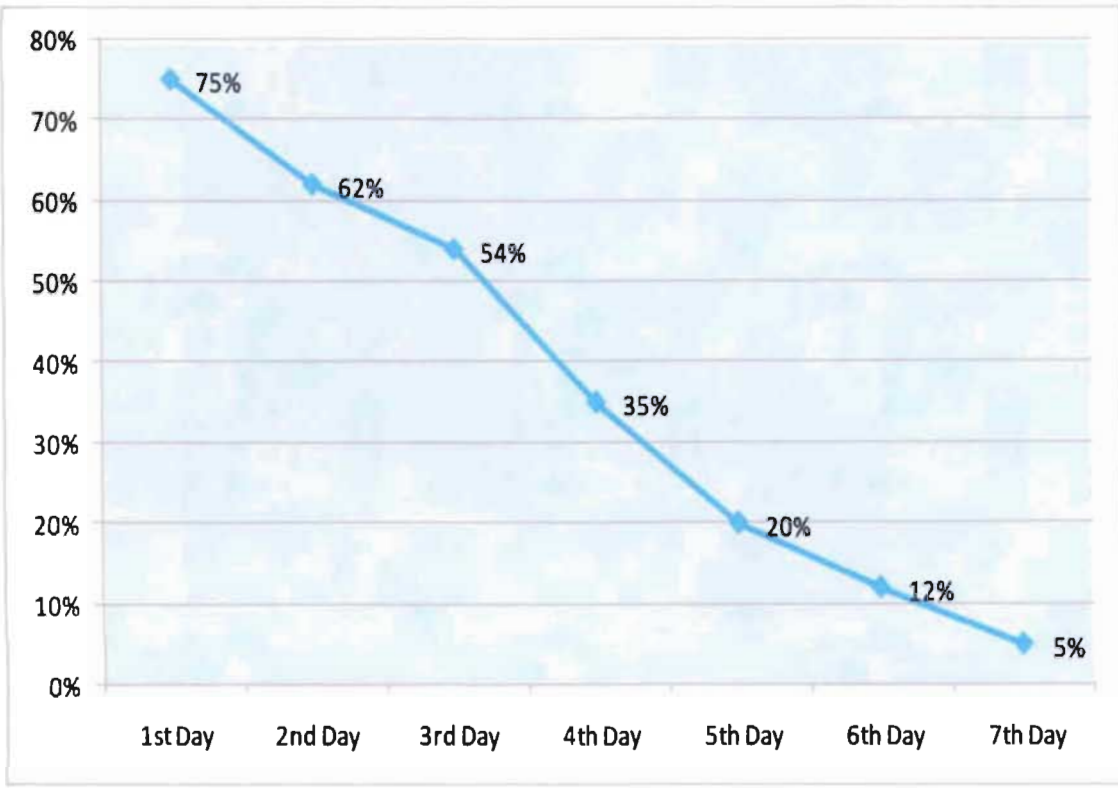


Figure 5.6: Percent distribution of O2 inhalation according to days among children of suffering from Community Acquired Pneumonia (CAP).

This figure shows that at first day 75% of children taken oxygen inhalation , at 2nd day the number was 65%, 3rd day 54% ,4th day 35%,5th day 20%, 6th day 12%, 7th 5% children was taken oxygen inhalation who were suffering from Community Acquired Pneumonia (CAP).

