

***A Survey on Prevalence & Treatment of Pneumonia at Hospital in
Gazipur***



Daffodil
International
University

*[In the partial fulfillment of the requirements for the degree of Masters of
Pharmacy]*

Submitted To

Department of Pharmacy
Faculty of Health & Life Sciences
Daffodil International University

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June 2024

APPROVAL

This thesis paper, “**A Survey on Prevalence & Treatment of Pneumonia at Hospital in Gazipur**”, submitted to the Department of Pharmacy, Faculty of Health & Life Sciences, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of Masters of Pharmacy and approved as to its style and contents.

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DECLARATION

I hereby declare that this thesis report, “**A Survey on Prevalence & Treatment of Pneumonia at Hospital in Gazipur**”, is done by me under the supervision Dr. Mohammed Shafikur Rahman Associate Professor, Department of Pharmacy Faculty of Health & Life Sciences Daffodil International University. I am declaring that this thesis is my original work. I also declare that neither this thesis nor any part therefore has been submitted elsewhere for the award of Master’s degree.

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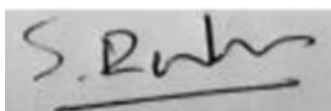
Faculty of Health & Life Sciences

Daffodil International University

Certificate

This is to certify that the results of the investigation that are embodied in this thesis works are original and have not been submitted before in substance for any degree or diploma of this university. The entire present work submitted as a thesis work for the partial fulfillment of the degree of Masters of Pharmacy.

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ACKNOWLEDGEMENT

I might want to communicate my profound applause to the All-powerful Allah who has given me the capacity to finish my undertaking work and the chance to concentrate in this subject.

I'm a lot of thankful to my honorable thesis supervisor Dr. Mohammed Shafikur Rahman Associate Professor, Faculty of Allied Health Sciences, Department of Pharmacy, Daffodil International University.

I would like to express my humble regards to Dr. Muniruddin Ahmed, Professor and Head, Department of Pharmacy, Daffodil International University.

I also wish to offer my respect to all of the teachers of Pharmacy Department, Daffodil International University and thankful to other members for their excellent cooperation with us.

Finally, I would like to express my gratitude towards my parents and other family members for their kind cooperation and encouragement which helped me in completion of this thesis.



My Parents,

The persons who always encourage me in every sphere of my life.

My teacher,

*The persons who guided me in this process and the faculties who kept me
on track.*

Abstract

This survey investigates the prevalence and treatment protocols for pneumonia at a hospital in Gazipur. Pneumonia, a significant public health concern, poses a substantial burden on healthcare systems worldwide, particularly in low- and middle-income regions. As per survey, 90% of respondents retorted that they have been very familiar about Pneumonia, although 8% designated that they have been lacked familiarity with the illness. Conferring to this investigation, 67% participants replied that they have been affected with Pneumonia & 33% responder replied that they haven't affected with Pneumonia. 39% participants replied that they have been diagnosed Pneumonia with one time in their life time, 31% responders retorted that they have been diagnosed Pneumonia with two time in their life time. 36% participants replied that they have been experienced shortness of breath, 34% responders retorted that they have been experienced Cough-may cough up yellow or green mucus. Conferring to the exploration most of the responders (50%) replied that they have been experienced 1-2 week symptoms before seeking medical attention. 30% responders replied that they have been sought first attention from hospital, 25% participants retorted that they have been sought first attention from local clinic, 20% responders replied that they have been sought first attention from pharmacy. Conferring to the survey, 42% responders replied that doctor suggested chest X-ray, 25% responders retorted that doctor suggested blood test. 35% responders replied that they have been taken antibiotic, 28% responders retorted that they have been taken corticosteroid, 22% participants retorted that they have been taken leukotriene receptor antagonist (LTRA). In conclusion, the findings of this survey provide a comprehensive overview of pneumonia's prevalence and treatment in Gazipur, serving as a valuable resource for healthcare providers and policymakers.

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Chapter one

Introduction

1. Introduction

Pneumonia, a significant cause of morbidity and mortality worldwide, continues to pose substantial public health challenges, particularly in developing regions. This acute respiratory infection, which inflames the air sacs in one or both lungs, can be caused by a variety of pathogens including bacteria, viruses, and fungi. In hospital settings, pneumonia is not only prevalent but also requires timely and effective treatment to prevent complications and fatalities [1]. Gazipur, a rapidly growing urban area in Bangladesh, exemplifies many of the health care challenges faced by developing regions, including high rates of respiratory infections. Understanding the prevalence and treatment practices of pneumonia in this locale is crucial for improving patient outcomes and informing public health strategies. This survey aims to provide a comprehensive overview of the prevalence and treatment modalities of pneumonia in hospitals within Gazipur [2]. By examining patient demographics, clinical characteristics, treatment protocols, and outcomes, this study seeks to identify key patterns and areas for improvement. The findings will be instrumental in guiding health care providers, policymakers, and researchers towards more effective management and prevention strategies for pneumonia, ultimately enhancing the health and well-being of the population in Gazipur [3].

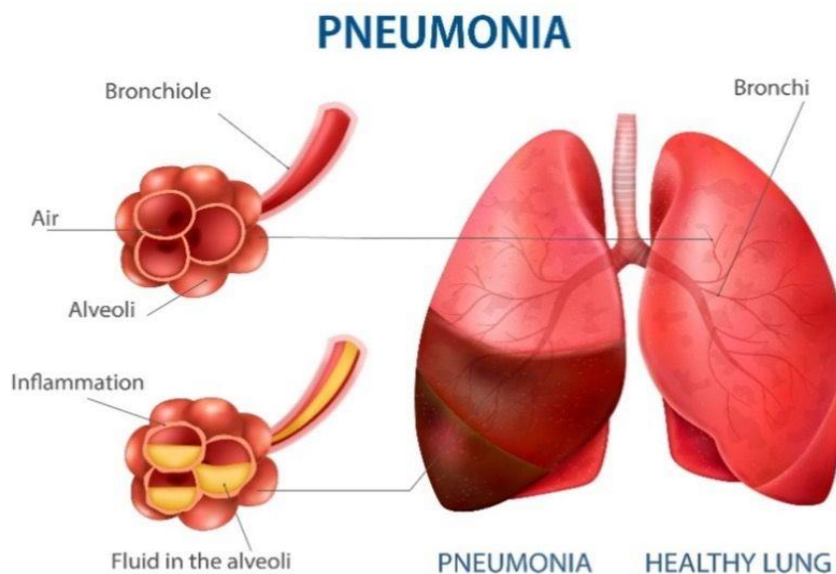


Figure 1: Pneumonia

1.1 Etiology of Pneumonia

Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus, causing symptoms such as a cough with phlegm or pus, fever, chills, and difficulty breathing. The etiology of pneumonia can be broadly categorized based on the causative agents, which include bacteria, viruses, fungi, and other pathogens [4]. Here's a detailed look at the common causes:

❖ Bacterial Pneumonia

Streptococcus pneumoniae: The most common cause of bacterial pneumonia in adults. Often referred to as pneumococcal pneumonia.

Haemophilus influenzae: Another common cause, especially in patients with chronic obstructive pulmonary disease (COPD).

Mycoplasma pneumoniae: Causes a milder form of pneumonia known as "walking pneumonia," which is more common in younger individuals.

Chlamydia pneumoniae: Another cause of walking pneumonia, often seen in school-aged children and young adults [5].

Legionella pneumophila: Causes Legionnaires' disease, a severe form of pneumonia, often associated with contaminated water sources.

Staphylococcus aureus: Can cause pneumonia, particularly after influenza infection or in hospitalized patients.

❖ Viral Pneumonia

Influenza virus: A significant cause of pneumonia, especially during flu season.

Respiratory syncytial virus (RSV): A common cause of pneumonia in infants and young children.

SARS-CoV-2: The virus responsible for COVID-19, which can cause severe pneumonia [6].

Adenovirus: Can cause pneumonia, especially in military recruits and immunocompromised individuals.

Parainfluenza virus: Causes respiratory infections including pneumonia, primarily in children [7].

❖ Fungal Pneumonia

Histoplasma capsulatum: Causes histoplasmosis, more common in the Ohio and Mississippi River valleys.

Coccidioides spp.: Causes coccidioidomycosis (Valley fever), found in the southwestern United States.

Blastomyces dermatitidis: Causes blastomycosis, more common in the southeastern, south-central, and midwestern United States.

Pneumocystis jirovecii: Causes Pneumocystis pneumonia (PCP), particularly in immunocompromised patients, such as those with HIV/AIDS [8].

❖ Other Causes

Aspiration pneumonia: Occurs when food, liquid, or vomit is inhaled into the lungs, leading to infection.

Chemical pneumonia: Caused by the inhalation of toxic chemicals, fumes, or smoke [9].

1.2 Pathogenesis of Pneumonia

Pneumonia is an inflammatory condition of the lung primarily affecting the alveoli and is usually caused by an infection. The pathogenesis of pneumonia involves several stages and factors that contribute to the infection and the subsequent inflammatory response. Here is a detailed description of the pathogenesis:

1. *Pathogen Entry*

Pneumonia can be caused by a variety of pathogens including bacteria, viruses, fungi, and parasites. The primary routes of pathogen entry into the lungs include:

- **Inhalation:** Pathogens in airborne droplets are inhaled directly into the lungs.
- **Aspiration:** Inhalation of oropharyngeal or gastric contents that are colonized with pathogens [10].
- **Hematogenous spread:** Pathogens spread through the bloodstream from a primary infection site.
- **Direct extension:** From contiguous sites of infection such as the pleura or mediastinum.

