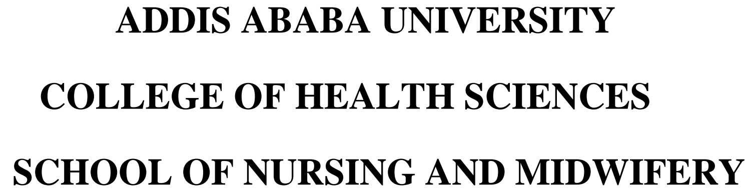

ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

PREVALENCE AND ASSOCIATED FACTORS OF PNEUMONIA AMONG UNDER-FIVE CHILDREN AT PUBLIC HOSPITALS IN JIMMA ZONE, SOUTH WEST OF ETHIOPIA, 2018.

BY: KENENISA TEGENU (BSc NURSE)

A THESIS SUBMITTED TO THE SCHOOL OF GRADUATE STUDIES OF ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS IN PEDIATRIC AND CHILD HEALTH NURSING

JUNE, 2018

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ADDIS ABABA, ETHIOPIA

APPROVAL BY THE BOARD OF EXAMINATION

This thesis by **kenenisa Tegenu Lema** is accepted in its present form by the board of examiners as satisfying thesis requirement for the degree of masters in **pediatric and child health nursing.**

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STATEMENT OF DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis.

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ACRONYMS AND ABBREVIATIONS

AIDS- Acquired Immune Deficiency Syndrome

AOR- Adjusted Odds Ratio

ARTI-Acute Respiratory Tract Infection.

CHD- Congenital Heart Disease

CHERG-Child Health Epidemiology Reference Group

CI-Confidence Interval

COR-Crude Odds Ratio

CSA-Central Statistical Agency

D.E.C-Data Entry clerk

EBF-Exclusive Breast Feeding

ETB- Ethiopian Total Birr

EDHS-Ethiopian Demographic and Health Survey

EPIDATA-Epidemiological Data

Hib- Haemophilus Influenzae Type B vaccine

IMNCI-Integrated Management of Neonatal and Childhood Illness

JUMC- Jimma University medical center

OPD- Out Patient Department

PBF-Partial Breast Feeding

PI-Principal Investigator

PCV-Pneumococcal Conjugate Vaccine

SDG- Sustainable Development Goal

SPSS-Statistical Package for Social Science

UNICEF-United Nations Children's Fund

WHO-World Health Organization

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ABSTRACT

Background: It is estimated that in Ethiopia 3.37 Million children encounter pneumonia annually which contributes to 18 per cent of all causes of deaths killing over 40,000 under-five children every year. These deaths are easily preventable and treatable through simple and cost effective interventions.

Objective: To assess the prevalence and associated factors of pneumonia among under -five children at public hospitals in Jimma Zone, South West, Ethiopia.

Methods: Institutional based cross-sectional study design was conducted on 306 participants and systematic random sampling was applied. Data was collected by interview method using structured questionnaire. To control data quality data collectors and a supervisor was trained for two days, pretest was done on 5 % of a sample size, and completeness and consistencies of questionnaires was checked. The data was entered in to EPIDATA version 3.1 and then exported to Statistical Package for Social Science version 23 for analysis. All variables were used in the bivariate logistic regression. To determine potential predictors of under-five pneumonia variables with p value less than 0.2 were further considered for multivariate logistic regression and P value <0.05 at 95% Confidence interval was declared statistically significant association.

Result: Prevalence of pneumonia among under-five children was 28.1%. Use wood as fuel source(P= 0.003, AOR=3.45), cook food in living room(P= 0.008, AOR= 3.34), caring of the child on mothers back or besides the mother during cooking (P= 0.008, AOR= 2.96), absence of windows in the kitchen(P= 0.001, AOR= 2.5), children who unvaccinated(P= 0.004, AOR= 4.6), Vitamin A supplementation(P= 0.002, AOR= 0.168), mixed breast feeding during 6 months(P= 0.014, AOR= 3.26), moderate acute malnutrition(P= 0.002, AOR= 4) and child history of ARTI(P= 0.004, AOR= 4) were a potential determinates of under-five children pneumonia.

Conclusion and Recommendations: This studies show that the prevalence of under-five pneumonia was high. Therefore, by make intervention on potential determinates such as: by Ventilate and improved housing conditions, give health education on exclusive breastfeeding, increase immunization and Vitamin A supplementation, improve child nutritional status, and early control of respiratory tract infection we can reduce under-five pneumonia.

Key words: under five pneumonia, assonated factors, prevalence and Jimma zone.

CHAPTER ONE: INTRODUCTION

1.1 Back ground

The term pneumonia describes as inflammation of parenchymal structures of the lung, such as the alveoli and the bronchioles. Pneumonia is most commonly classified by where or how it was acquired: community-acquired, aspiration, hospital-acquired (nosocomial) and ventilator-associated pneumonia. It may also be classified by the area of lung affected: lobar pneumonia, bronchial pneumonia and acute interstitial pneumonia, or by the causative organism. Pneumonia in children may additionally be classified based on signs and symptoms as non-severe, severe, or very severe. People with infectious pneumonia often have a productive cough, fever accompanied by shaking chills, shortness of breath, sharp or stabbing chest pain during deep breaths, and an increased rate of breathing(1, 2).

Pneumonia is usually caused by infection with viruses or bacteria. Causes of pneumonia by both Virus and bacteria's may occur up to 45% in children and 15% in adults. Bacteria are the most common cause of community-acquired pneumonia (CAP), with Streptococcus pneumoniae isolated in nearly 50% of cases. Other commonly isolated bacteria include Haemophilus influenzae in 20%, Chlamydophila pneumoniae in 13%, and Mycoplasma pneumoniae in 3% of cases. In children for about 15% of pneumonia cases a number of drug-resistant versions of the above infections are becoming more common, including drug-resistant Streptococcus pneumoniae (DRSP) and methicillin-resistant Staphylococcus aurous(3, 4).

Commonly viral infection agents of pneumonia include rhinoviruses, coronaviruses, influenza virus, respiratory syncytial virus (RSV), adenovirus, and parainfluenza. Fungal pneumonia is uncommon, but occurs more commonly in individuals with weakened immune systems or other medical problems. Also variety of parasites can affect the lungs. Idiopathic interstitial pneumonia or noninfectious pneumonia is a class of diffuse lung diseases(3, 5).

The World Health Organization (WHO) estimates there are 156 million cases of pneumonia each year in children younger than five years, with as many as 20 million cases severe enough to require hospital admission and 1.2 million deaths annually, making up 18% of all deaths of this age group and mainly affecting children in developing countries. In developing countries, respiratory tract infections are not only more prevalent but more severe, accounting for more than 2 million deaths annually; pneumonia is the number one killer of children in these societies.

More than 60% of such incidence of pneumonia is reportedly concentrated in just two regions, namely Southeast Asia and Africa, each bears 35 and 61 million new infections in a year, respectively. In the developed world, the annual incidence of pneumonia is estimated to be 33 per 10,000 in children younger than five years (6-8).

There are deferent risk factors of pneumonia for children in developing countries include malnutrition, low birth weight, nonexclusive breast feeding first 4 months of age and lack of immunization. Possible risk factors include housing condition, passive smoking, maternal education, day care attendance, birth order, and environmental factors such as indoor air pollution, overcrowding, humidity, high altitude and outdoor air pollution. Other risk factors include; comorbid diseases like (diarrhea, measles, URTI, asthma HIV and Malaria), micronutrient deficiencies such as zinc, vitamin D and vitamin A deficiency (7, 9, 10).

The cornerstone of effective treatment for childhood pneumonia remains appropriate antibiotics and supportive care. Community case management of childhood pneumonia reduces pneumonia mortality by 70%. Accumulating evidence suggests that community based use of oral antibiotics for pneumonia may be a feasible and effective strategy for reducing mortality (6, 11, 12).

Improved access to health care, immunization, better nutrition, promotion of breast feeding, and improved living conditions contribute to the reduction in incidence of pneumonia and decline in case fatality rates. Improved home ventilation and reduction in exposure to indoor air pollution and cigarette smoke are important strategies to reduce the severity and incidence of childhood pneumonia. Prevention of pneumonia has also been expedited by the introduction of HibV, PCV and RSV. Combined data from six studies of the effectiveness of Hib vaccine in low and middle income countries indicates a reduction of 18% in radiological pneumonia, of 6% in severe pneumonia and of 7% in pneumonia-associated mortality(13, 14).

1.2 Statement of problem

Globally Pneumonia is the leading cause of child mortality from infectious diseases, accounting for approximately 16 percent of the 5.6 million under-five deaths, killing around 900,000 children in 2016. This means a loss of over 2,500 children lives every day, or over 100 every hour. Pneumonia kills nearly 1 million children under the age of five around the world, causing more deaths than HIV/AIDS, diarrhea and malaria combined. 'The forgotten child killer': Pneumonia kills two kids under five every minute(15).

Mortality attributed to pneumonia has decreased since 2000, but remains a major public health concern. According to the WHO 2016 report pneumonia accounted for 16% of the estimated 5.9 million deaths among children aged less than 5 years in 2015. According to 2012, however, then global estimate of childhood pneumonia deaths was 18%, which can be translated to approximately 1.4 million childhood deaths, roughly a 100,000 deaths rise from the previous report of 2011 (8, 16).

The incidence in under-five age group is estimated to be 0.29 episodes per child-year in developing and 0.05 episodes per child-year in developed countries. This translates into about 156 million new episodes each year worldwide, which 151 million episodes are in the developing world. Pneumonia kills an estimated 1 million children under the age of five every year worldwide. From this 90–95% of deaths occur in the developing world. Most cases occur in India (43 million), China (21 million) and Pakistan (10 million), with additional high numbers in Bangladesh, Indonesia and Nigeria (6 million each). Of all community cases, 7–13% is severe to be life-threatening and require hospitalization(7, 8).

The African Region has, in general, the highest burden of global child mortality, 50% of worldwide deaths from pneumonia in this age group. By contrast, less than 2% of these deaths take place in the European Region and less than 3% in the Region of the Americas. More than 90% of all deaths due to pneumonia in children age less than 5 years take place in 40 countries. The incidence and severity of childhood pneumonia was highest in Africa and south East Asia, which accounted for 30% and 39% respectively of the global burden of severe cases. In these two regions, 15 countries accounted for two-thirds of all childhood pneumonia episodes and severe cases (8, 17). More than 490,000 children under-five died by pneumonia in 2016 in sub-Saharan Africa (18).

