PREVALENCE AND RISK FACTORS OF SEVERE PNEUMONIA AMONG CHILDREN AGED BELOW 5 YEARS AT JINJA REFERRAL HOSPITAL

BY

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DECLARATION

I, Abdisadiq Adan Alio; hereby declare that this research proposalis my original work and has never been submitted to any institution of learning for any academic award.

Signature……...…Date: ……

APPROVAL

This is to certify that the research entitled ‘Prevalence and risk factors of severe pneumonia among children aged below 5 years at Jinja Referral Hospital has been done by the student under my supervision.

Supervisor

DR. Abner Tagoola

Signature.....Date……..……

DEDICATION

This work is dedicated to my parents Mr. Adan Alio and Mrs. Fatuma Adan, for their love, financial and spiritual support during the time for my research.

ACKNOWLEDGEMENT

I extend my sincere gratitude to DR. Abner Tagoola, my supervisor for his professional guidance, patience and encouragement made it possible for the successful completion of this research. Appreciation goes to Jinja Regional Referral Hospital especially pediatric department for enabling me carry out my research. Lastly I thank my family members and my colleagues for financial and emotional support. I am deeply indebted to you all.

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OPERATIONAL DEFINITIONS

Pneumonia case: The child with cough of two or less weeks of duration with fast or difficult breathing due to a problem in the chest for specific age.

Severe pneumonia case: The child with cough of two or less weeks of duration with one or more of the danger signs with or without fast breathing for specific age.

Fast breathing: 50 breaths per minute or more for children aged 2 to less 12 months, 40 breaths per minute or more for children aged 12months -5 years

Danger signs: Any of the following in a child aged less than five years: convulsion, in ability to drink/eat, vomiting everything, unconsciousness, Lower chest in drawing, stridor, unusually sleepiness.

LIST OF ABBREVIATIONS

AIDS: Acquired Immune Deficiency

ARI: Acute Respiratory tract Infection;

CI: Confidence interval

HIV: Human Immunodeficiency Virus

UNICEF: united Nations Children's Fund;

WHO: World Health Organization

ABSTRACT

Background:

Severe Pneumonia is ranks as number one contributor to mortality among children under age 5 years, leading to mortality estimated at 2400 children a day globally and in Uganda, severe pneumonia is the second leading cause of death among children under the age of five years (data shows that 21% of all under-five deaths are due to respiratory infections).

The main aim of this study was to determine the prevalence and factors associated with severe pneumonia among aged children 2-59months seen at Jinja regional referral hospital.

Methods:

Hospital based cross-sectional study was employed on 216 child-mother pairs. Data was collected using structured and pre-tested questionnaire. Data analysis was conducted using statistical package for social sciences (SPSS) version 25 software. Odds Ratio along with 95% confidence interval was estimated to identify determinates of pneumonia and p values <0.05 were considered significant.

Results:

Prevalence of severe pneumonia among under-five children was 6.5%. Lack of formal education (primary and below), use of wood for cooking were identified risk factors.

Conclusion:

Prevalence of severe pneumonia in under-five children is low. Identified risks can be prevented and controlled through community mobilization on health benefits and improved ventilation in cooking places prevent under five severe pneumonia.

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, severe pneumonia is the number one infectious killer of children under age 5 years, Contributing to mortality estimated 2400 children a day(WHO, 2016). Severe Pneumonia accounted for 16% of the 5.6 million under-five death, killing around 880,000 children in 2016(UNICEF, 2017).

In developing countries, childhood severe pneumonia remains a leading cause of death in children and accounts for up to 21% of deaths in children under the age of five years (Zar & Ferkol, 2014). In sub-Saharan Africa, the estimated proportion of death in children aged below 5 years attributed to severe pneumonia ranges between is 17-26%(Farooqui, Jit, Heymann, & Zodpey, 2015).

Uganda is currently ranked among the 15 countries with the highest estimated number of deaths due to clinical pneumonia (Tramper-Stranders, 2018). In Uganda, pneumonia is the second leading cause of death among children under the age of five years and 21% of all under-five deaths are due to respiratory infections (UBOS, 2016).

Studies conducted have reported a strong link between child pneumonia mortality and poverty-related factors. For instance, a study in India (Farooqui et al., 2015) reported Under nutrition, lack of safe water, and sanitation while a study in Malawi (Mortimer et al., 2017) reported indoor pollution and inadequate access to health care as the major risk factors. A study in Mulago hospital, Uganda reported severe malnutrition and hypoxemia as the risk factors for severe pneumonia (Rebecca Nantanda, Ostergaard, Ndeezi, & Tumwine, 2014).

In Jinja hospital, prevalence and risk factors of severe pneumonia in children under 5 years are not well understood due to paucity of data. Thus, this study seeks to bridge this gap by determining prevalence and risk factors of severe pneumonia among children under 5 attending Jinja hospital.