5.7 Percent distribution of children received Nebulization in case of Community Acquired Pneumonia (CAP)

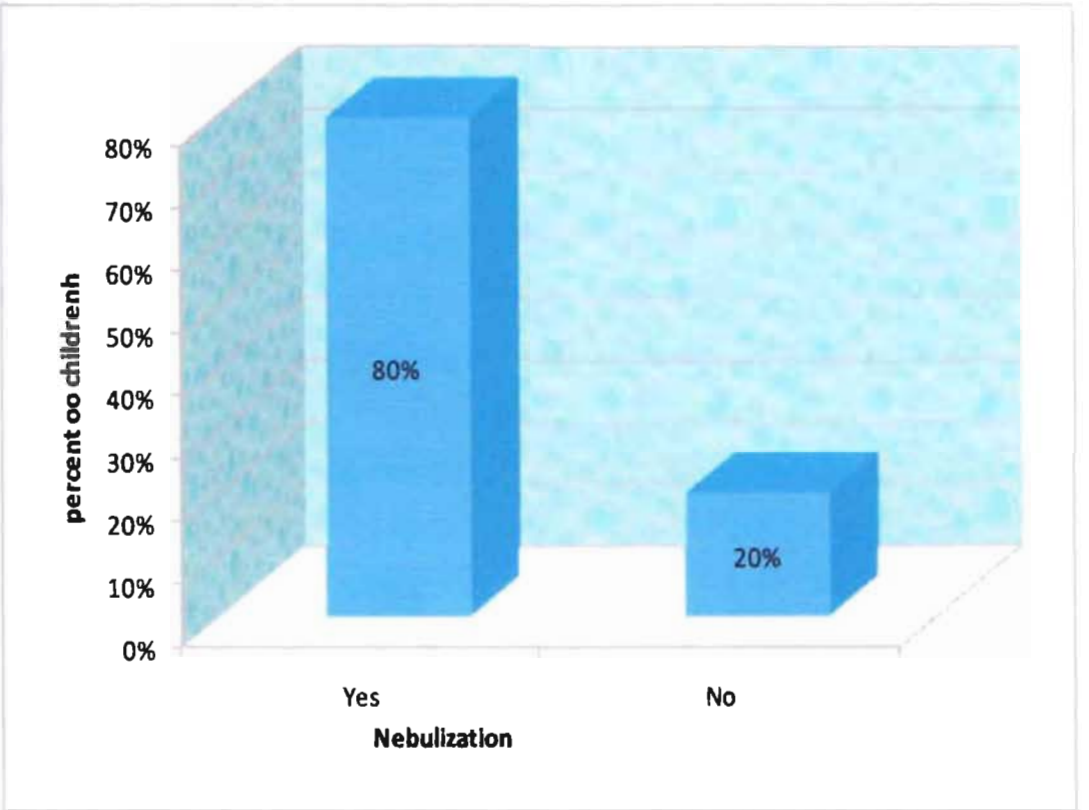


Figure 5.7: Percent distribution of children received Nebulization in case of Community Acquired Pneumonia (CAP).

This figure shows that among the children of Community Acquired Pneumonia (CAP) 80% children taken Nebulization and rest of 25 % do not take Nebulization.