2. Colonization and Initial Infection

Once pathogens enter the respiratory tract, they must adhere to and colonize the epithelial cells of the respiratory mucosa. Factors that facilitate this include:

- **Adhesins:** Surface proteins on pathogens that bind to receptors on host cells.
- **Evasion of host defenses:** Pathogens evade the host's initial immune responses through various mechanisms such as capsule formation, secretion of proteases, and inhibition of phagocytosis [11].

3. Host Immune Response

The host immune system recognizes and responds to the invading pathogens through both innate and adaptive immunity:

- **Innate immune response:** This involves the activation of alveolar macrophages, release of pro-inflammatory cytokines (e.g., IL-1, TNF- α), and recruitment of neutrophils to the site of infection.
- **Adaptive immune response:** This includes the activation of T cells and the production of pathogen-specific antibodies by B cells. Cytotoxic T cells and helper T cells play a crucial role in clearing the infection [12].

4. Inflammation and Alveolar Damage

The inflammatory response leads to increased permeability of the alveolar-capillary membrane, resulting in:

- **Edema:** Fluid leaks into the alveoli, causing alveolar flooding and impaired gas exchange.
- **Consolidation:** Accumulation of inflammatory cells, fibrin, and cellular debris in the alveoli, leading to consolidation visible on radiographic imaging [13].

- **Hypoxia:** Due to impaired gas exchange, patients experience hypoxia, which can lead to respiratory distress.

5. Resolution or Progression

The outcome of pneumonia depends on various factors including the virulence of the pathogen, the host immune response, and timely medical intervention:

- **Resolution:** Successful immune response and appropriate antibiotic or antiviral treatment lead to the resolution of inflammation, clearance of pathogens, and repair of lung tissue.
- **Complications:** In some cases, pneumonia can lead to complications such as abscess formation, pleural effusion, acute respiratory distress syndrome (ARDS), or septicemia [14].

6. Factors Influencing Pathogenesis

Several factors influence the pathogenesis of pneumonia, including:

- **Host factors:** Age, underlying chronic diseases (e.g., COPD, diabetes), immunosuppression, smoking, and malnutrition.
- **Pathogen factors:** Virulence, toxin production, resistance to antibiotics.
- **Environmental factors:** Poor air quality, overcrowded living conditions, and seasonality.

Pneumonia results from the complex interplay between the invading pathogen and the host's immune defenses. Understanding the pathogenesis is crucial for developing effective preventive and therapeutic strategies. Early recognition, appropriate antimicrobial therapy, and supportive care are key to managing and reducing the morbidity and mortality associated with pneumonia [15].

Pneumonia Pathophysiology

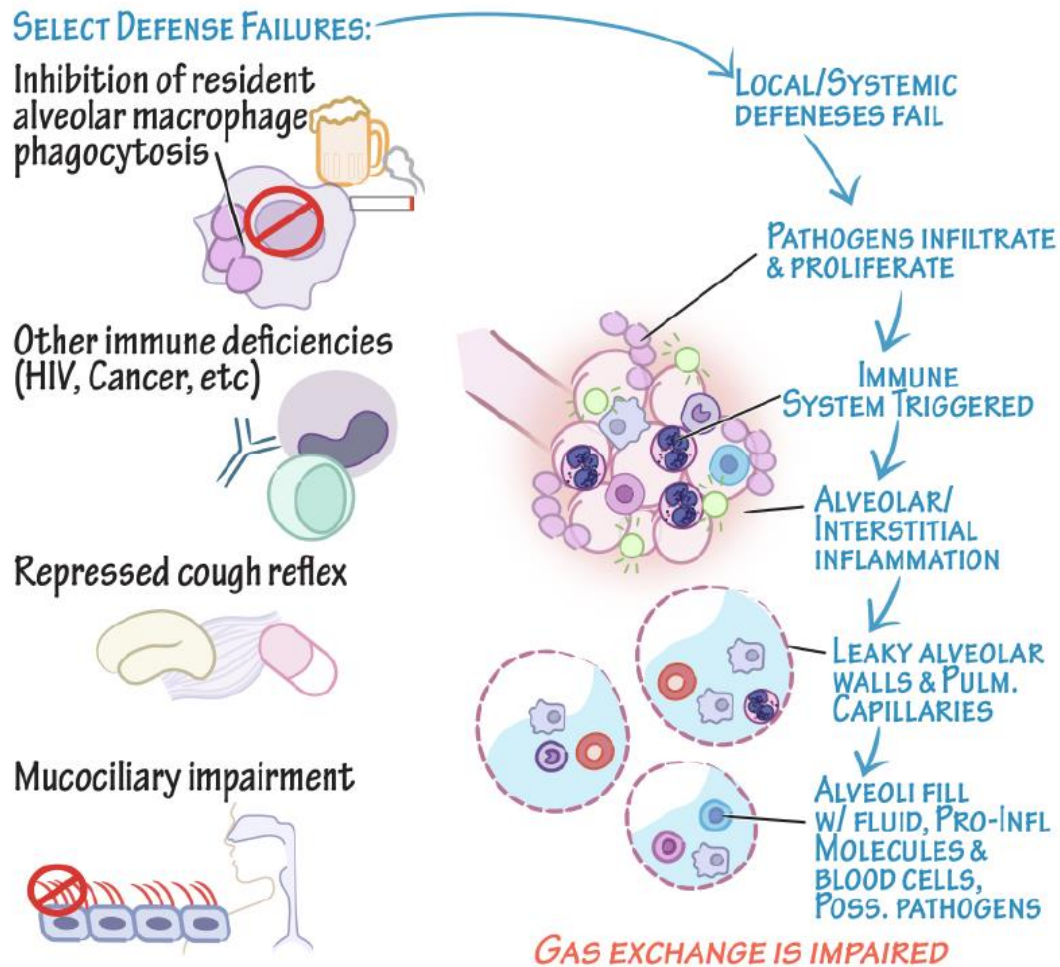


Figure 2: Pathogenesis of Pneumonia

1.3 Prevention and Management Strategies of Pneumonia

Prevention Strategies

1. Vaccination:

- Pneumococcal Vaccines:** Vaccines such as PCV13 (Pneumovax 13) and PPSV23 (Pneumovax 23) protect against *Streptococcus pneumoniae*, a common cause of bacterial pneumonia.
- Influenza Vaccine:** Annual flu shots can prevent influenza, a common precursor to viral pneumonia [16].

- **Hib Vaccine:** Protects against *Haemophilus influenzae* type b, particularly important for children.
- **COVID-19 Vaccine:** Reduces the risk of severe respiratory illness caused by SARS-CoV-2, which can lead to pneumonia.

2. **Hand Hygiene and Respiratory Etiquette:**

- Regular hand washing with soap and water or using alcohol-based hand sanitizers.
- Covering mouth and nose with a tissue or elbow when coughing or sneezing to prevent the spread of respiratory infections [17].

3. **Healthy Lifestyle:**

- Avoiding smoking, as it damages the lungs and impairs immune response.
- Reducing exposure to air pollution.
- Maintaining good nutrition to support the immune system.

4. **Preventive Healthcare:**

- Regular health check-ups to monitor and manage chronic illnesses such as diabetes and heart disease that can increase the risk of pneumonia.
- Managing chronic respiratory conditions like asthma or chronic obstructive pulmonary disease (COPD) to prevent exacerbations [18].

Management Strategies

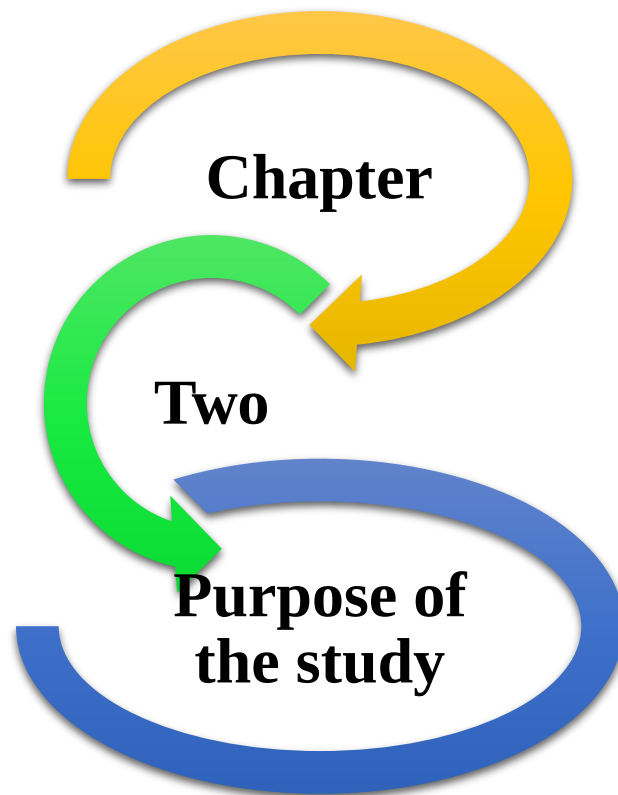
1. **Medical Treatment:**

- **Antibiotics:** Used for bacterial pneumonia, based on the suspected or confirmed causative agent. Common antibiotics include amoxicillin, azithromycin, and doxycycline.
- **Antivirals:** Prescribed for viral pneumonia caused by influenza or COVID-19, such as oseltamivir or remdesivir [19].