1.2 Problem statement

Childhood severe pneumonia has been the commonest cause of suffering worldwide among under-five children, with the developing nations carrying the highest mortality and morbidity pneumonia burden (Guerrera, 2015). It is the major killer of children under the age of five years than any other

diseases known to affect children, and, also, more than the death shares of Acquired Immune Deficiency Syndrome (AIDS), Malaria, and Measles combined (Jain et al., 2015).

Eighteen percent of all the under-five childhood death in Uganda is recognized to be due to severe pneumonia (Rebecca Nantanda, Tumwine, Ndeezi, & Ostergaard, 2013). The nationwide Uganda Demographic and Health Survey (UDHS,2016) may not accurately represent the prevalence of the problem since the problem was ascertained through recall based parental reporting (UBOS, 2016). Neither the nationwide UDHS report nor the locally specific surveys on the prevalence and associated factors of under-five pneumonia represent the nature of the problem in Jinja regional referral hospital.

This study is, therefore, intended to bridge this information gap by determining the prevalence of severe pneumonia among children under 5 years and its associated factors.

1.3 Significance of the study

Under-five severe pneumonia is a universal problem of public health importance that disproportionately affects every region, including Uganda presently. Despite the sustained effort to stop the problem, pneumonia continues to contribute to mortality of millions of children worldwide which calls for contribution of innovative strategies with systematic researches as one of as one of the ways . The widespread nature of the problem in Uganda has already contributed to mortality of millions of children which calls for the need to look for lasting solution to end the problem.

The under-five severe pneumonia morbidity burden also costs the health services program as health services are passed on to cure high severe pneumonia morbidity cases. Severe Pneumonia is not only the problems of individuals, but it is also equally the problem of policy makers, planners and communities at large. Controlling the continued threat of pneumonia is one of the major health priorities of the government of Uganda for which this study will contribute its part. The result will be used to ensure the continuity of continuum of care so that healthy preschool children will be transformed to healthy adolescents. Above all, there were no previous studies in this area that could determine the prevalence of the problem.

1.4 Objectives of the study

1.4.1 General objective

To assess the prevalence and risk factors of severe pneumonia among children aged below 5 years attending Jinja referral hospital.

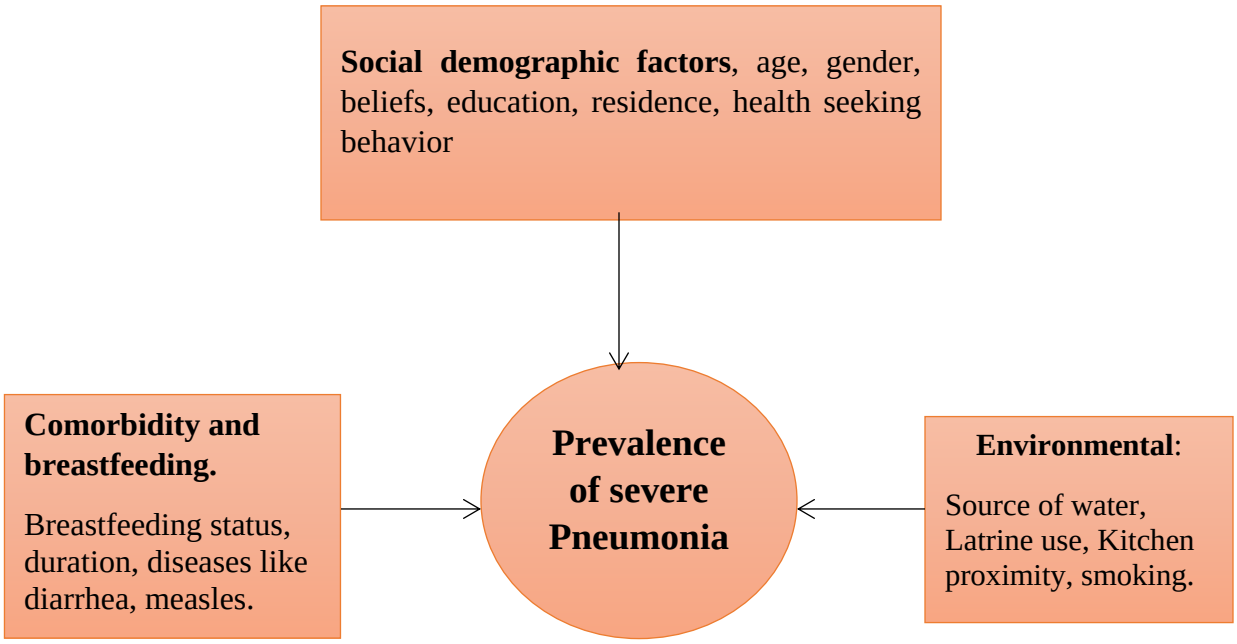
1.4.2 Specific objectives

- To determine the prevalence of severe pneumonia among children aged below 5 years attending Jinja referral hospital.
- To identify risk factors severe pneumonia among children aged below 5 years attending Jinja referral hospital.

1.5 Conceptual frame work

The conceptual framework represents a relationship between factors that influence the prevalence of severe pneumonia among children 2-59 months attending Jinja regional referral hospital.