In Ethiopia, pneumonia is a leading single disease killing under-five children. It is estimated that in Ethiopia 3,370,000 children encounter pneumonia annually which contributes to 18 per cent of all causes of deaths killing over 40,000 under-five children every year(8). These deaths are easily preventable by cost effective interventions like immunization, good nutrition, exclusive breast feeding, appropriate complementary feeding hand washing (19). According to study conduct at Wondo Genet district, Sidama zone, Ethiopia, the prevalence of pneumonia among under-five children visit health center was 33.5% (20).

Burden and severity of childhood pneumonia is high in Ethiopia children due to limited coverage and affordability of effective preventive interventions like immunization of PCV, RSV, and lack of good access to care and unavailability of effective management strategies. In our countries children also have high exposure pneumonia compared with children in high-income countries. The huge discrepancy between the current incompatibly big and high peal of pneumonia reflects poorly designed prevention strategies in the poorest settings like Ethiopia (21, 22).

It is therefore important that to look at a combination of strategies for reducing the morbidity and mortality from pneumonia. These include preventive strategies such as routine immunizations, zinc and vitamin A supplementation, control of environmental factors, promotion of breast feeding, good nutrition, safe drinking water and good sanitation. Nevertheless, pneumonia remains the major cause of death in children. These deaths are easily preventable and treatable through simple and cost effective interventions. So, addressing current gaps for prevention of under-five pneumonia is critical to achieving Sustainable Development Goal (SDG 3)(23).

The widespread nature of the problem in Ethiopia has already killed thousands of children which need to look for lasting solution so as to end the problem. Despite the sustained effort to stop the problem, pneumonia continue to common mortality of children which calls for innovative strategies that will come about only through systematic researches. Data on the frequency of pneumonia and their related risk factors are important for planning child health care services but scarce in our countries. There is no study done on the pneumonia prevalence and associated factors at Jimma zone. Therefore, this study aimed to assess the prevalence and associated factors of pneumonia among under-five children at public hospital found in Jimma Zone Sothern Ethiopia.

1.3 Significance of study

In Ethiopia pneumonia kill over 40,000 under-five children every year. These deaths are easily preventable and treatable through simple and cost effective interventions. Understanding about the factors that contribute to under-five pneumonia helps the policy makers and health administrators to improve the health care services through prevention and review of the failures of the ongoing interventions. It also helps in improving child health based on the factors identified during the study.

Identifying factors associated with pneumonia in under-five children will help zonal health office, woreda health managers and extension workers in designing appropriate intervention to improve health status of under-five children. Therefore, identifying common factors associated with under-five pneumonia and burden, support for the readiness of health facilities to make appropriate prevention and evaluation of the causes of under-five pneumonia. Thus, this study tried to make all these possible.

This study will be also help researchers as input for other studies, which was conducted on the related subject matter in the future time.

CHAPTER TWO LITERATURE REVIEW

2 .1.1 Global Incidence and Prevalence under five pneumonia

Pneumonia is the single largest contributor to child mortality, accounting for almost 28–34% of all under-five deaths globally. Annually, approximately 120–156 million cases of acute lower respiratory infections (ALRI) occur globally, with approximately 1.4 million resulting in death. Of these, pneumonia kills an estimated 1 million children under the age of 5 every year and accounts for 15% of deaths in children <5 y of age, with 90–95% of these deaths occurring in the developing world. The majority (»2 thirds) of pneumonia episodes in children <5 y of age occurs in just 15 countries, with South Asia and Sub-Saharan Africa collectively those enduring the largest burden of more than half the worldwide total cases of pneumonia in children(7, 8).

Estimates of clinical pneumonia incidence are highest in South-East Asia (0.36 episodes per child-year), closely followed by Africa (0.33 episodes per child-year) and by the Eastern Mediterranean (0.28 episodes per child-year), and lowest in the Western Pacific (0.22 episodes per child year), the Americas (0.10 episodes per child-year) and European Regions (0.06 episodes per child-year). More than 90% of all deaths due to pneumonia in children aged less than 5 years take place in 40 countries(7, 11).

India, Pakistan, Nigeria, democratic republic of Congo and Ethiopia are the five highest children pneumonia mortality burden countries in the world. In India, pneumonia killed about 0.397 million children younger than five years which equates to 23.6% of all deaths. In china, pneumonia is the single leading cause of childhood mortality, contributing to 17.4% to the toll of deaths in children less than five years. In Ruanda, Sierra Leone, Somali, South Sudan and South Africa, 18%,16%,19%,20% and 17% of under-five deaths of pneumonia respectively in 2012. Conversely, Peru, Nepal, Mozambique, and Morocco, carry pneumonia case load of correspondingly 10%,14%,14%, and 13%(8, 24, 25).

Cross sectional study done at Southeast Nigeria indicate that the prevalence of pneumonia is 31.6% and risk factors identified in the study include; inadequate breast feeding, poor immunization status, attendance to day care centers, large family size, poor parental educational statues, parental smoking, living in the urban area and use of biofuels (26).

2. 1.2 Prevalence Under five Pneumonia in Ethiopia

EDHS, 2016 shows that the prevalence of ARI symptoms is 30 percent from children visit health facility from this pneumonia occupied high percent(27). In Ethiopia, pneumonia is the single leading cause of death among children younger than five years. The WHO report showed there were 389,000 under five deaths, of which 22% were due to pneumonia. According to the recent 2014 countdown to 2015 report , however, the toll of under- five pneumonia deaths has supposedly dropped to 18%,which is among the highest even compared to the load in the majority of African countries. There are only scant source of data on this problem locally. For instance, a case control study in Gilgel Gibe revealed that 42% of post neonatal and 22.6% of neonatal mortality were attributable to pneumonia (24).

Institutional based cross sectional study conduct at Wondo Genet district, Sidama zone, Ethiopia, the prevalence of pneumonia among under-five children was 33.5%. Absence of separate kitchen, absence of window in the kitchen, breast feeding less than one year and children at age range of 2-12 months were identified as determinates of pneumonia(20). Community based cross sectional study conduct at Este town Northwest Ethiopia show that; the overall two weeks prevalence of pneumonia among under-five children was 16.1%. Stunting, using charcoal for cooking, carrying the child on back during cooking, keeping cattle inside the main house and living in crowded house were the most important variables found associated with pneumonia among under-five children in this study(28).

2.2 Associated Factors to under –five pneumonia

2.2.1 Socio Demographic Characteristics

The risk of pneumonia in children in developing countries is 3 to 6 times higher than other children. Not only outbreak of pneumonia, but also the mortality rate of this disease is higher in developing countries. Mortality due to childhood pneumonia is strongly linked to poverty-related factors such as under nutrition, lack of safe water and sanitation, indoor air pollution and inadequate access to health care. and inadequate knowledge and awareness of mothers about proper infant care practices to this disease that exacerbating the problem(10).

2.2.1.1 In come and Residence

A cohort study conduct in Egyptian shows that a low family income and residence were significant independent predictive risk factors for SCAP among Egyptian children(29). A

descriptive study carried out in Al-Zahraa and Al-Hakeem Hospital, Iraq show that highly percentage of pneumonia patients (86%) was in low income it gave a highly statistical significant and the highly percentage in distribution of pneumonia patients was in urban area (91%), than rural area (9%), and it gave a highly statistical significant deference (30).

2.2.1.2 Maternal education

Maternal educational level plays vital role and most important factors in predicting children health. Mother's education level has an undeniable and important impact on children's health. In this regard, the role of mother in health promotion and disease prevention, assistance in early diagnosis and patient care is vital. Similarly case-control study done at Komfo Anokye Teaching Hospital University of Ghana shows that low maternal educational level were the significant risk factors for under five pneumonia (31).

2.3. Environmental Risk Factors

2.3.1 Indoor air pollution

Half of the 2 million premature deaths in low income countries are due to pneumonia caused by indoor air pollution from solid fuel use. The effect of indoor air pollution on under five children found that the risk of pneumonia among children who are exposed to indoor air pollution from solid fuel combustion increased by 80%. Similarly WHO study indicates that indoor air pollution strongly associated with pneumonia-related mortality in children. A systematic review of indoor air pollution and pneumonia risk among young children (<5 years) in developing countries found a significant association with pneumonia morbidity and mortality after adjustment for possible confounders including socioeconomic status, parental education, breastfeeding, malnutrition and cigarette smoke exposure(32).

A cross-sectional survey was conducted in Rasuwa district of Nepal, indicate that; (31.4%) of the children under five years of age who lived in household using biomass fuels suffered from ALRI and use of traditional/open type of cooking stove was found to be highly associated with ALRI among children(33).

2.3.2 Inappropriate sanitation and overcrowded

Conditions of poverty include inappropriate sanitation, overcrowded living conditions, lack of clean water and irregular hand washing, they contribute to child pneumonia. Studies suggest that

in impoverished communities, regular hand washing can reduce the incidence of child pneumonia by 16% (95%CI 11%-21%)(19).

2.3.3 Environmental tobacco smoke (ETS) and maternal prenatal smoking

High, and rising, rates of cigarette smoking in the Western Pacific region is a major public health concern. In Western Pacific region house hold cigarette smoke exposure is common (70.5%) with 28.7% of childhood pneumonia cases and 44,000 hospitalization events attributed to passive cigarette smoke exposure. According to a study from Ho Chi Minh City, 81% of children hospitalized for pneumonia had household cigarette smoke exposure(34).

2.4 Health facility and child care factor

2.4.1 Availability / Distance/Cost of Health facility

Failure to access healthcare is an important contributor to child mortality in many developing countries. In a national household survey in Malawi show that, trained healthcare provider was visited for 48.0% of illness episodes and multivariate regression model showed that children from the poorest households were less likely to seek care when ill compared to those living in wealthier. In addition, visiting a trained healthcare provider was associated with longer travel time and higher direct costs compared to visiting an untrained provider. Thus, several barriers to accessing healthcare in Malawi for childhood illnesses exist(35).

2.4.2 Delays in seeking health care

Lack of money, distance, and perception of the illness not being serious were the major reasons for not seeking care. Residence and knowledge were identified as the major predictors of health care seeking practices from health facilities. Cross sectional Derra district, north shoa zone, Ethiopia, Studies have shown that maternal behavior in seeking medical care for diseases of children is affected by factors such as socio-economic status, mother's knowledge and beliefs about the cause and severity of the disease and their traditional beliefs(36).