- **Antifungals:** Used for fungal pneumonia, which is less common but requires specific treatment.
2. **Supportive Care:**
 - **Oxygen Therapy:** Administered to patients with severe hypoxemia to ensure adequate oxygen levels in the blood.
 - **Fluids:** Intravenous fluids to maintain hydration, especially in severe cases where oral intake is inadequate.
 - **Pain and Fever Management:** Using medications like acetaminophen or ibuprofen to manage fever and chest pain [20].
 3. **Hospitalization:**
 - Necessary for severe cases, especially in patients with significant respiratory distress, confusion, low blood pressure, or other complications.
 - Intensive care unit (ICU) admission may be required for patients needing ventilatory support or close monitoring.
 4. **Monitoring and Follow-Up:**
 - Regular follow-up visits to monitor recovery, especially in high-risk groups such as the elderly, young children, and those with comorbidities.
 - Chest X-rays and other imaging techniques to ensure resolution of infection and identify any complications [21].
 5. **Patient Education:**
 - Educating patients about the importance of completing the full course of prescribed antibiotics.
 - Advice on smoking cessation and reducing alcohol consumption.

- Guidance on recognizing early symptoms of pneumonia to seek prompt medical attention.

Preventing and managing pneumonia involves a multifaceted approach that includes vaccination, good hygiene practices, a healthy lifestyle, and appropriate medical care. Early intervention and adherence to preventive measures can significantly reduce the incidence and severity of pneumonia, improving overall health outcomes [22].



2.1 Purpose of the study

The primary purpose of this study is to investigate the prevalence and treatment methodologies of pneumonia among patients at a hospital in Gazipur. This study aims to achieve the following specific objectives:

- To determine the incidence and demographic distribution of pneumonia cases among patients admitted to the hospital.
- To identify any patterns or trends in the occurrence of pneumonia over a specified period.
- To analyze the various treatment protocols and medical interventions used for pneumonia patients.
- To assess the effectiveness and outcomes of the treatment regimens employed by healthcare providers in the hospital.
- To examine common risk factors associated with pneumonia in the patient population, such as age, gender, pre-existing health conditions, and lifestyle factors.
- To explore the presence of comorbidities and their impact on the severity and treatment of pneumonia.
- To gather data on the hospital's practices concerning diagnosis, patient management, and follow-up care for pneumonia.
- To identify potential areas for improvement in clinical practices and patient care strategies.



3.1 Literature Review

Analysis 1:

Approximately 200 million cases of viral community-acquired pneumonia occur annually, with an even split between children and adults. Advances in molecular diagnostic tests have significantly enhanced our understanding of viruses' role in pneumonia, revealing that viral pneumonia is more common than previously thought. In children, the most frequently identified viruses are respiratory syncytial virus, rhinovirus, human metapneumovirus, human bocavirus, and parainfluenza viruses, in both developed and developing countries. Dual viral infections are prevalent, and one-third of children show signs of viral-bacterial co-infection. In adults, viruses are responsible for about one-third of community-acquired pneumonia cases, with influenza viruses, rhinoviruses, and coronaviruses being the main culprits. However, bacteria still play a major role in adult pneumonia cases. Differentiating between viral and bacterial pneumonia can be aided by considering factors such as the presence of viral epidemics in the community, patient age, illness onset speed, symptoms, biomarkers, radiographic changes, and treatment response. Despite this, no clinical algorithm can definitively distinguish the cause of pneumonia. There is no consensus on whether patients with clear viral community-acquired pneumonia should receive antibiotics. Apart from neuraminidase inhibitors for influenza-related pneumonia, there is no definitive role for specific antivirals in treating viral community-acquired pneumonia. Influenza vaccines remain the only specific preventive measure available. More research is needed to better understand the causes and pathogenesis of community-acquired pneumonia, especially to gather more data from developing countries and investigate regional differences in pneumonia causes [23].

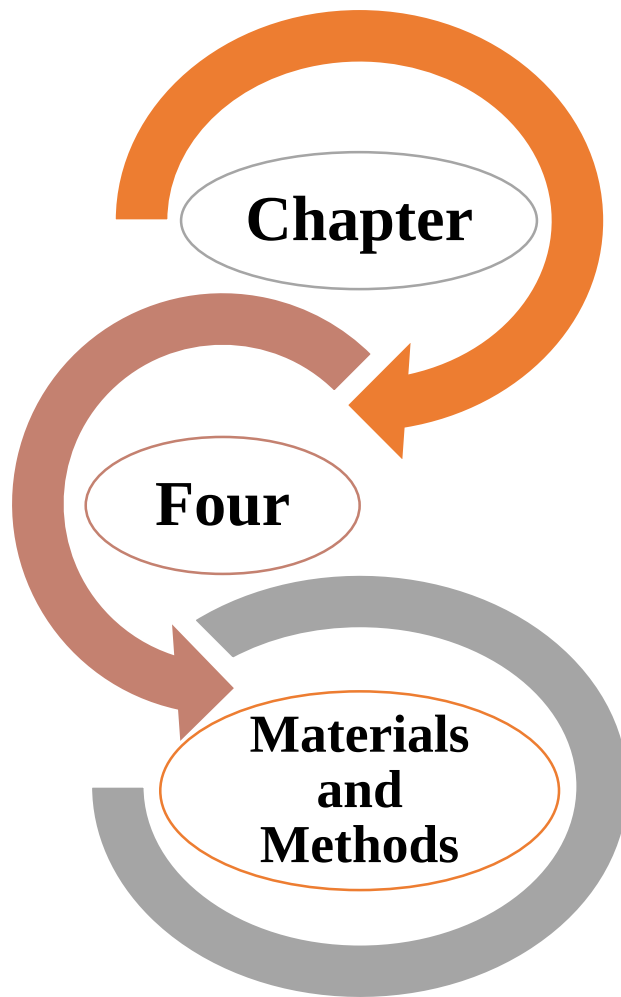
Analysis 2:

For nearly two centuries, pneumonia has been recognized as a common and potentially fatal condition. Studies from the pre-antibiotic era revealed mortality rates of about 1 per 1000 annually, with over 80 percent of cases attributed to *Streptococcus pneumoniae* and mortality rates ranging from 20 to 40 percent. Community-acquired pneumonia, which differs from hospital-acquired or nursing home-acquired pneumonia, remains a prevalent and serious illness. In the United States, there are currently an estimated 4 million cases

each year, with an attack rate of 12 per 1000 adults, approximately 600,000 hospitalizations annually, and an annual cost of \$23 billion. Pneumonia ranks as the sixth leading cause of death in the U.S. and the leading cause of death from infectious disease. Despite significant advancements in identifying new microbial pathogens and developing antimicrobial agents, pneumonia is still marked by considerable debate regarding diagnostic evaluation and treatment decisions [24].

Analysis 3:

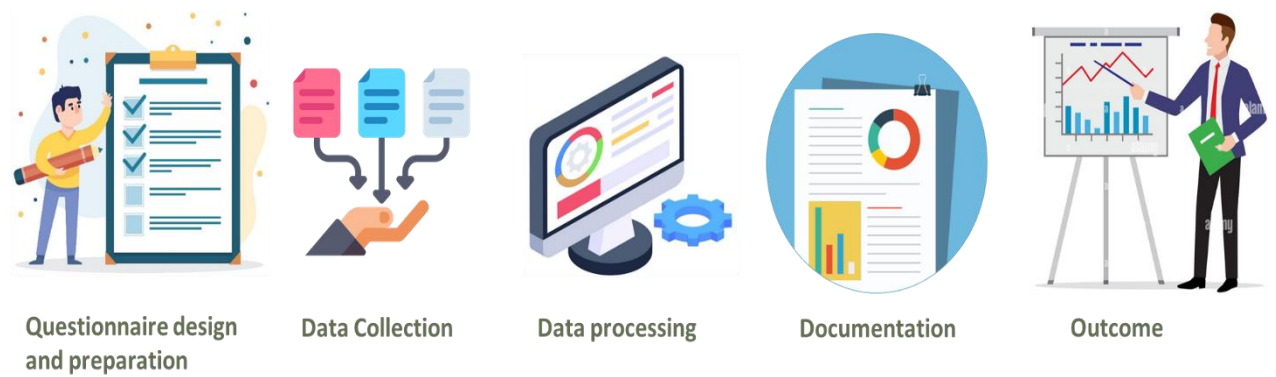
In this paper, we review the literature on managing pneumonia in developed countries. Pneumonia is typically diagnosed based on symptoms such as cough, respiratory distress, fever, and changes seen in chest X-rays. It affects all pediatric age groups, with the highest incidence in children under five years old. Despite low mortality rates, pneumonia imposes a significant burden on both primary and secondary healthcare. Inpatient admission rates for pneumonia have increased in some regions in recent years. Pneumonia is unlikely if a child only has wheezing. In routine clinical practice, a microbiological diagnosis is often not made due to the insensitivity of current tests. The etiology of pneumonia varies by region, with about half of the cases being viral. Management of moderate pneumonia, the most common type presenting in secondary care, involves careful assessment and oral antibiotics, followed by early discharge when the patient improves. We summarize clinical trial data from developed countries, noting that many trials are underpowered. Patients with moderately severe pneumonia do not require invasive investigations, but clinical judgment is necessary for identifying and investigating more complex cases. We discuss the rising importance of certain pathogens, including non-vaccinated strains of *S. pneumoniae*, Panton-Valentine leukocidin *S. aureus*, H1N1 Influenza A, and Human Bocavirus. The issue of antimicrobial resistance is considered, and we review recent data on the long-term effects of childhood pneumonia. By reviewing the literature, we highlight significant evidence gaps and suggest areas for future clinical research [25].