5.8 Percent distribution of children received different type of Vaccines in case of Community Acquired Pneumonia (CAP)

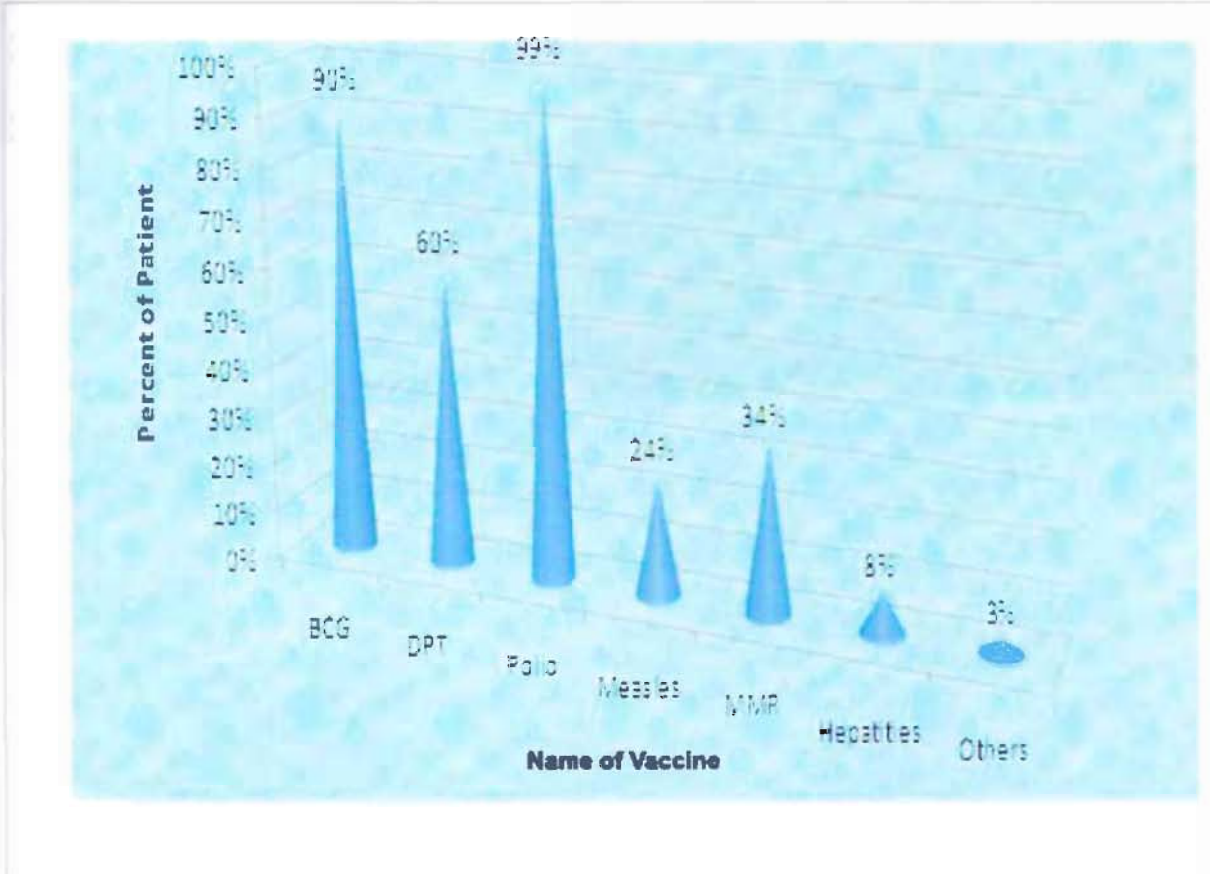


Figure 5.8: Percent distribution of children received different type of Vaccines in case of Community Acquired Pneumonia (CAP).

This figure gives information that 90% children received BCG, 60% children received DPT, 99% children received Polio, 24% children received Measles, 34% children received MMR, 8% children received Hepatitis and 3% children received other vaccines in case of Community Acquired Pneumonia (CAP).

5.9 Percent distribution of Number of Vaccines received by children who were suffering from in case of Community Acquired Pneumonia (CAP)