2.4.3 Immunization/vaccination

South Africa has included the H influenzae type b (Hib) vaccine into national guidelines, with potential to reduce Hib invasive disease by 46% to 93% in vaccine recipients. A recent review of intervention packages by shows that programs of childhood immunization and control of pneumonia mortality in children are highly cost-effective (37).According to cross sectional study done at northwest region of Uruguay, pneumonia incidence decrease, between 2009 and 2012, by

27.3% and 46.4% respectively and 2001–2004 and 2009–2012 comparison showed a significant difference of 20.4% for consolidated pneumonia hospitalizations. A significant incidence decline was recorded among children 6 to 35 months of age. An overall significant reduction in pneumonia hospitalizations was observed following the introduction of PCV7 and furthermore following the change to PCV13(38).

2.4.4 Lack of Breast Feeding

The risk of ARI is increased by approximately 60% in children who are never breastfed. A systematic literature review and meta-analysis shows that suboptimal breastfeeding elevated the risk of pneumonia morbidity and mortality outcomes across age groups. In particular, pneumonia mortality was higher among not breastfed compared to exclusively breastfed infants 0-5 months of age and among not breastfed compared to breastfed infants and young children 6-23 months of age(39).An institution based case control study conducted at in Achefer District, Northwest Ethiopia indicate that those children who had no chance to be breast feed were 83 times more likely to be cases than those who were exclusively breast feed(40).

2.5 Preexisting medical and Co-morbid conditions

2. 5. 1 Malnutrition

Under nutrition, defined by wasting, stunting, and specific nutritional deficiencies, is associated with approximately half of all deaths in children. Consequently, the presence of severe acute malnutrition can increase mortality from pneumonia 15-fold (41). Children who their weight is less than 70% appropriate weight for their age, compared to other children, increased an 8 times risk of mortality from pneumonia for them(10). A case control study was conducted at Nepalgunj Medical College, Kohalpur Teaching Hospital, Kohalpur, Nepal indicate that moderate wasting was present on 36.4% of case group and 16.8% of control group and It was significantly associated with ALRI (42).

2.5.2 Nutritional deficiency

In Iran, 43 percent of the 200 children were admitted to Children's Medical Center that were diagnosed with radiologic rickets, were also suffering from bronchopneumonia. Therefore, vitamin D deficiency may be an important factor predicts pneumonia in children less than 5 years in developing countries.(43) The role of vitamin A in the growth and development of cells and tissues (especially in respiratory epithelial cells and lung tissue) is essential. Vitamin A

deficiency is associated with inflammation and infection in children and the severity of the infection(10) Zinc deficiency to be associated with increased risk of infection, particularly pneumonia. Similarly, Studies conducted in US & Pakistan reported the reduction of pneumonia incidence and prevalence among children who received zinc supplementation(44).

2.5.3 Co-morbid conditions

Prematurity, low birth weight, chronic disease and HIV/ AIDS have been recognized as independent risk factors for pneumonia-related mortality in children (32). Children with co-morbid conditions such as prematurity, malnutrition, congenital heart disease or HIV-infection often require prolonged periods of hospitalization. (45)

Chronic diseases that are associated with child pneumonia include gastro-esophageal reflux, rhino-sinusitis with post-nasal drip, atopic asthma, congenital heart disease with cardiac failure and cystic fibrosis. Cross sectional study in China showed that 33% children admitted to the Intensive Care Unit with severe pneumonia had a pre-existing co-morbid condition. Comorbid conditions, especially congenital heart disease, were also associated with prolonged hospital admission and death from pneumonia. Pneumonia is the number one cause of hospitalization and death in children with severe immune-compromise, including human immunodeficiency virus (HIV)-infected children (46).

2.6 conceptual framework

Under- five pneumonia is dependent variable and factors that related to under- five pneumonia are socio-demographic factors including educational level, family size, income, residence and occupation. Environmental factors like indoor air pollution, poor ventilation, overcrowded tobacco smoke exposure and expose the child to un-favorable environmental conditions are predictors of under-five pneumonia. Health facility and child care factors which include factors such as availability, distance, cost of health facility, delays in seeking health care, un immunized and lack of breast feeding also related to under five pneumonia. One factor directly or indirectly affects other factors for example socio-demographic factors can affect environmental factors or health facility and child care factor.

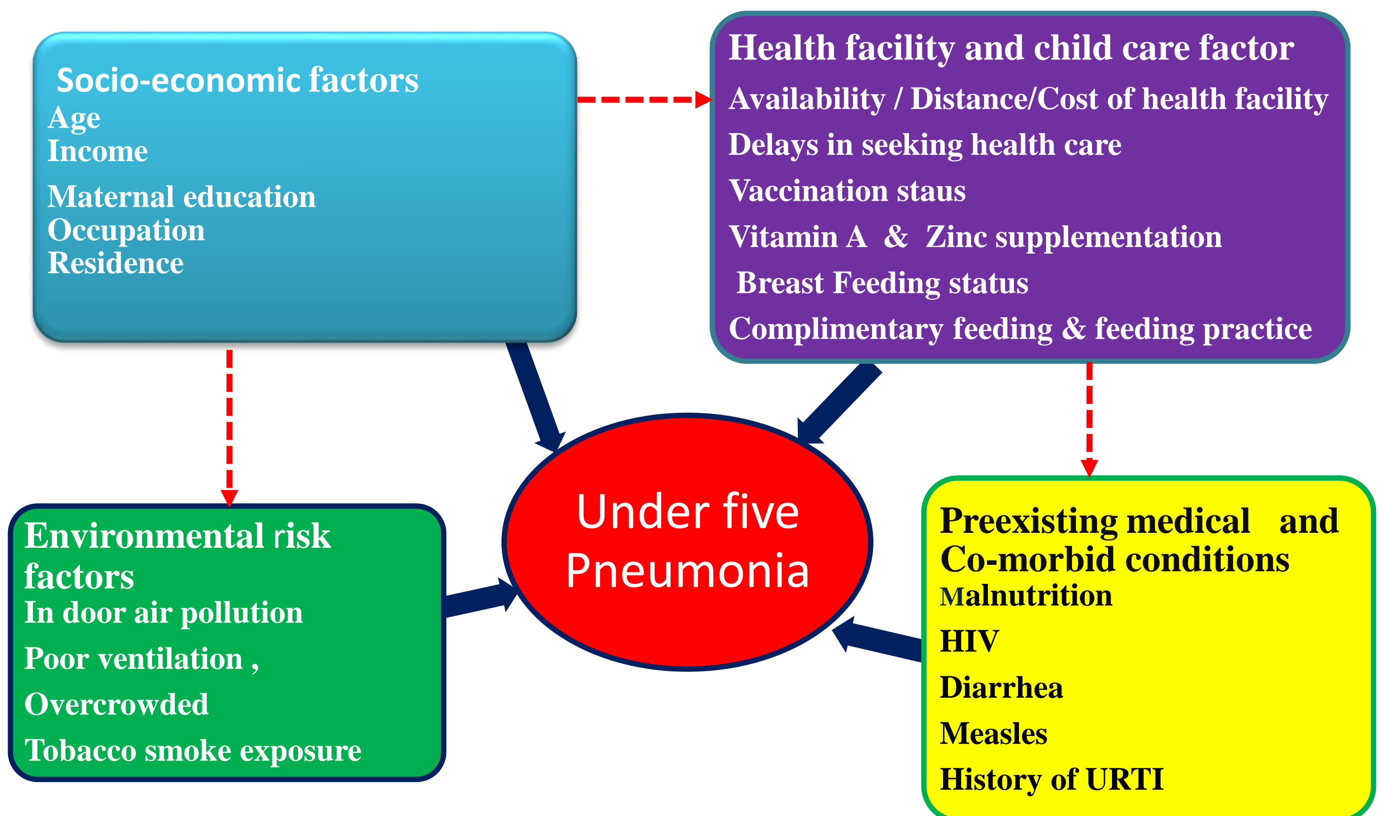

Figure-1 Conceptual frame work on associated factors to pneumonia among under -five children developed from deferent literature review (7, 9, 10, 13, 17, 20, 25, 32, 34, 47-50).

CHAPTER THREE
3 OBJECTIVES OF THE STUDY

3.1 General objective

To assess the prevalence and associated factors of pneumonia among under-five children's at public hospitals in Jimma Zone, South West of Ethiopia, 2018.

3.2 Specific objectives

To determine the prevalence pneumonia among under -five children's at public hospitals in Jimma Zone, South West of Ethiopia 2018.

To identify factors associated with pneumonia among under -five children's at public hospital in Jimma Zone, South West of Ethiopia, 2018.

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CHAPTER FOUR
4 METHODS AND MATERIALS

4.1 Study Area and the Study Period

The study was conducted in public hospitals in Jimma zone, Oromia region state south-West Ethiopia. Jimma zone far 350 Km from Addis Ababa. Based on the 2007 Census conducted by the CSA, this Zone has a total population of 2,486,155, an increase of 26.76% over the 1994 census, of whom 1,250,527 were men and 1,235,628 women; with an area of 15,568.58 square kilometers. Jimma has a population density of 159.69, while 137,668 or 11.31% are urban inhabitants, a further 858 or 0.03% are pastoralists. According to 2007 CSA under five children in Jimma zone were 421,626, which male 212,159 and female 209,467. In this zone there are seven public hospitals namely, Jimma University medical center, Shenen Gibe, Agaro Limu, Seka, Omoneda and Satema hospital. Except JUMC all are district hospitals.

Study was conducted from March 1-31, 2018 G.C.

4.2 Study Design

Institutional based cross-sectional study design was conducted.

4.3. Population

4.3.1. Source of Population

The sources of population were all under -five children visit out patients department of public hospitals in Jimma zone.

4.3.2. Study population

The Study populations were all under -five children with mother/ care givers visiting out patients department of selected public hospitals in Jimma Zone during data collection period.

4.4 Eligibility Criteria

4.4.1. Inclusion criteria

Children 2-59 months of age with mother / care giver visiting out patients department of selected Public hospitals in Jimma Zone during data collection period.

4.4.2 Exclusion Criteria

Severely sick child need life treating intervention.

If mother / care givers were refused.