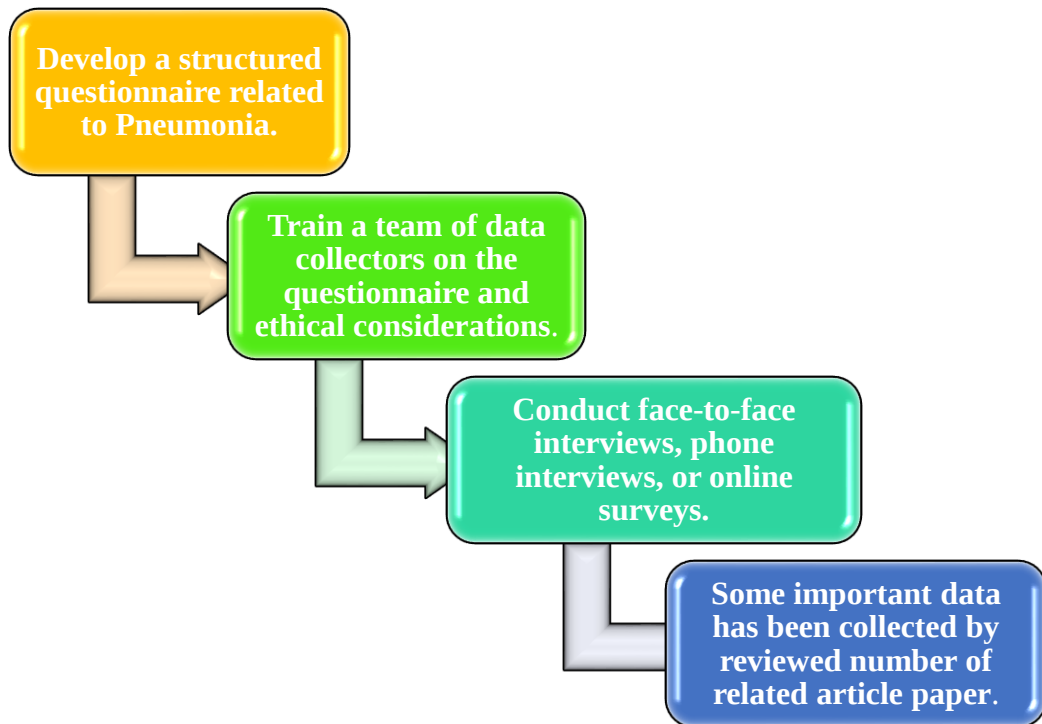
4. Methodology

Choose a cross-sectional survey design to gather data from a patients in the Gazipur Hospital.

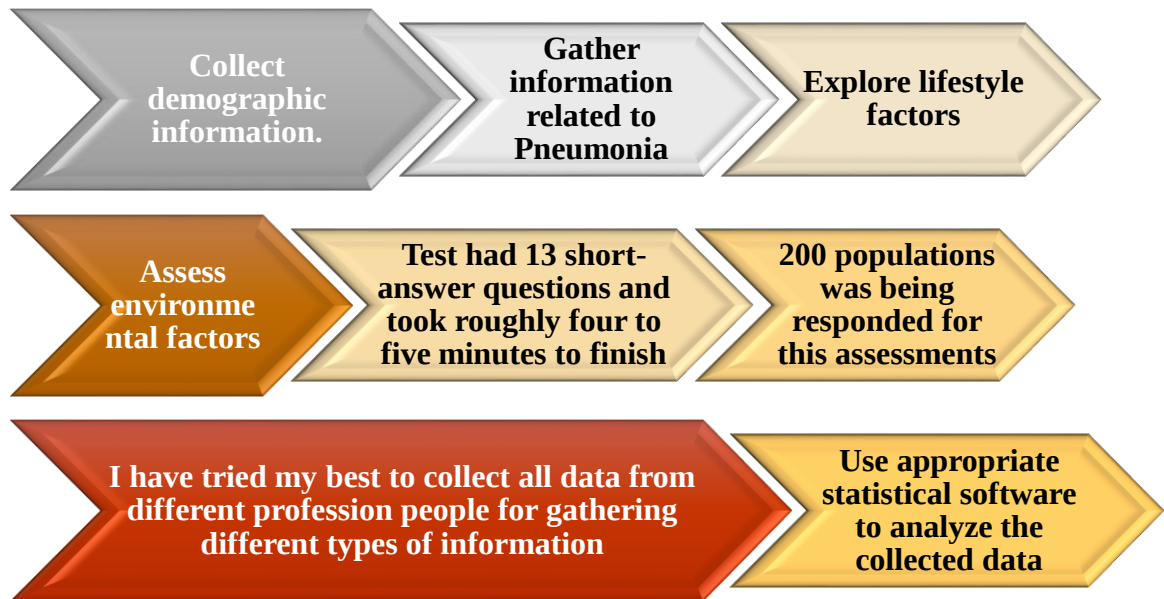
➡ I have started work for this survey in February 2024.



4.1 Data Collection



4.2 Data Variables & Analysis process





5.1 Age of Responders

Q: Age of the participants

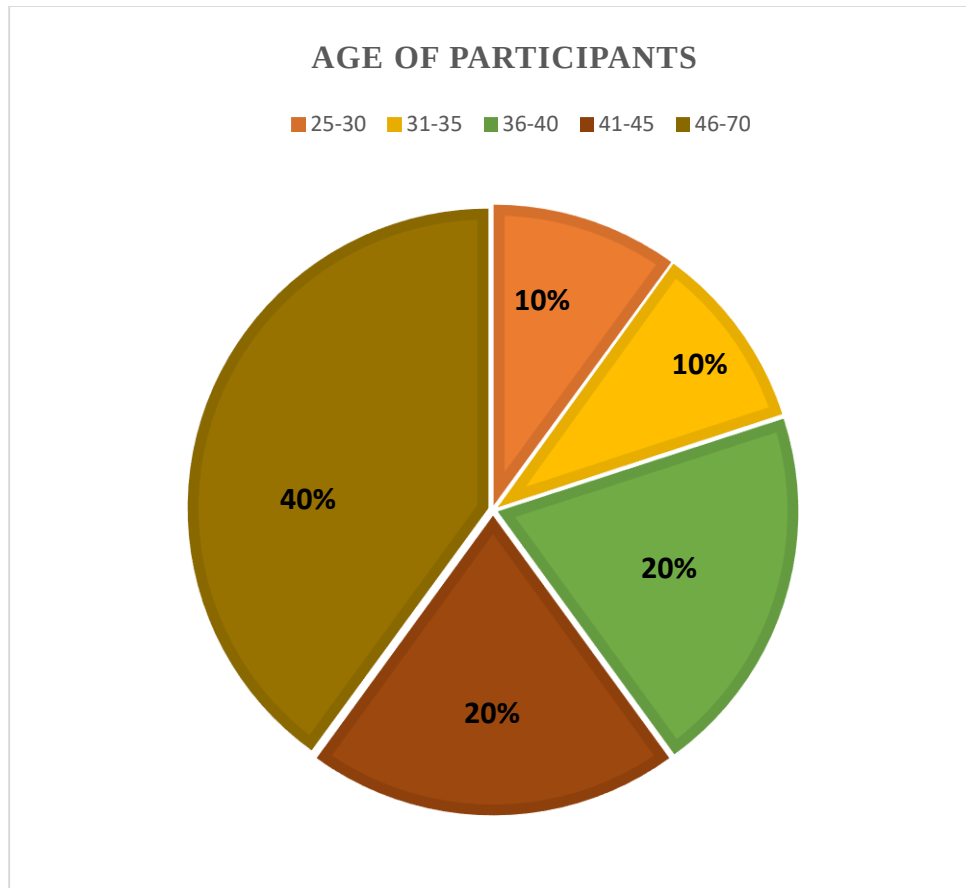


Figure 3: Age of Responders

Discussion: A total of 200 individuals took part in the study, spanning ages from 25 to 70. The majority of participants (40%) fell into the age bracket of 46 to 70 years. Those aged 25 to 30 constituted 10% of the participants, while the groups aged 36 to 40 & 41 to 45 comprised 20% and 20% respectively.

5.2 Gender of Participants

Q: Gender

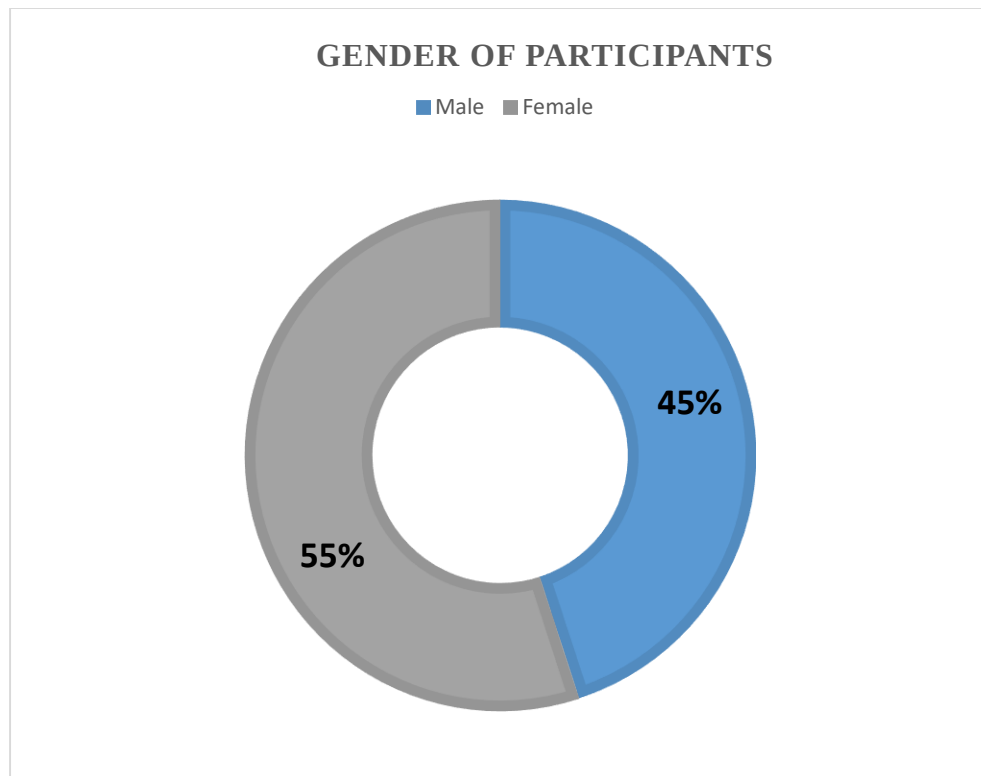


Figure 4: Gender of Participants

Discussion: In this examination, there was a balanced representation of genders, with 45% being male and 55% female participants.