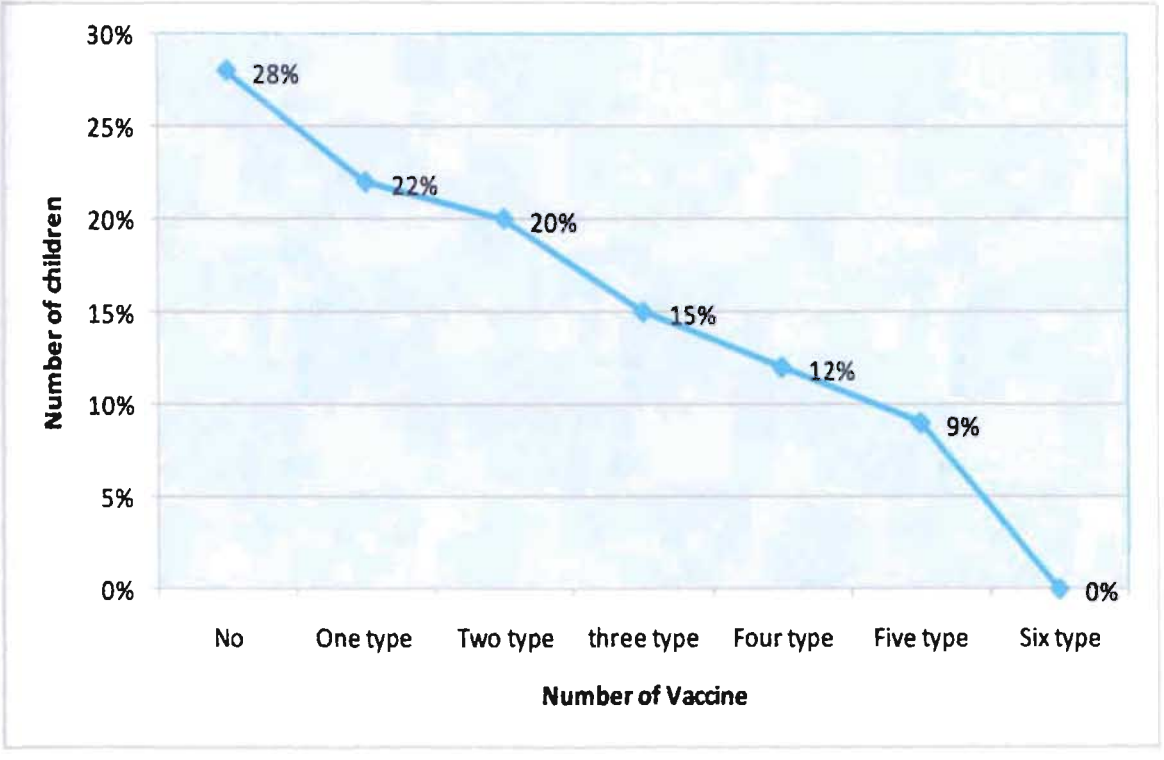


Figure 5.9: Number of Vaccines received by children suffering from Community Acquired Pneumonia (CAP).

This figure shows that 28% children did not take any type of vaccine, 22% taken only one type of vaccine, 15% children taken two type of vaccine, 12% children taken three type of vaccine,9% was taken five kinds of vaccine and no children who was received all of kind of vaccine were suffering from in case of Community Acquired Pneumonia (CAP).

CHAPTER-6

DISCUSSION & CONCLUSION

DISCUSSION

Pneumonia is a common illness in all parts of the world. It causes the air sacs in the lungs to fill with fluid, making it hard for to breathe. The most common types are caused by viruses, bacteria or parasite. Viruses cause about one-half of all cases of pneumonia. Most cases of viral pneumonia last a short time and are not very serious. The flu virus (influenza) can cause a serious case of pneumonia. Bacterial pneumonia can occur in all age groups. This type occurs more often in people (Rudan, 2008).

The most common bacterium that cause of pneumonia is Streptococcus pneumoniae, or pneumococcus. A vaccine is available to protect against this type of pneumonia. The Community-acquired pneumonia one of the most common illness and can affect people of all ages. The aim of this study to establish supportive treatment along with antibiotic will help doctor to improve disease condition and patient relief from Pneumonia (O'Brien, 2009).

Pediatrics pneumonia universally treated with antibiotics amoxicillin is the drug of choice for presumably pneumococcal disease. At present available prospective research data on the epidemiology of pediatrics CAP in western countries are from the 70's-80's correspondingly data on bacterial etiology are mainly from the 80's – 90's. Current concepts of pneumococcal etiology are mostly based on poorly validated antibody assays. Most data in clinical characteristics in children's CAP, as well as on antibody treatment come for developing countries, thus not being a directly applicable in western communities recent viral studies have revealed the role of rhinovirus (Hazir, 2006).

There are different types of supportive treatment used in case of CAP. This can help the patient improved their disease condition. According to this study among 51% children received oxygen inhalation, 76% received Nebulization, 45% NG Fluid, 25% received Bronchodilator and 15% received IV Fluid along with antibiotic in case of suffering from Community Acquired Pneumonia (CAP) .

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Annexure

Case Report form (CRF)

Project Title: Effect of Zink supplementation in clinical cure of Pneumonia in children.