4.5 Variables

4.5.1 Dependent Variable

Under five children Pneumonia

4.5.2 Independent variables

- ❖ Socio-economic factors
  - ✓ Educational level,
  - ✓ Family size,
  - ✓ Income,
  - ✓ Residence and
  - ✓ Occupation
- ❖ Environmental factors
  - Indoor air pollution,
  - Poor ventilation,
  - Overcrowded
  - Tobacco smoke exposure
- ❖ Health facility factors and Child care factors
  - o Availability, distance, cost of health facility,
  - o Delays in seeking health care,
  - o Un immunized and
  - o Lack of breast feeding
- ❖ Preexisting medical conditions of child and Co-morbid conditions of child
  - ▪ Diarrhea, Measles, URTI, Asthma, HIV and Malaria
  - ▪ Lack of micronutrient sublimation such as zinc and vitamin A.

4.6. Sample size and sampling technique

4.6.1 Sample size*:* The sample size was determined using the single population proportion formula. Considering the prevalence of under-five pneumonia which taken from institutional based cross sectional study conduct at Wondo Genet district, Sidama zone, Ethiopia(20), level of confidence 95%, and margin of error 5%, the sample size calculated as follows:

$$n_o = \frac{(Z\alpha/2)^2\, p(1-p)}{d^2}$$

Where,

n_o - initial Sample size

z- Standard normal value at 95% CI which is 1.96

p- Estimated population proportion is 0.34

d- Possible margin of error tolerated which is 5%.

$$n_o = \frac{(1.96)^2 0.34(1-0.34)}{(0.05)^2}$$

n_o = 345

The source of population is 1500 under -five children visit out patients departments of selected public hospital in Jimma zone which is less than 10,000, population correction formula is used to determine adjusted minimum sample size as follows

$$nf = \frac{n}{1+n/N}$$

Where

n_o= minimum sample size (345)

N=Total number of under -five children visit out patients departments of selected public hospital in Jimma zone. (1500)

n_f= final sample size

Thus $nf = \frac{n}{1+n/N}$

$$nf = \frac{345}{1+345/1500}$$

$$= \frac{345}{1.23}$$

$$= \mathbf{281}$$

By adding non respondents rate 10% of sample size the final sample size was

$n_f = 281 + 281 * 0.1$

$= 281 + 28$

$= \mathbf{309}$

4.6.2 Sampling procedures

There are seven public hospitals in Jimma zone, from seven hospitals four hospitals namely Jimma University medical center (JUMC), Shenen Gibe hospital, Agaro hospital and Seka hospital were selected by using simple random sampling. Then the final calculated samples size for the study was proportionally allocated to each selected hospitals. An individual study participant was selected using systematic random sampling techniques from under five OPD registration book of each selected hospital by K-value.

Proportional allocation for each selected hospital.

Jimma University Medical Center (N= 500)

$$= \frac{\text{Under five children visit OPD of JUMC * final sample size}}{\text{Total under-five children visit OPD of selected hospital}}$$

$$= \frac{500 * 309}{1500} = \mathbf{103}$$

Agaro hospital (N=330) = $\frac{\text{under five children visit OPD of Agaro hospital * final sample size}}{\text{Total under-five children visit OPD of selected hospital}}$

$$= \frac{330 * 309}{1500} = \mathbf{68}$$

Seka hospital(N=320) under five children visit OPD of Seka hospital * final sample size

Total under-five children visit OPD of selected hospital

$$= \frac{320 * 309}{1500} = \mathbf{66}$$

Shanen gibe hospital (N=350) $\frac{\text{under five children visit OPD of Shanen Gibe * final sample}}{\text{Total under five children visit OPD of selected hospital}}$

$$= \frac{350 * 305}{1500} = \mathbf{72}$$

K vale = $\frac{\text{Total under five children visit OPD of selected hospital}}{\text{Final sample size}}$

$$= \frac{1500}{309} = 4.5 \approx \mathbf{5}$$

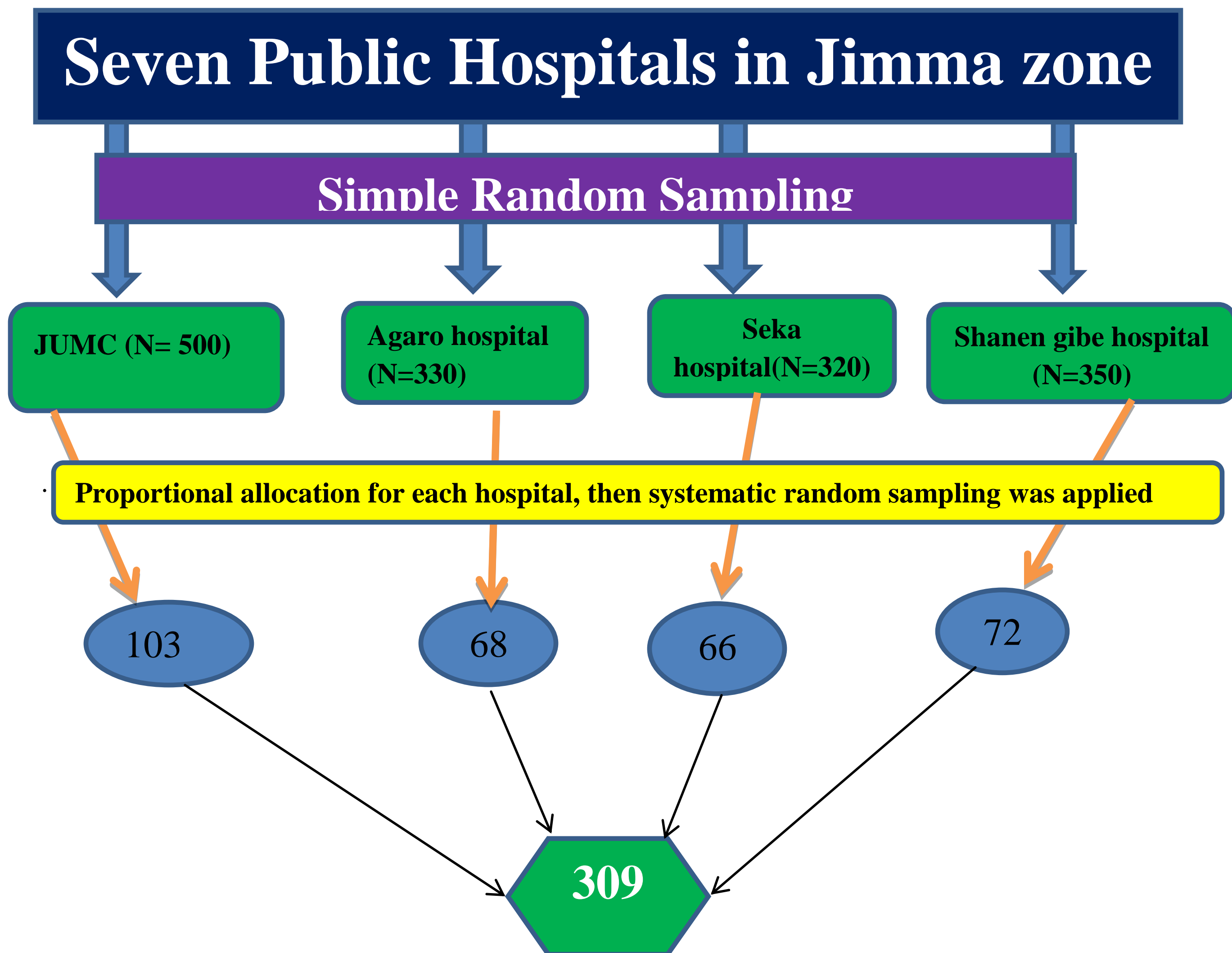

Figure- 2: Schematic presentation of the sampling procedure for the selection of sample under-five children from under -five children at public hospital in Jimma Zone, South West. Ethiopia, March, 2018

4.7 Data Collection procedures

Interviewer administered structured questionnaire was used to collect data from sampled mother or care giver who visiting under five children out patients departments of four selected hospitals. The questionnaire is adapted and modified from different related studies(20). The reliability of the tool was determined based by the analysis result of the (Cronbach's alpha=0.78) pretest which was 0.78 and Content validity was ensured by comparing result of study with other similar study. The questionnaire consist four part; part-I socio-demographic factors, part–II Environmental factors, part –III Health facility and child care factor. English version

questionnaire was translated in to Afaan oromo language by expert, then translated back in to English by the other expert person to check the consistency.

Finally record review was done to collect information on diagnosis of child, preexisting medical or Co-morbid conditions, height and weight of the children. Four diploma nurse and one (BSc) Nurse was recruited as data collectors and supervisor, respectively.

4.8 Data quality control

Both data collectors and a supervisor were trained for two days on objective of study and techniques of data collection. A supervisor was check the completeness and consistencies of questionnaires filled by the data collectors to ensure the quality of the data. The Principal investigator was evaluates the data before the data analysis stage to verify the completeness of the collected data.

Pretest was done on 5 % of a sample size in Limu hospital to ensure internal consistency of the instrument. After collecting the pretest data, each individual questionnaire response was checked for any potential problem related to the instrument, such as any difficult question which did not satisfy the respondent psychology, not understandable or unclear question to reply. Finally a corrective measure was taken.

4.9 Data Processing and Analysis

The data was entered and coded in to the Epi-Data version 3.1 up on creating the questionnaire template in the QES file of the software. The entered data was cleaned to ensure the validity of the data. Then, the analysis was made with SPSS version 23 after exporting the prepared data. Descriptive statistics and logistic regression was computed. All variables were used in the bivariate logistic regression and a variable with p-value ≤ 0.2 was further considered for multivariate logistic regression to control confiding variables. Crude odds ratio and adjusted odds ratio (AOR) was analyzed with a 95% confidence interval (CI) and p-value <0.05 was considered a statistically significant association.

4.10 Operational definition

Under five children: Children age less than 59 months, but in this study infant less than two months was not included because at age of less than two months the case as not diagnosis as pneumonia.

4.11 Ethical Consideration

Ethical clearance for the start of the study was obtained from Research Ethical Committee of School of Nursing and Midwifery, College of Health Sciences, Addis Ababa University**.** Then the letter was written to selected hospital like Jimma University medical center, Shenen Gibe hospital, Agaro hospital and Seka hospital in Jimma zone for data collection. Verbal and written informed consent was obtained from participants after a detailed explanation on the purpose and benefit of the study right before the individual data collection. Data collectors and a supervisor were told to help participants involved in the study only willingly by clarifying them the objective and purpose of the study. The participants were informed that their failure to participate in the study was not result in any form of penalty and assured that they can quit from the study any time they want.