5.3 Professional Status of Responders

Q: What is your profession?

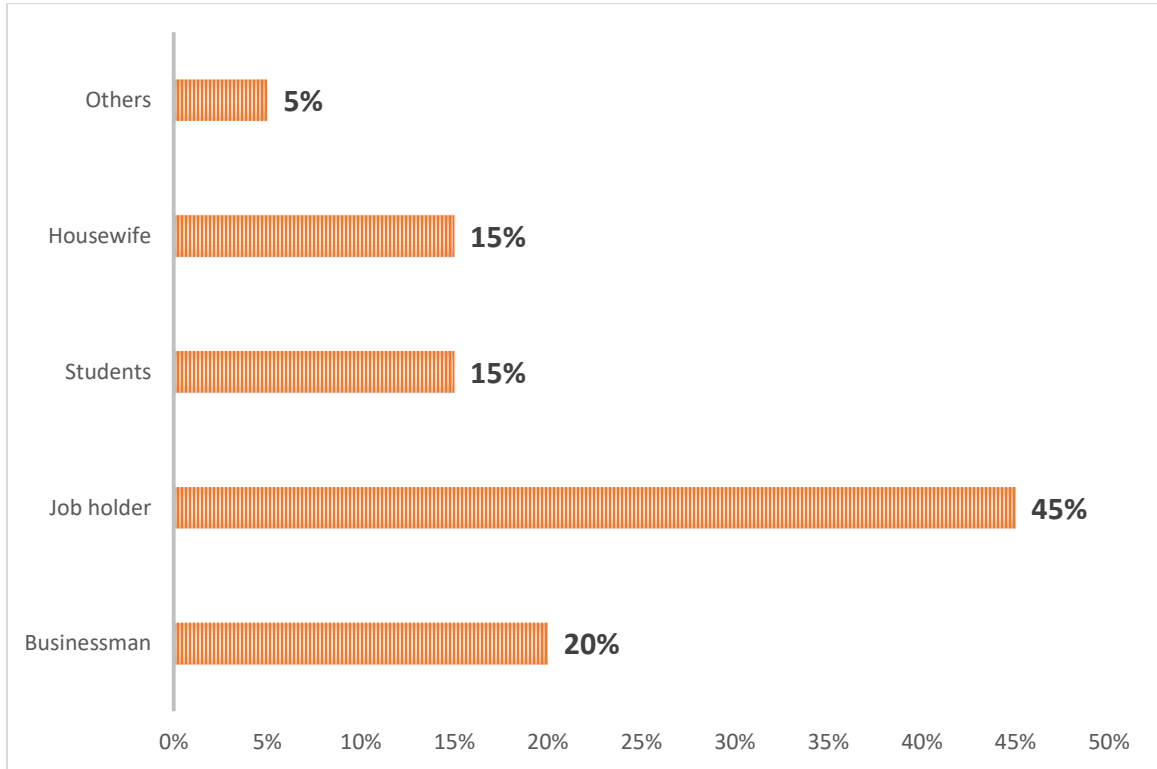


Figure 5: Professional Status of Responders

Discussion: Various professionals were selected to participate in this survey. According to Figure 6, the majority of participants are employed in jobs (45%), while 20% are businesspeople.

5.4 Familiar with Pneumonia

Q: How familiar are you with Pneumonia?

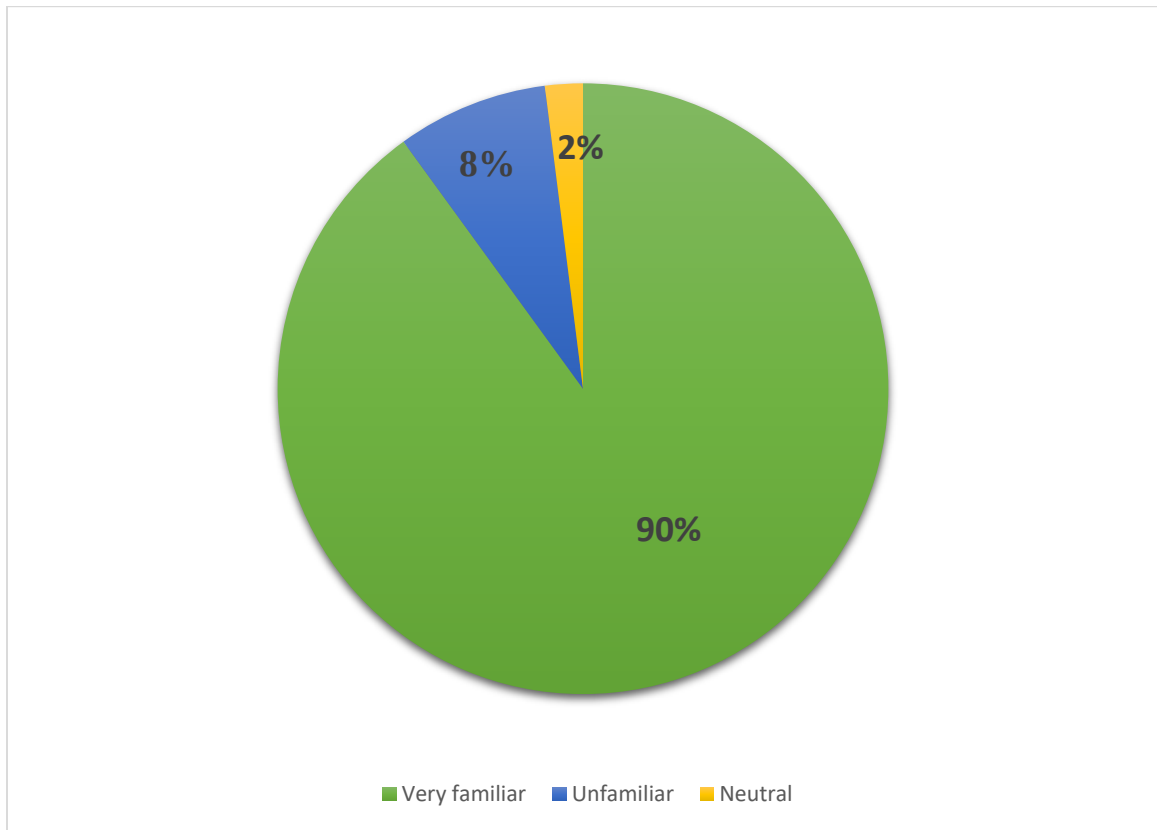


Figure 6: Familiar with Thalassemia

Discussion: Pneumonia is an infection that inflames the air sacs in one or both lungs. The air sacs may fill with fluid or pus (purulent material), causing cough with phlegm or pus, fever, chills, and difficulty breathing. Pneumonia can be caused by a variety of organisms, including bacteria, viruses, and fungi. As per survey, 90% of respondents retorted that they have been very familiar about Pneumonia, although 8% designated that they have been lacked familiarity with the illness.

5.5 Affected ratio of Pneumonia

Q: Have you been diagnosed with Pneumonia?

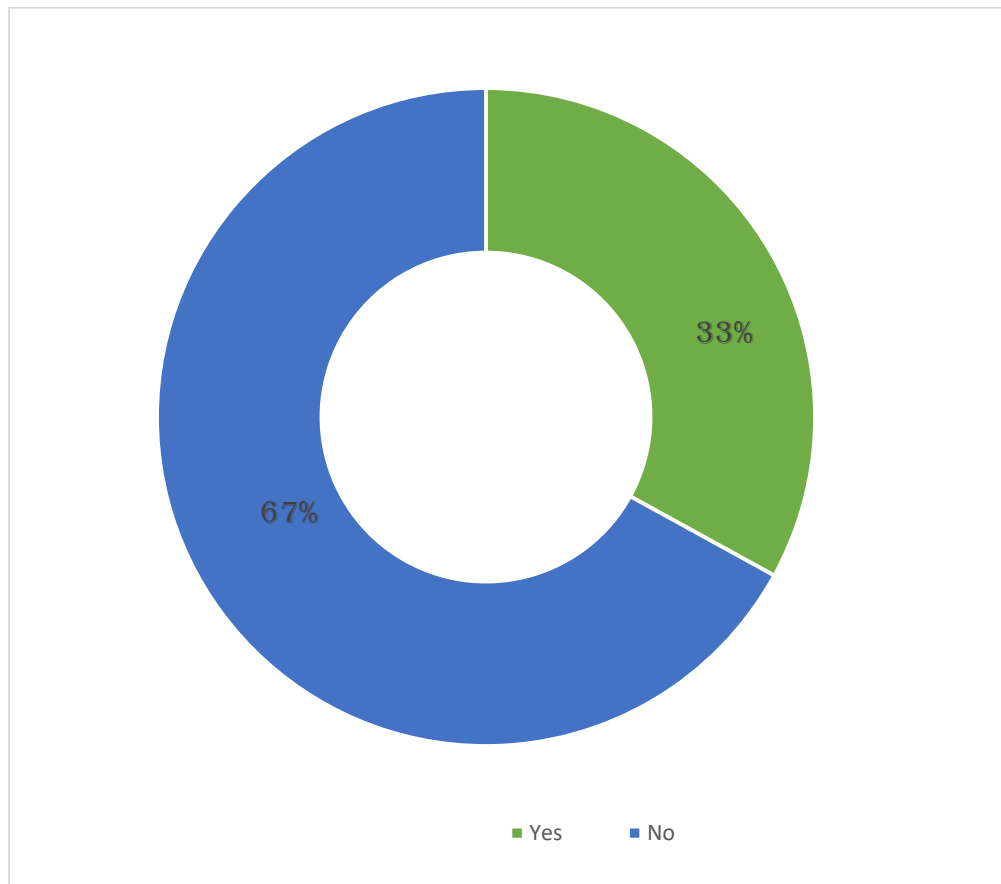


Figure 7: Affected ratio of Pneumonia

Discussion: Conferring to this investigation, 67% participants replied that they have been affected with Pneumonia & 33% responder replied that they haven't affected with Pneumonia.