- **General Information**

Registration #:----------

Identification#:----------

Laboratory ID #:----------

Date of admission #:----------

Date of discharge #: ----------

Bed No #:----------

- **Particulars of patient**

1. Name: ----------

2. Date of birth: ----------

3. Place of birth: ----------

4. Sex: Male/Female

5. Age in Months: ----------

- **Other Additional Information's**

6. Address: ----------

7. Family Structure: ----------

8. No. of brother and sister: ----------

9. Did anyone die before? Yes/ No

Reason of death: ----------

10. How many member stay in one room? ----------

11. Parents educational status:

Father: ---------- Mother: ----------

12. Occupation of parents: ----------

13. Gross monthly income: ----------Tk.

14. Socio-economic condition: ----------

15. Smoking habit of parents:

Father: ---------- Mother: ----------

- **Inclusion Criteria**

16. Height: ----------

17. Weight: ----------

18. Z-score: ----------

19. Immunization status:

BCG ☐ DPT+ Polio ☐ Measles ☐

MMR ☐ Hepatitis B ☐ Others ☐

20. Previous clinical history of similar episode (last 1 year):

21. Breast feeding Practice:

Exclusive Breast feeding ----------

Total Breast feeding----------

Age, when weaning started: ----------

- **Chief complaints**

22. Fever: YES/ No, Days ----------

23. Cough: YES/ No Days ----------

24. Running nose: YES/ No Days ----------

25. Vomiting: YES/ No Days ----------

26. How many times a day: ----------

27. Weather Following cough: YES/ No

28. Fast breathing: YES/ No Days ----------

29. Difficult breathing: YES/ No Days ----------

30. Convulsion: YES/ No Days ----------

31. Ear Pain: YES/ No Days ----------

32. Appetite: YES/ No Days ----------

33. Feeding: Unable----------, Difficult----------, and normal----------

34. H/O medication during the present illness: ----------

- **Physical Examination**

Day	1	2	3	4	5	6	7
Date							
Temperature							
Respiratory rate							
Pulse rate/min							
Chest in drawing	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -
Lethargy	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -	Yes- No -

- **Management Given at Hospital**

Day	1	2	3	4	5	6	7
Date							

Name of the drugs	Injection: Syrups: Tablets: Additional:	Injection: Syrups: Tablets: Additional	Injection: Syrups: Tablets: Additional	Injection: Syrups: Tablets: Additional	Injection: Syrups: Tablets: Additional	Injection: Syrups: Tablets: Additional	Injection: Syrups: Tablets: Additional

- **Auscultation**

Day	1	2	3	4	5	6	7
Date							
Breath sound	Vesicular ..... Bronchial	Vesicular ..... Bronchial	Vesicular ..... Bronchial	Vesicular ..... Bronchial	Vesicular ..... Bronchial	Vesicular ..... Bronchial	Vesicular ..... Bronchial
Rhonchi	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent
Crepts							
Heart	1st :	1st :	1st :	1st :	1st :	1st :	1st :

sound	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal	Normal ..... Abnormal 2nd Normal ..... Abnormal
gallop	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent	Present ..... Absent

35. Any clinical signs of Zinc deficiency: YES/ No

- **Supportive treatment**

Day	1	2	3	4	5	6	7
Date							

O2 Inhalation		Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------	Starting time: ---------- Off time: ---------- Duration ----------
Nebulization		Times: ----------	Times: ----------	Times: ----------	Times: ----------	Times: ----------	Times: ----------	Times: ----------
Bronchodilator								
Other Supportive Treatments	NG Fluid							
	I.V							

	Fluid							
Others								
Zinc		Bottle No. ---						

- **Patient's investigation**

36. Complete blood count: ----------

37. Chest X-ray: ----------

38. Blood culture (if done):----------

39. Sputum culture (if done):----------

40. Electrolytes (if done):----------

- **Diagnosis**

-Pneumonia

-Sever Pneumonia

-Very Sever Pneumonia

- Bronchopneumonia

- **Outcome Variables**

38. Clinical improvement: no---------- days

39. Radiological improvement: no----------days

40. Day on which became a febrile: ----------

41. Name. Of Rx given: ----------

42. Day on which discharge:

- **Follow-up**

43. Day3, after discharge:

---

44. Day7, after discharge:

- **Others**

45. Name of the physician: ----------

46. Physician code: ----------