4.12 Dissemination of Results

The results of the study will be presented to the public defense and following which the final edition (revision) was disseminated to Department of Nursing and Midwifery, College of Health Sciences, Addis Ababa University. Dissemination of the result will also be made to the hospitals in Jimmaa zone and Jimmaa zone health office through hard/ or softcopies found appropriate. Also, manuscripts will get submitted for publication in peer reviewed scientific reputable journals for publication and will also be presented in scientific conferences.

CHAPTER FIVE
RESULT

5.1. Socio demographic characteristics of the respondents

Estimated sample size in this study was 309 from this 306 respondents were participated in this study. The response rate of study was 99%. Among 306 children, 169(55.2%) of them were males and 137(44.8%) were female. The mean age of the children was 23.5±16 months and majority 179 (58.5%) children's residence was urban.

Table 1 Socio-demographic characteristics of under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Variables	Category	Frequency(N=306)	Percent
Sex	Male	169	55.2
	Female	137	44.8
Age of the child	2-12 months	117	38.2
	13-36 months	117	38.2
	37-59 months	72	23.6
Residence of the child	Urban	179	58.5
	Rural	127	41.5
House hold size	< 3 members	98	32
	4-6 members	179	58.5
	>7 members	29	9.5
Income of family	< 2000 birr	137	44.8
	2000 – 3999 birr	97	31.7
	4000 -5999birr	30	9.8
	≥ 6000 birr	42	13.7
Marital status of parent	Married	295	96.1
	Unmarried	12	3.9
Educational status of mother	Illiterate	65	21.3
	Literate	241	78.7
Educational status of father	Illiterate	45	14.7
	Literate	261	85.3
Mother current occupation	Self employed	253	82.7
	Un employed	7	11.4
	Civil servant	35	
	Other	11	5.9
Child father occupation	Self employed	171	70.3
	Un employed	51	
	Civil servant	76	24.8
	Other	10	1.6

5.2. Environmental characteristics of the respondents

Charcoal were the most common 182(59.5%) source of cooking fuel and 170 (55.6%) of house hold were use wood as fuel source for cooking. Around 227(75%) of participants family's had a kitchen and 79(25%) participants families were cook food in the living room.

Table 2 Environmental characteristics of under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Variables	Category		Frequency(N=306)	Percent
Kind of toilet facility	pit latrine		271	88.6
	Ventilated improve pit latrine		21	6.9
	Open field		14	4.6
Number of rooms in house	1 room		77	25.2
	≥ 2 rooms		229	74.8
Type of fuel source	Charcoal	Yes	182	59.5
		No	124	40.5
	Wood/ Crop wastes	Yes	170	55.6
		No	136	44.4
	Electricity	Yes	85	27.8
		No	221	72.2
Place of food cooking at home	Living room		79	25.8
	Kitchen		227	74.2
Child location during cooking	Caring mothers back or besides during cooking		102	33.3
	Outside of the cooking house		204	66.6
Place of child sleep	Separate room		245	80.1
	The same room to food cooking room		61	19.9
Separation of kitchen from the main house	Yes		182	59.5
	No		45	14.7
windows in Kitchen	No window in kitchen		65	47.1
	≥1 window in kitchen		162	52.9
windows in the house	≤1 window in house		116	37.9
	≥ 2 window in house		190	62.1
Cigarette smoking house hold exposure.	1 Yes		30	9.8
	2 No		276	90.2

5.3 Health care facility and child care characteristics of respondents

From total 306 children participants 198 (64.7%) were fully vaccinated, 45(14.7%) were up to date, 18(5.8) were partial vaccinated and 45(14.7%) were unvaccinated. During six months of life about 256(83.6%) children were practice exclusive breast feeding.

Table 3 Health care facility and child care characteristics of under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Variables	Category	Frequency(N=306)	Percent
Health care facility as soon as sick	Yes	269	88.2
	No	37	11.8
Distance from your home to nearest health facility by Km	$\leq$3 KM	200	65.4
	4-6 KM	49	16.0
	$\geq$ 7 KM	57	18.6
Duration of illness	$\leq$ 1 day	199	65.0
	2-4 day	86	28.1
	$\geq$ 5 day	21	6.9
means of transport	Walking	98	32.0
	motor-cycle	62	20.3
	Public service vehicle	140	45.7
	Personal vehicle	6	2.0
Vitamin A supplementation	Yes	80	26.1
	No	226	73.9
Zinc Supplementation	Yes	22	7.2
	No	284	92.8
Vaccination Status	Fully vaccinated	198	64.7
	Up to date	45	14.7
	Partial vaccinated	18	5.8
	Unvaccinated	45	14.7
Breast feeding status during 6 months	Exclusive breastfeeding	256	83.6
	Mixed Breast feeding	50	16.4
Duration of breast feed	< 2 years	185	60
	>2 years	121	40
Child care giver at home	Parental care	266	86.9
	Home maid/ care giver	40	13.1

5.4 Preexisting medical or Co-morbid conditions characteristics of respondent's

From 306 children's participants 248(81.1 %) had no malnutrition and 58(18.9%) had moderate acute malnutrition. Among children's participant's Acute respiratory tract infection was the commonest 107 (35%) history of past medical diseases followed by AGE 77(25.2%).

Table- 4 Preexisting medical or Co-morbid conditions characteristics of under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Variables	Category		Number(N= 306)	Percent (%)
MUAC	≤ 11.9 Cm		11	3.6
	12-12.9 Cm		36	11.8
	≥ 13 Cm		259	84.6
Malnutrition	No malnutrition		248	81.1
	Moderate acute malnutrition		58	18.9
History of past medical diseases	AGE	Yes	77	25.2
		No	229	74.8
	ARTI	Yes	107	35
		No	199	65
	Malaria	Yes	10	3.3
		No	296	96.7
	HIV/AIDS	Yes	3	1.0
		No	301	98.4
	Chronic diseases like CHD, Asthma	Yes	8	2.6
		No	298	97.4
	History of parent ARTI	Yes	67	21.9
		No	239	79.1

5.5 Prevalence of Pneumonia and Signs and symptoms of pneumonia

From 306 children's participated in study, 115(37.6%) of them had history of cough during the time of survey. Fifteen (16.4%) children had difficulty of breathing and 97 (31.7%) had fast breathing at the time of the survey. Among total 306 children, 118 (38.6%) had fever; and 44 (14.4%) had chest wall in drawing. Twenty nine (9.5 %) had Crackles or stridor or wheezing sound during the survey. The overall prevalence of under-five children's pneumonia during the study was 86 (28.1%).

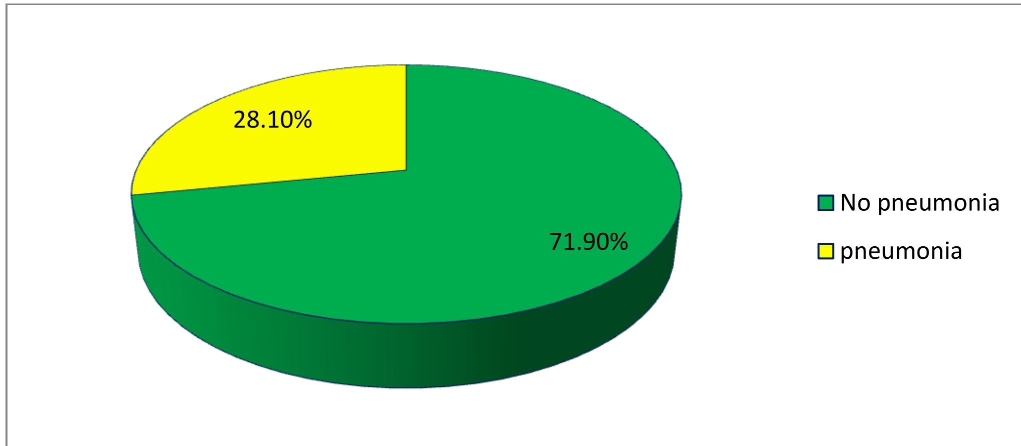

Figure -3 Prevalence of pneumonia among under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

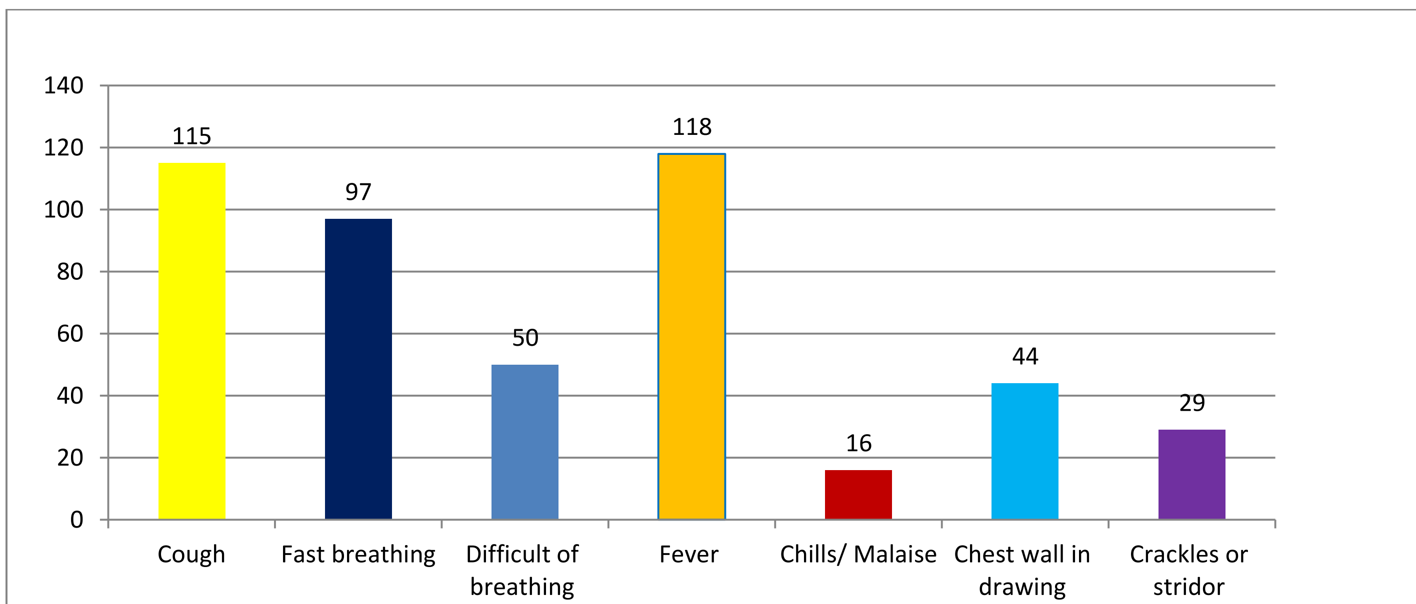

Figure- 4 Signs and symptoms of pneumonia among under -five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Among 86 children who had pneumonia 31(10%) of children had severe pneumonia. Moderate to severe respiratory distress is common Signs and symptoms of severe pneumonia followed by central cyanosis or hypoxemia (oxygen saturation<90 %)