5.6 Frequency of illness

Q: How many times have you been diagnosed with pneumonia in your lifetime?

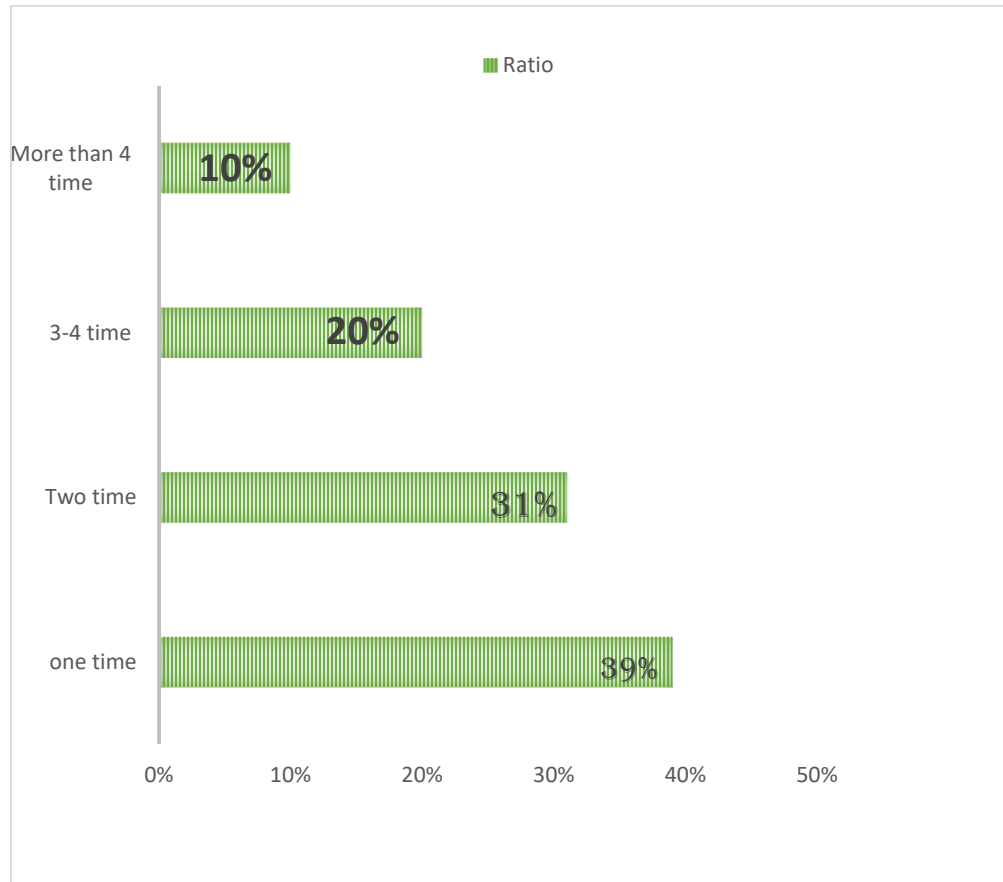


Figure 8: Frequency of illness

Discussion: As per this survey, 39% participants replied that they have been diagnosed Pneumonia with one time in their life time, 31% responders retorted that they have been diagnosed Pneumonia with two time in their life time & 20% responders replied that they have been diagnosed Pneumonia with 3-4 times in their life time.

5.7 Symptoms of Pneumonia

Q: What symptoms did you experience when you had pneumonia?

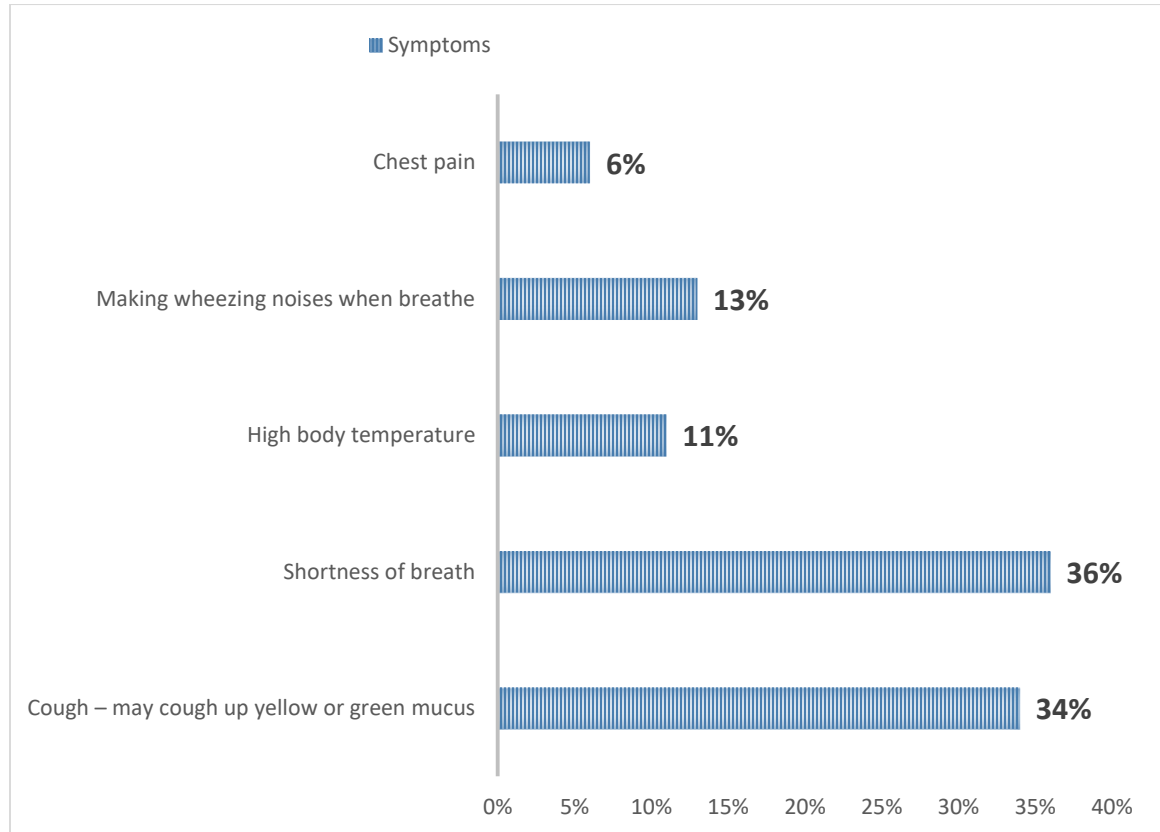


Figure 9: Symptoms of Pneumonia

Discussion: Numerous patients grappling with the condition exhibited a range of symptoms. In this survey, 36% participants replied that they have been experienced shortness of breath, 34% responders retorted that they have been experienced Cough-may cough up yellow or green mucus, 13% responders replied that they have been experienced wheezing noises when breathe & 11% participants replied that they have been experienced high body temperature.

5.8 Duration of experienced symptoms

Q: How long did you experience symptoms before seeking medical attention?

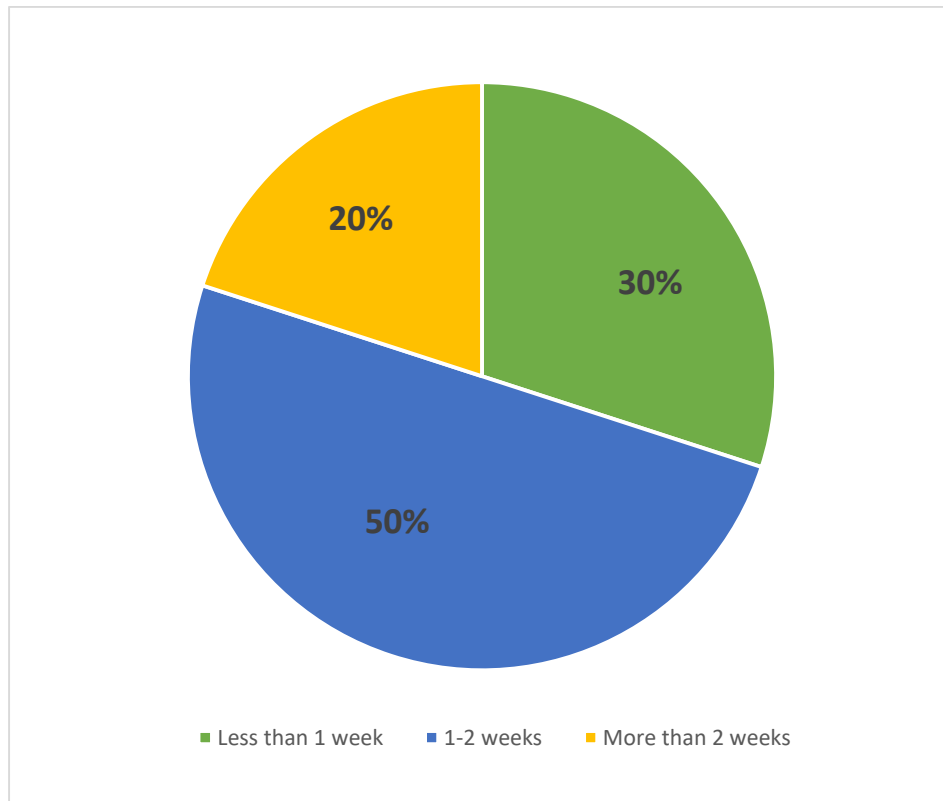


Figure 10: Duration of experienced symptoms

Discussion: Conferring to the exploration most of the responders (50%) replied that they have been experienced 1-2 week symptoms before seeking medical attention. 30% participants replied that they have been experienced less than 1 week & 20% retorted that they have been experienced more than 2 weeks before seeking medical attention.