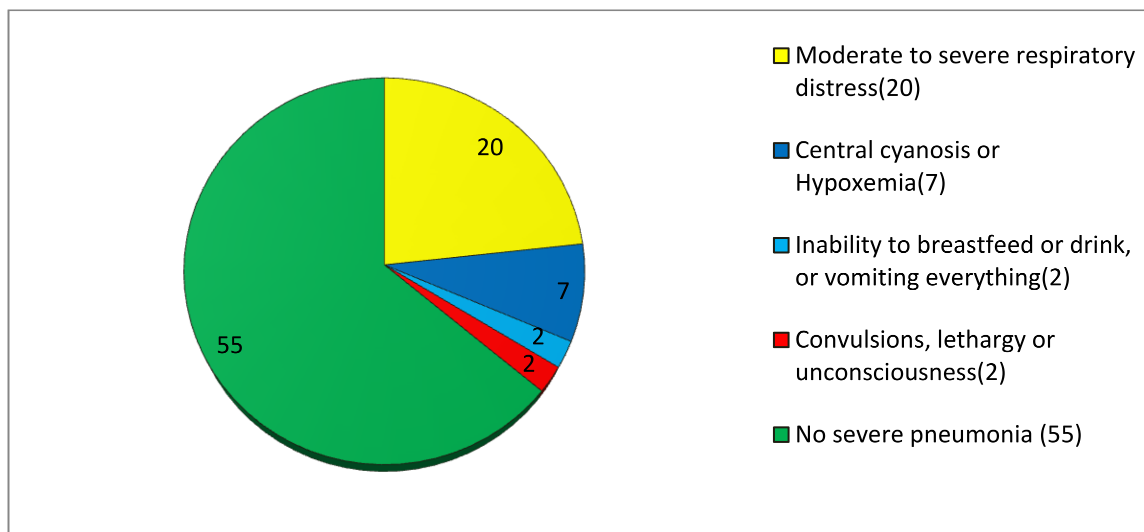

Figure- 5 Severe pneumonia among under -five children visiting at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

5 11 multivariate logistic regression

All study variables were tested by binary logistic regression analysis and variable those had less than 0.2 P- values were candidate for the multivariate logistic regression to control confounding variable and to determine potential predictors of under-five pneumonia.

This result showed that children from those household used wood as fuel source increase the risk of child hood pneumonia by 3.4 times (P= 0.003, AOR=3.4 CI= (1.5, 7.7)) when compare to children from household those not used wood as fuel source. According to this result child those from household cook food in living room were three times (P= 0.008, AOR= 3.2 CI= (1.37, 7.9)) more likely to develop pneumonia as compared to children those from household cook food in kitchen. Also caring mothers back or besides during cooking increase the risk of child to develop pneumonia by 2.5 times (P= 0.006, AOR= 2.56 CI= (1.33, 6.5)) when compare to keeping the child outside of the cooking house.

This finding indicate that children who unvaccinated were 4.6 times (P= 0.003, AOR= 4.6 (95% CI) = (2.64, 11)) more likely to develop pneumonia as compared to children who fully vaccinated. Also Children who got Vitamin A supplementation were 83% less likely to had pneumonia (P= 0.002, AOR= 0.168 (95% CI) = (0.055- 0.51)) when compare to Children who not got Vitamin A supplementation. Children those their parent give/practice mixed breast feeding during 6 months have three times (P= 0.014, AOR= 3.26 (95% CI) = (1.266, 8.34)) chance risk to develop pneumonia than children their parent give/practice exclusive breastfeeding.

This finding suggest that children who had moderate acute malnutrition were four times (P= 0.001, AOR= 4 (95% CI) = (2, 10)) more likely to develop pneumonia as compared to children who had no malnutrition. Also this finding indicate that children those who had ARTI in last two weeks were four times (P= 0.001, AOR= 4 (95% CI) = (2, 8)) more likely to develop pneumonia as compared to children who had no ARTI in last two weeks. Similarly children those who had contact with house hold those had ARTI in last two weeks were two point six times (P= 0.011, AOR=2.6 (95% CI)=(1, 6) more likely to develop pneumonia as compared to children those who had no contact with house hold ARTI in last two weeks.

Table- 5 Multivariate logistic regression analysis factors associated to pneumonia among under - five children at public hospitals in Jimma Zone, South West, Ethiopia, May, 2018.

Variable	Category	Pneumonia		COR	p-value	AAOR(95% CI)
		Yes	**No**			
Wood as fuel source	Yes	65	105	3.39	.003	**3.411** (1.5, 7.7)
	No	21	115			1
Place of food cook	Living room	41	38	4.36	.009	**3.268**(1.4, 7.9)
	Kitchen	45	182			1
Child location during cooking	caring mothers back or besides during cooking	56	46	7	.008	**2.55**(1.33, 6.5)
	Outside of the cooking house	30	174	1		1
Vitamin A supplementation	Yes	12	68	0.362	.002	**.168**(0.05- 0.5)
	No	74	152	1		1
Vaccination Status	Fully vaccinated	39	159	1		1
	Up to date	12	33	1.483	.123	**2.245** (0.8-6.3)
	Partial vaccinated	9	9	4.077	.094	**3.1(0.8-11)**
	Unvaccinated	26	19	5.579	.003	**4.624**(2.64, 11)
Breast feeding status during 6m	Exclusive breastfeeding	59	193	1		1
	Mixed Breast feeding	27	27	3.271	.014	**3.3**(1.266, 8.3)
Malnutrition	No malnutrition	54	194	1		1
	Moderate acute malnutrition	32	26	4.4	.002	**4.161**(2, 10)
History ARTI	Yes	51	56	4.26	.001	**4.027**(2, 8)
	No	35	164	1		1
History of house hold ARTI	Yes	35	32	4.03	.011	**2.655**(1, 6)
	No	51	188	1		1

AOR= Adjusted Odds Ratio, COR = Cured Odds Ratio, Hosmer and Lemeshow Test=0.419

CHAPTER SIX

6 .1 DISCUSSION

Pneumonia in under- five children is a leading cause of morbidity and mortality in Ethiopia and other developing countries. Prevalence and related risk factors of under-five pneumonia are important for planning child health care services, for proper management and prevention strategy of under-five pneumonia.

In this study the prevalence of under-five pneumonia was 28.1% which is higher than 16.1% community based cross sectional study conduct at Este town Northwest Ethiopia. This discrepancy is due to study design which institutional basis of the study might increase the prevalence(28). But this study prevalence was lower than 33.5% the prevalence of study conduct at Wondo Genet district, Sidama zone, Ethiopia. This deference might be due to study setting and seasonal variation(20). Studies done at Southeast Nigeria indicate that the prevalence of pneumonia is 31.6 percent which nearly similar to this study prevalence(26).

This finding shows that children from those household use wood as fuel source increase the risk of child hood pneumonia by three (AOR). This is in line with a cross-sectional survey conducted in Nepal, which shows use of traditional cooking fuel was found to be highly associated with ALRI(33). UNICEF report shows that exposing children to household air pollution like solid fuels (wood, animal dung and crop waste) to cook food double their risk of pneumonia(51). Children from those household who had no kitchen were 3.34 (AOR) times more likely to develop pneumonia, this study result consistent with study done at Sidama zone, which indicate Children from household without kitchen were 6.8 times more likely to develop pneumonia(20).

According to this study caring of the child on mothers back or besides the mother during cooking increase the risk of child to develop pneumonia by three times. It is consistent with study conduct at Este town Northwest Ethiopia which shows that a child carried on back during cooking was five times more likely to develop pneumonia than a child who was not carried (28). This is due to the facts that high indoor air pollution associated fuel use may adversely affect specific and non-specific host defenses of the respiratory tract against pathogens. Improved household air quality can reduce cases of severe pneumonia(52).

This finding indicate that children who had unvaccinated were 4.6 times more likely to develop pneumonia as compared to children who fully vaccinated (P= 0.004, AOR= 4.6 (95% CI) =

(2.64, 11)). It is consistent with study undertaken in two slums of Dibrugarh town, India which indicate that reduction in occurrence of pneumonia have been observed in completely immunized child as according to age(53). This is due to immunizations help reduce childhood 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)(54).

This study revealed that Children who got Vitamin A supplementation were 83% less likely to had pneumonia (P= 0.002, AOR= 0.168 (95% CI) = (0.055- 0.551)). This result consistent with study conduct in Rwanda which shows that vitamin A supplementation reduces under-five pneumonia(50). This probably due to the facts that role of vitamin A in the growth and development of cells and tissues (especially in respiratory epithelial cells and lung tissue) is essential. Vitamin A also help in preventing inflammation and infection in children and the severity of the infection(10).

This finding indicate that children whose their parent gave/practice mixed breast feeding during 6 months had three times chance risk to develop pneumonia. It is in line with UNICEF report which shows that infants under 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 (51). It is widely recognized that, breast milk contains the nutrients, antioxidants, hormones, lymphocytes and antibodies secretory Immunoglobulin A (IgA) needed by the child to survive and develop, and specifically for a child's immune system to function properly. Also a systematic literature review and meta-analysis which indicate that Suboptimal breastfeeding elevated the risk of pneumonia morbidity and mortality outcomes across age groups(39).

According to this study children who had moderate acute malnutrition were four times more likely to develop pneumonia (P= 0.002, AOR= 4 (95% CI) = (2, 10)). It in line with a study conducted in India which shows that malnutrition (OR=17.06) was significantly associated with pneumonia(55). Under nutrition may place children at an increased risk of developing pneumonia in two ways. First, malnutrition weakens a child's over all 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(51).