5.9 Place of medical attention

Q: Where did you first seek medical attention for your symptoms?

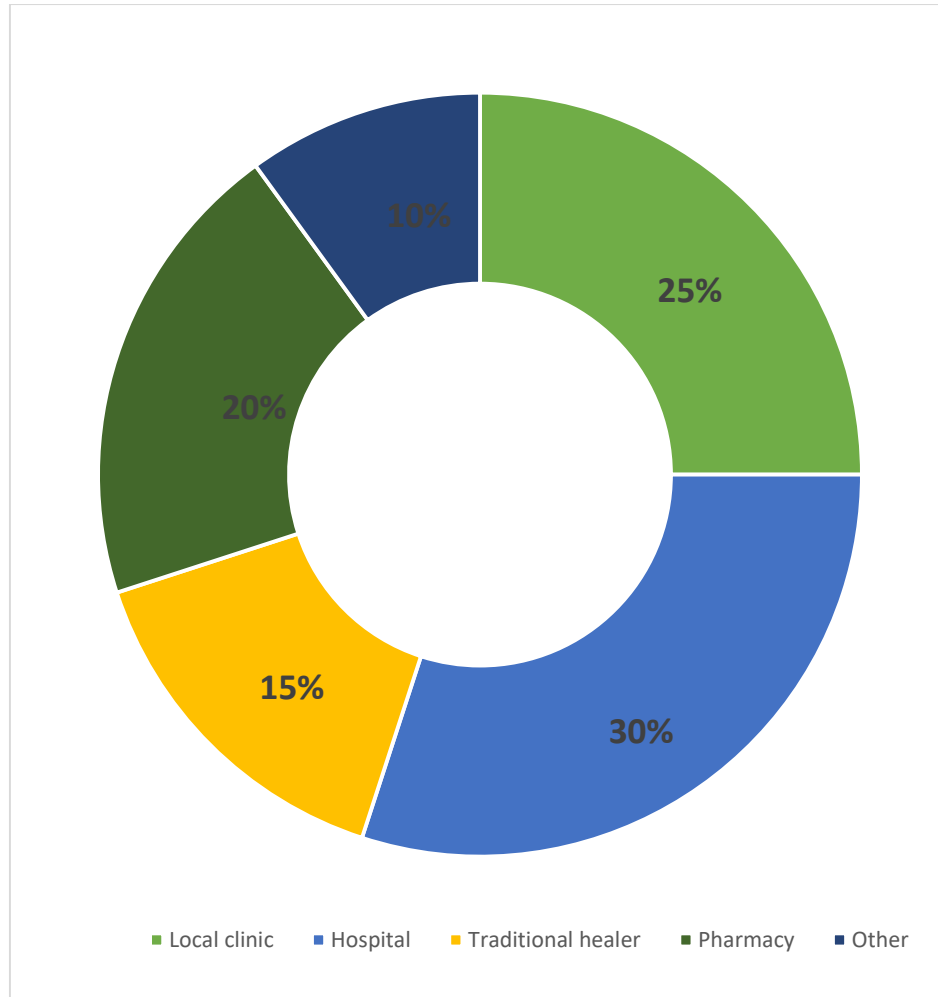


Figure 11: Place of medical attention

Conversation: As per this investigation, 30% responders replied that they have been sought first attention from hospital, 25% participants retorted that they have been sought first attention from local clinic, 20% responders replied that they have been sought first attention from pharmacy & 15% responders replied that they have been sought first attention from traditional healer for their symptoms.

5.10 Diagnostic test

Q: What diagnostic tests were performed?

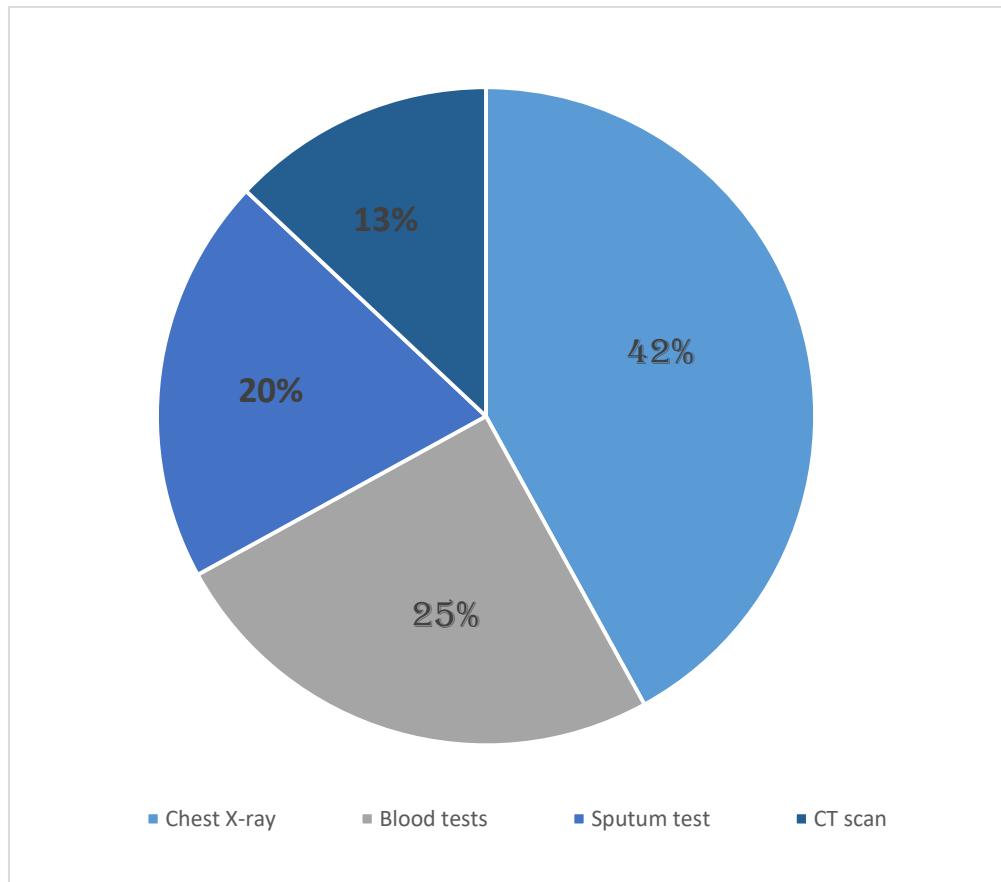


Figure 12: Diagnostic test

Discussion: Conferring to the survey, 42% responders replied that doctor suggested chest X-ray, 25% responders retorted that doctor suggested blood test, 20% participants replied that doctor suggested sputum test for identified Pneumonia.

5.11 Taken medication

Q: What type of medication did you receive for pneumonia?

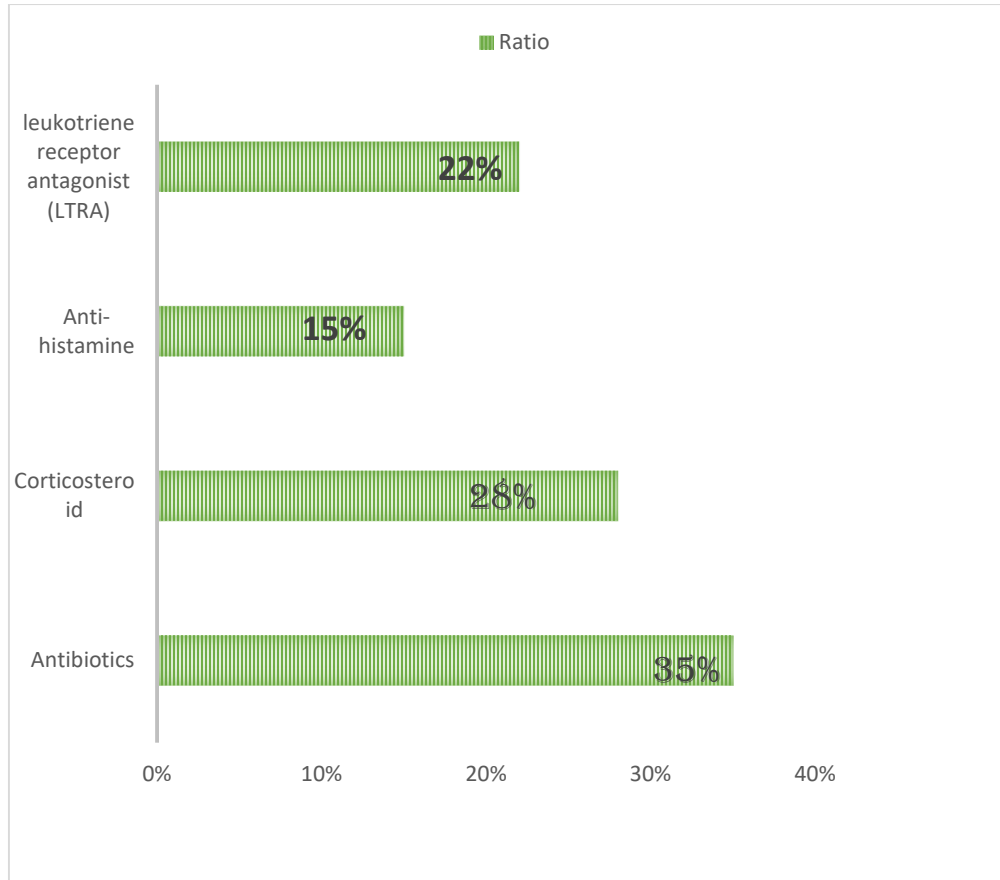


Figure 13: Taken medication

Discussion: As per this investigation, 35% responders replied that they have been taken antibiotic, 28% responders retorted that they have been taken corticosteroid, 22% participants retorted that they have been taken leukotriene receptor antagonist (LTRA) & 15% responders replied that they have been taken antihistamine for relieving Pneumonia symptoms.