This finding suggest that Children who had ARTI in last two weeks were four times more likely to develop pneumonia (P= 0.004, AOR= 4 (95% CI) =(2, 8)). It is in line with study conducted in Kenya(56). It also consistent to Netherlands study which indicates the risk of CAP to be 2.46 times & 1.8 times more likely if the child has three and two episodes of URTI respectively in the past(57)**.**

According to this study children who had contact with house hold those who had ARTI in last two weeks were three times more likely to develop pneumonia (P= 0.007, AOR=2.8 (95% CI)=(2, 7). It is consistent with institutional-based study conducted at Kamise, Oromia zone, Amhara Region which shows that children from households with a history of ALRI within the past fifteen days prior to data collection were three times more likely to develop pneumonia compared to their counter parts(58). This probably might be due to respiratory tract infections are easily transmitted from household contacts to children. Severity of the disease also depends on virulence and load of the pathogen; the load is usually higher when infection is from a household contact(7).

6.2 Strength and limitation of the study

6.2.1 Strength of the study

- The study covers large scope of the study area.
- The response rate was 99% enable us to assume that target population is reflecting degree of accuracy.

6.2.2 Limitation of the study

- ✓ Since the study is cross –sectional it does not show cause and effect between dependent and independent variables.
- ✓ The information was self-reported and no behavior of the mother was observed.
- ✓ The study may be subjected to response bias from the respondents

CHAPTER SEVEN

7 CONCLUSION AND RECOMMENDATION

7.1 Conclusions

This studies show that the prevalence of under-five pneumonia was twenty eight percent. It was high. The study identified factors associated to under-five pneumonia such as;

- From environmental factors; Use wood as fuel source, cook food in living room, caring of child on mothers back or besides the mother during food cooking and absence of windows in the kitchen are potential predictors of under-five pneumonia
- Among health care and child care factor like; Vitamin A supplementation, Vaccination Status and Breast feeding status during 6 months are also potential predictors of under-five pneumonia.
- From preexisting medical or Co-morbid conditions factors such as; Malnutrition, history of child ARTI and history of contact with house hold that had ARTI are potential predictors of under-five pneumonia.

7. 2 Recommendation

Based on the results of this study the following recommendations were forwarded.

For each public hospital in Jimma zone, Community of Jimma zone and health care provider.

- Use of wood as fuel source should be discouraged but instead alternative affordable methods which produce less smoke be used.
- Ventilate and improved housing conditions, use separate kitchen from living room and use kitchen which has windows should be encouraged.
- Caring of child on cooking mothers back or besides the mother should be discouraged
- Promote and give health education on exclusive breastfeeding, immunization for the first six months of life.
- All children attending health care services should be assessed for nutritional status and Nutritional counseling is recommended for all children attending health facilities.
- Promote early treatments and prevention of ARTI of child and house hold.

For ministry of health, Oromia regional health bureau, Non-governmental organizations and Jimma Zonal health bureau

- Increase immunization coverage by promoting accessible and affordable immunization and give health education about immunization and make community mobilization about immunization.
- Promote assessment for nutritional status and nutritional counseling for all children attending health facilities.
- Promote exclusive breastfeeding for the first six months of life.
- Increase and promote Vitamin A supplementation.

ANNEX

Annex 1 - Information Sheet

Title of the Research Project: To assess the prevalence and associated factors of pneumonia among under -five children at public hospitals in Jimma Zone, South West of Ethiopia, 2018.

Name of Investigator: Kenenisa Tegenu

Name of the Organization: Public hospital in Jimma Zone.

Name of the Sponsor: Addis Ababa University

Introduction: This information sheet is prepared for public hospital in Jimma zone administration office. The aim of the form is to make the above concerned office clear about the purpose of research, data collection procedures and get permission to conduct the research.

Purpose of the Research Project: To assess the prevalence and associated factors of pneumonia among under -five children at public hospital in Jimma zone, south west of Ethiopia, 2018.

Procedure: In order to achieve the above objective, information which is necessary for the study will be taken from under -five children mother or care giver and child medical record.

Risk and /or Discomfort: Since the study will be conducted by taking appropriate information from under -five children mother or care giver and child medical record it will not inflict any harm on the patients. The name or any other identifying information will not be recorded on the questionnaire and all information taken was kept strictly confidential and in a safe place. The information retrieved will only be used for the study purpose.

Benefits: The research has no direct benefit. But the indirect benefit of the research for the participant and other clients in the program is clear. This is because if program planners are preparaing predicted plan there is a benefit for clients in the program of getting appropriate care and treatment services.

Confidentiality: The information collected was kept confidential and it will not be revealed to anyone except the investigator and it was kept in key and locked system with computer pass ward.

Person to contact: This research project was reviewed and approved by the institutional review board of AAU, College of Health Science, and Nursing and Midwifery department. If you have any question you can contact the Investigator with the following address.

Name: Kenenisa Tegenu (Bsc)

Institution: AAU University, College of Health Science, Department of Nursing and midwifery

Cell phone: +251- 917501356

E-mail: kenenisategenu56@gmail.com.

Annex-2: Patient Information

Hello. My name is --------------------and I am data collectors of research on prevalence and associated factors of under- five childhood pneumonia in public hospitals in Jimma zone. The research is intended to benefit the community including the people that was participating in this research and will introduce no risk to the participant. The result that will come out of this study was used by the government and the district health office to base their rational decision to develop appropriate strategies to combat this problem.

The questionnaire requires the maximum of 20 minutes to complete. Your child selected randomly through lottery method from all children visit OPD of this hospital. Your participation is entirely voluntarily, and you can quit from the study any time you want. You will have no penalty if you fail to show desire to participate. I, hope that you will participate in the study since the data that will come from you was important for us. Your name and other personal identity will not be used and hence the information we will collect from you will completely be kept confidential and will not be disclosed to any third person other than the people participating in this study. For any question you want to ask us, you can use the contact address here under.

May I now begin the interview?

If yes, continue interviewing

If No, thank and stop interviewing

Name of the interviewer______________ Sign. _____ Date ________

Name of the supervisor. _____________. Sign. _______ Date_______

Addresses

Tel:0917501356

Email:kenenisategenu56@gmail.com

Annex 3: Consent Form

I (the respondent), the undersigned, am told that the researcher is going to conduct study in this hospital to determine the prevalence and possible risk factors of 02 -59 months old childhood pneumonia, and s/he acquainted with me the first time s/he meets. I am also informed that the result of the study was used by both the government and the Jimmaa zone health office to commence appropriate strategies to battle this problem. I am, too, told that the research will benefit the community in general including me, the respondent, and that the research will not inflict any harm to me. I have been told that I have full right to have enough time to understand and then take part in the study on the basis of my interest and besides, I am briefed that I will be interviewed for not more than 20 minutes. I am let know that my child and I was selected randomly by the investigator. Moreover, I am notified that my participation in the study is entirely voluntarily, and that I can quit from the study any time I want. Likewise, I am enlightened that I will not be subjected to any form of punishment following my failure to participate in the study. In the same way, I am explained that the information collected from me will not by any means be disclosed to any people other than those participating in the study unless obtained permission from me. Equally, I am told that I can ask them questions I found difficult.

Name of the interviewed ______________________________ Date______________________

Signature ______________________.   Addresses______________________

Name of the interviewer ____________________________Sign. _____

Name of the supervisor._____________._______________Sign. _______

Annex 4: Questionnaire form: English version

Questions related to the determinants and prevalence of pneumonia in children aged less than five years.

Card No _____________Date__________________ Questionnaire code: ------------

Instruction: Choose the appropriate answers of the study participants for each of the following questions.

No	Part I Socio-economic factors	Coding category
100	Sex of the child	1 Male 2 Female
101	Age of the child	Specify----------
102	Residence of the child?	1 Urban 2 Rural
103	How many members in your family?	Specify----------
104	Monthly Income of the family?	Specify----------
105	Marital status of parent?	1 Married 2 Single 3 Divorced 4 Windowed
106	Educational status of mother?	1 Illiterate 2 Read and write 3 Primary (1-8) 4 Grade (9-12) 5 Diploma and above
107	Educational status of father?	1 Illiterate 2 Read and write 3 Primary (1-8) 4 Grade (9-12) 6 Diploma and above
108	Mother current occupation?	1 Housewife 2 Civil servant

		3 Merchant 4 Student 5 Daily labor 6 Other specify-------------------------
109	Child father occupation?	1 Farmer 2 Student 3 Civil servant 4 Merchant 5 Daily labor 6 driver 7 Other specify-------------------------

N o	**Part II questions on environmental factors**	**Coding category**
201	What is the main source of drinking water for family?	1 Piped water 2 Protected dug well 3 None protected dug well 4 Sparing water 5 Rain water 6 River/pond/ /dam
202	What kind of toilet facility do you have at home?	1 Open pit latrine 2 Ventilated improve pit latrine 3 Open field
203	How many rooms are there in your house (including the sitting room)?	Specify----------
204	With what type of fuel source do you cook at home?	1 Charcoal 2 Wood 3 Electricity 4 Kerosene 5 Animal dung 6 Crop wastes 7 Other specify

205	Where do you usually cook your food?	1 Living room 2 Kitchen 3 Outdoors
206	Where is the usual location of the child during cooking?	1 caring mothers back or besides during cooking 2 Outside of the cooking house
207	Do children sleep in the same house used for cooking?	1 Yes 2 No
208	Is the kitchen separated from the main house?	1 Yes 2 No
209	Number of windows in the kitchen	Specify----------
210	Number of windows in the house	Specify----------
211	Does the child have house hold cigarette Smoking exposure?	1 Yes 2 No

No	**Part-III Health facility and child care factors**	**Coding category**	
301	Do you take your child to health facility as soon as sick?	1 Yes 2 No	If yes skip to 303
302	If Q no 201 no for what reason?	1 Health facility far from home 2 I can't afford payment 3 I 'am bus by other work 4 Other	
303	What is the estimated distance from your home to health facility by Km?	Specify----------	
304	How long was the child sick before coming to this hospital for this illness?	Specify----------	
305	Which means of transport did you use to come to this hospital?	1 Walking 2 motor-cycle 3 Public service vehicle 4 Personal vehicle 5 Other	

306	Does your child taken Vitamin A supplementation within 6 months?	1 Yes 2 No
307	Does your child take Zinc Supplementation?	1 Yes 2 No
308	What is Vaccination Status of child?	1 Fully vaccinated 2 Up to date 3 Partial vaccinated 4 Unvaccinated
309	Breast feeding status of the child during the first 6 months of life	1 Exclusive breastfeeding 2 Mixed Breast feeding 3 Not Breast feeding
310	For how long have you breast feed your child?	1 up to date 2 1-23 months 3 24- 36 months 4 >37 months
311	When Complementary feeding start?	Specify----------
312	Who is child care giver at home?	1 Parental care 2 Home maid/ care giver