5.12 Ratio of hospitalized population

Q: Were you hospitalized for pneumonia?

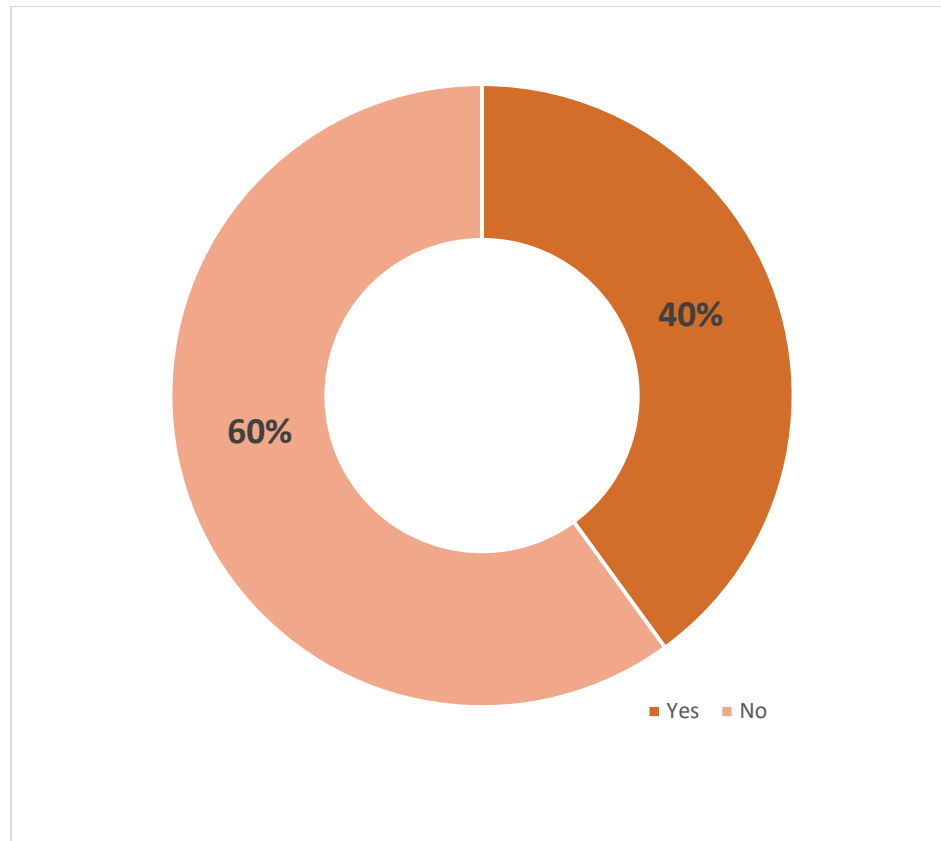


Figure 14: Ratio of hospitalized population

Discussion: In this survey, 40% responders replied that they have been hospitalized for Pneumonia & 60% participants retorted that they haven't been hospitalized.

5.13 Side effect of taken treatment

Q: Did you experience any side effects from the treatment?

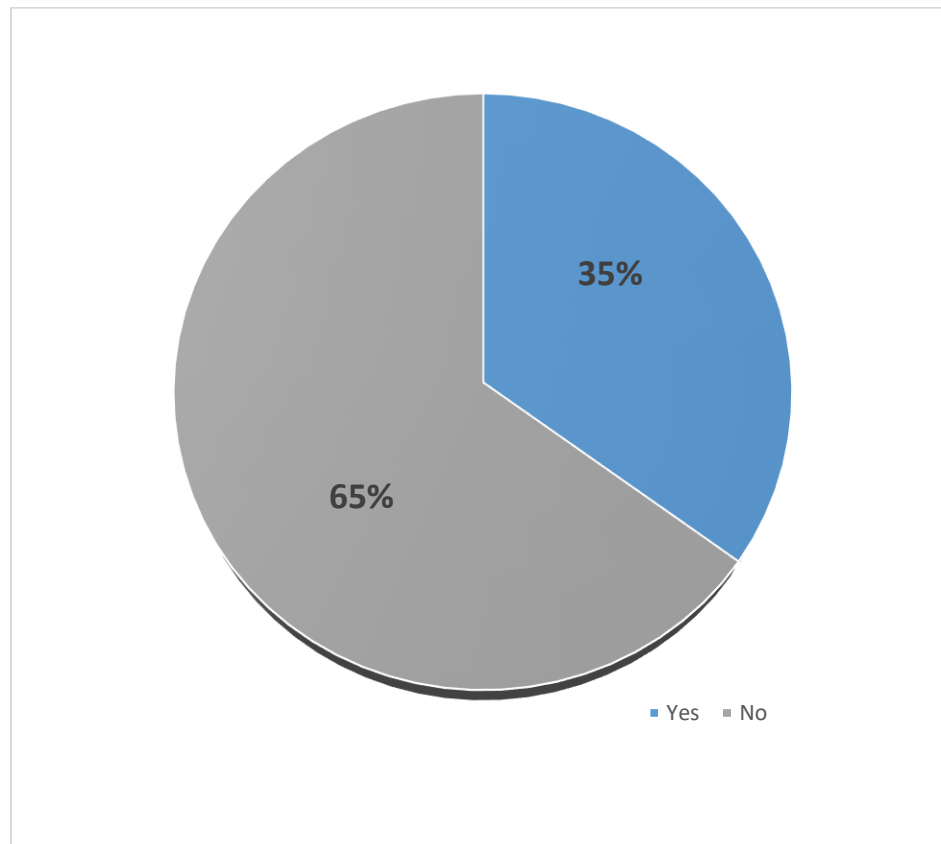
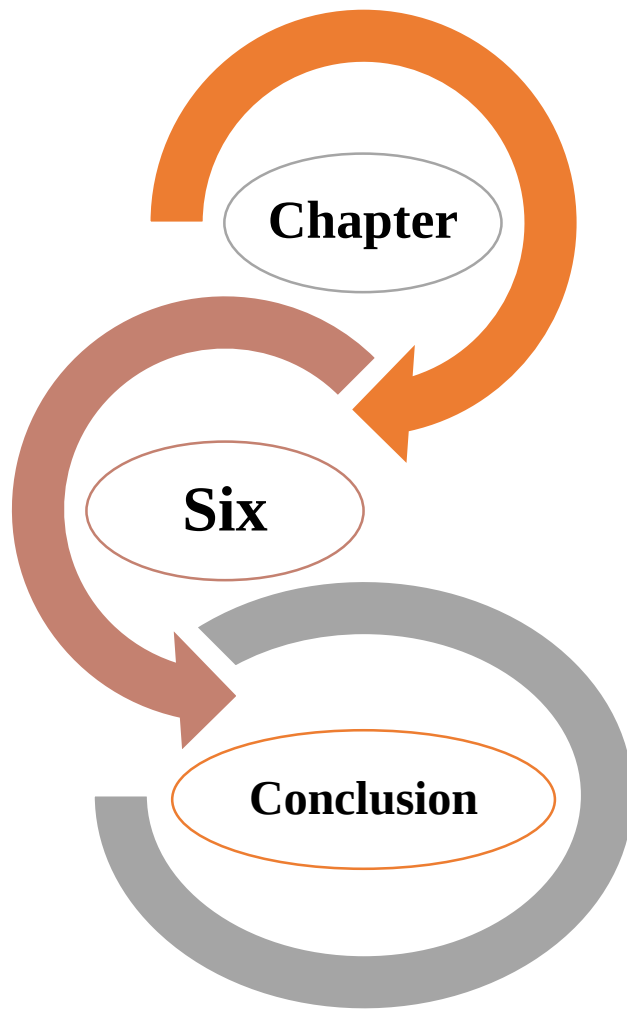


Figure 15: Side effect of taken treatment

Discussion: As per this investigation, 35% responders responded that they have been experienced side effect after taken long time Pneumonia treatment.



6. Conclusion

The survey on the prevalence and treatment of pneumonia at the hospital in Gazipur reveals critical insights into the current state of healthcare management for this respiratory condition. The study highlights a notable incidence of pneumonia among patients, underscoring the need for heightened awareness and improved preventive measures. The demographic data indicates that certain groups, such as the elderly and children, are more susceptible, necessitating targeted interventions for these vulnerable populations. In conclusion, the findings of this survey provide a comprehensive overview of pneumonia's prevalence and treatment in Gazipur, serving as a valuable resource for healthcare providers and policymakers. By addressing the identified gaps and leveraging the insights gained, there is a substantial opportunity to enhance the quality of care, reduce the disease burden, and ultimately improve the health and well-being of the community.

Chapter **Seven**

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