No	**Part IV Criteria to diagnosis pneumonia**	
401	Does a child diagnosis for pneumonia for now or last two weeks? From card.	1 Yes 2 No
402	Does child have the following sign and symptoms?	1. Cough duration of cough------------- 2. Fast breathing 3. Difficult of breathing 4. Fever 5. chills 6. Loss of appetite, nausea, vomiting 7. Malaise/ lethargy 8. Chest wall in drawing 9. Crackles or stridor or wheezing sound
403	Does child have Cough or difficult	I. Moderate to severe respiratory distress

	breathing plus at least one of the following?	II. Central cyanosis or Hypoxemia (oxygen saturation<90 %) III. Inability to breastfeed or draink, or vomiting everything IV. Convulsions, lethargy or unconsciousness or Capillary refill ≥2 second

No	Part V Preexisting medical or Co-morbid conditions	Coding category
501	What is a diagnosis of child?	Specify--------------
502	MUAC	Specify----------
503	Malnutrition (WFH)	Wt of the child (kg) --------- Ht of the child (cm)……….
504	Have your child ever had diarrhea?	1 Yes 2 No
505	Have your child ever had Measles in months?	1 Yes 2 No
506	History of child ARTI in last two weeks?	1 Yes 2 No
507	History of Malaria?	1 Yes 2 No
508	History of HIV/AIDS?	1 Yes 2 No
509	History of Chronic diseases like CHD, Asthma?	1 Yes 2 No
510	History of households ARTI in last two weeks?	1 Yes 2 No

THANK YOU!!

Annex 5: Questionnaire form: Afaan Oromo version

Lakk Galmee ____________Guyyaa _________________ Eyyummessaa gaaffii_-----------------

Lakk	Kutaa 1 Gaaffii haala jiruu fi jireenya hawaassuma	Qoqqodama deebii
100	Saala daa'imaa	1 Dhiira 2 Dubara
101	Umurii daa'imaa	Maqaa dhahi_---------------
102	Iddoo jireenya daa'imaa	1 Magaala 2 Baadiyaa
103	Mana keessan keessa nama meqatu jiraata?	Maqaa dhahi_---------------
104	Galii Ji'aa tilmaamaan	Maqaa dhahi_---------------
105	Haala gaa'ilaa maati?	1 Kan fuudhe/ heerumte 2 Kan hin fuune / hin heerumne 3 Kan wal hiikan 4 Kan wal-irraa du'an
106	Sadarakaa barumsa haadha?	1 Hin baranne 2 Bareessuu fi dubbisuu danda'u 3 Sadarkaa tokkoffaa (1-8) 4 Sadarkaa 2ffaa fi qophaa'ina (9-12) 5 Dippilomaa fi isaa ol
107	Sadarkaa barumsa abba?	1 Hin baranne 2 Bareessuu fi dubbisuu danda'u 3 Sadarkaa tokkoffaa (1-8) 4 Sadarkaa 2ffaa fi qophaa'ina (9-12) 5 Dippilomaa fi isaa ol
108	Hojii haadha ?	1 Hojjettuu manaa 2 Hojettuu mootummaa 3 Daladaltuu 4 Barattuu 5 kan biraa Maqaa dhahi --------------------

109	Hojii abbaa ?	1 Qotee bulaa 2 Hojjetaa mootummaa 3 Daldalaa 4 Barataa 5 kan biraa Maqaa dhahi --------------------

Lak	Kutaa 2 Gaaffii haala naannoo	Qoqqoodama Deebii
201	Maddi bishaan dhugaatii maatii keessanii maalii?	1 Bishaan ujummoo 2 Bishaan boollaa kuufame 3 Bishaan boollaa hin kuufamne 4 Bishaan raafamu 5 Bishaan rooba 6 Bishaan lagaa
202	Mana fincanii akkalakki fayyadamtuu?	1 Mana fincaanii baana 2 Mana fincaanii foayya'aa 3 Badheettii
203	Kutaa/gola meeqatu mana keessan keessa jiraa?	Maqaa dhahi---------------
204	Nyaataa bilcheessuuf gosa madda humna boba'aa kamitti fayyadamtuu?	1 Kasala 2 Muka 3 Humna ifaa 4 Gaazii 5 Dhoqqee horii 6 Galabaa midhaanii 7 kan biraa Maqaa dhahi-------------------
205	Nyaata yeroo hedduu eessatti bilcheessitu ?	1 Mana jirenyaa keessatti 2 Mana nyaata bilcheessanitti 3 Mana alaatti 4 kan biraa Maqaa dhahi--------------------
206	Nyaata yeroo bilcheesitan daa'imma eessa teessisituu ?	1 Bakkum nyaata bilcheessinuti ykn dugda irratti baachuu

		2 Mana nyaanni bilchaatuun ala
207	Bakki Daa'imni rafuu fi nyaanni itti bilchaatu tokkoo?	1 eeyyeenii 2 Lakki
208	Manii nyataa ittiii bilchessamuu addatii qabduu ?	1 eeyyee 2 lakki
209	Manii nyatnii ittii bilchatuu foddaa meqaa qabaa	Maqaa dhahi-----------
210	Manni keessan foddaa meqaa qabaa?	Maqaa dhahi-----------
211	Mana keessaan keessa namni tamboo xuuxu jiraa?	1 eeyyee 2 lakki

Lakk	**Kuttaa-3 Hallaa mana yalla fi kunnunnassa**	**Qoqqoodama deebii**	
301	Daa'mni keessan akkumma dhukkubsateen/dhkkubsatten mana yaalaa fidduu?	1 eeyeen 2 lakki	Yoo eyyanii ta'ee Gafii -303 ti darabbii
302	Yoo yeroodhaan garaa mana yaalaa hin fidne sababa maalitiif ?	1 Manni yaala fagoo waan ta'eef 2 Kaffaltiin mana yalaaa waan natti cimuufi 3 Hojii biraatiin qabamee, waan yeroo hin qabneef 4 kan biraa Maqaa dhahi-------------	
303	Manni keessan mana yalaa irraa hanagamii fagataa?	Maqaa dhahii------------- Km	
304	Daa'imni kee dhukubstee osoo gara mana yaalaa hin dhuufiin hagamiif ture?	Maqaa dhahi----------	
305	Gara hospitaala kanaa dhufuuf geejjiba gosa kamii fayyadamatanii?	1 miilan demuu 2 Doq-doqqee 3 Geejjiba hawasummaa 4 Gejiba dhuunfaa 5 Kan biraa Maqaa dhahi--------------	
306	Daa'imnii kee ji'a ja'an kana keesssa	1 Eeyyee	

	Viitaaminii A fudhatee/fudhatte?	2 Lakki
307	Daa'imni kee Ziinkii fudhattee /fudhatee?	1 Eyyee 2 Lakki
308	Haalli talaaalii daa'imma keetii akkamii ?	1 Talaaalii hundaa fudhate/fudhatte 2 kan hangaa amma fudhatee 3 Walakkaa isaa fudhate/fudhatte 4 Talaalii fudhatee/ fudhatte hin beeku/beektu
309	Haalli harma hoosisuu jalaqabaa ji'a jahaa akkamii?	1 Harma hoosisuu qofa 2 Harmaa fi nyaata dabalataa 3 Harma hin hoone
310	Daa'imni kee ji'a meeqaaf harma hodhee/ hoote?	1 Hangaa ammati hodhaa jirraa 2 ji'aa 1-23 3 ji'aa 24- 36 4 ji'aa 37 oli
311	Daa 'immni nyaata dabalataa yoom eegalee/eegalee?	Maqaa dhahi----------
312	Daa'ima eenyutu kunuunsaa ?	1 Maatiitu Kununasa 2 Hojjettuu manaa/ gargaartuu manaa

No	**Kutaa-4 Qaabtillee ittin dhukubbnii sombaa bekamuu**	
401	Daa'imichi torbee lamaan darbe ykn amma dhukkubaa dha'icha sombatii qabamee/ qabamtee?	1 Eeyyee 2 Lakki
402	Daa'imni mallaatoo fi ragaa kannaen ni qabaa?	qufaa hangamiif qufaasise---- Hangarsuun dabaluu Afuura baafachuu dadhabuu Ho'inaa qaamaa Fedhii nyaataa dhabuu, hoaqqasisuu /balaqqamsiisuu Dadhabsisuu Lapheen keessaa seenuu Qorrisiisuu

403	Daa’imni qufaa ykn afuuraa baafachu dadhabuu fi kanenii kessaa tokkoo qabaa	I. Sirnii afuura bafannaa ukkamamuu II. Qaamni isaa(ija, hidhii) gara cuuquliisatti jijjiramuu III. Nyaata ykn harma fudhachuu dadhabuu ykn nyaata hunda ol deebisuu IV. Hurgufuu, baay’ee dadhabuu, of wallaaluu

Lakk	**Kutaa-5 Dhukkuba dabalataa amma jiruu fi duraan jiru**	Qoqqooddama debii
501	Gosa dhibee daa’imaa ?	Maqaa dhahi--------------
502	Safara naannaawwaa harkaa garaa olii	Maqaa dhahi----------
503	Hanqina nyaataa	Ulfaatina (kg) --------- Dheeraina (cm)……….
504	Daa’imni kana dura hoqqaasisaa fi basaadhaan qabamee abeetkaa ?	1 Eeyyee 2 lakki
505	Daa’imni gifiraa qabamee beekaa?	1 Eeyyee 2 lakki
506	Daa’imni dhibee sirna hargansuutiin qabamee/qabamtee beekaa/ beektii??	1 Eeyyee 2 lakki
507	Daa’imni dhibee busaan qabamee/qabamte beekaa/beekti?	1 Eeyyee 2 lakki
508	Daa’imni dhibee HIV/AIDS qabamee/qabamtee ?	1 Eeyyee 2 lakki
509	Daa’imni dhibee kan akka Onnee fi Asmii qabamee/qabmtee?	1 Eeyyee 2 lakki
510	Matii keessan keessaa namni torbee lamman darbee kessaa dhibee sirna hargansuutiin qabamee bekuu jirraa	1 Eeyyee 2 lakki

GALATOMMAA!

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