Figure 1: conceptual frame work



CHAPTER TWO: LITERATURE REVIEW

2.1 Morbidity

The rate of new severe pneumonia infections is high among children aged less than five years worldwide. The 2014 -Bulletin of world health organization (WHO) reported that 0.26 episodes per child-year of severe pneumonia was estimated worldwide with the significant variation in the incidence of severe pneumonia across WHO regions(Nantandaet al., 2014). The incidence of pneumonia infection estimated in developed countries by the same report to be only 0.05 episodes per child-year unlike the 0.29 episodes in developing countries, which can be translated to about 151.76 million deaths annually. However, this figure has reportedly fallen to 0.23 episode per child-year in 2010 (Berkley et al., 2014). 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. Vilas-Boas et al found, in 2014, that there were 120 million new pneumonia infections worldwide, 14 million of which were sever enough to require hospitalization (Vilas-Boas et al., 2014).

In Uganda, there are very few studies carried out so far on the prevalence of pneumonia and its risk factors and, as well, with one or more methodological weakness. The latest nationwide research to date was in 2014 in which estimated the national prevalence of pneumonia to be 7% with the significant variation across regions-; the highest and lowest of the two weeks recall based prevalence preceding the survey of the under- five pneumonia was reported in Mukono and Kampala, respectively. The average estimate may hide the probably high prevalence of pneumonia in the rural community. The percentage of children aged less than five years with pneumonia in Mukono reported to reach 6.4% (Rebecca Nantanda et al., 2013). A community based cross sectional study done in Kampala in 2014 found that the prevalence was as high as16%.This study, however, had limitations mainly grounded in the small sample size and ascertainment related to accuracy of information which was based on mothers or care takers' report (Rebecca Nantanda et al., 2014).

2.2 Mortality due to severe Pneumonia

Severe Pneumonia continues to be the global leading killer of children aged less than five years despite the efforts of the international community to control the problem. Approximately 20% of the 9 million estimated deaths in children aged less than five years in- 2013 was ascribed to pneumonia (Lassi et al., 2014). This figure has reportedly increased to 21% in the 2015 world health statistics report (World Health Organization, 2015). However, the 2014 estimates of pneumonia mortality by the UNICEF indicates that the disease was responsible for 15% of under five deaths in 2013.

Considering the under- five children pneumonia mortality burden on continent basis, Southeast Asia bears the highest, estimated to reach 21.8% followed by Africa where pneumonia is responsible for 17% of deaths (Guerrera, 2015). According to the 2011 lancet report, however, the highest burden of pneumonia mortality was observed in Sub-Saharan Africa where 43% of all the under-five childhood pneumonia mortality took place (Berkley et al., 2012). Likewise, in 2012, the Eastern Mediterranean and Western pacific each bears the child hood pneumonia mortality burden of 19% and 16%, respectively. By contrast, only Ten and 12% of childhood deaths in America and Europe, respectively, are attributable to pneumonia (Blot et al., 2014).

India, Pakistan, Nigeria, democratic republic of Congo, Ethiopia and Uganda are among the highest children pneumonia mortality burden countries in the world (Blot et al., 2014) .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 (Singh & Aneja, 2011). Seventy four percent of all under-five pneumonia deaths in 2011 was reportedly concentrated in the 15 high burden countries-10 of which are in Africa-, including Uganda. As the episodes of pneumonia progress to severity, the highest pneumonia mortality tend to occur in these 15 high burden countries (Lassi et al., 2014).The latest countdown 2014 report presents the country profile of each of the 75 countdown countries where more than 95% of all childhood pneumonia deaths occurred. The vast majority of countdown countries from Africa experienced disproportionately high load of pneumonia cases. In Rwanda, Sierra Leone, Somali, South Sudan and South Africa, 18%,16%,19%,20% and 17% of all under-five deaths, respectively, in 2012, died of pneumonia.

Conversely, Peru, Nepal, Mozambique, and Morocco, carry pneumonia case load of correspondingly 10%,14%,14%, and 13% (Onyango, Kikuvi, Amukoye, & Omolo, 2012).

In Uganda, pneumonia is the single leading cause of death among children younger than five years. The 2011 UDHS report showed there were 389,000 under five deaths, of which 22% were due to pneumonia (UBOS, 2011). In 2014, pneumonia was responsible for 21% of all under five deaths in the country (Rebecca Nantanda et al., 2014), only one percent reduction over the 4 years period. According to the recent 2015 countdown to 2016 report, however, the toll of under- five pneumonia deaths has supposedly plummeted to 18% (R Nantanda et al., 2016), which is among the highest even compared to the load in majority of African countries. Nonetheless, there are only scant source of data on this problem locally. For instance, a case control study in Mulago revealed that 42% of post neonatal and 22.6% of neonatal mortality were attributable to pneumonia (Rebecca Nantanda et al., 2014).

2.3 Risk factors of under-five pneumonia

2.3.1 Socio demographic characteristics

Both the incidence and mortality from pneumonia widely vary across the age of the child where children younger than 2 years of age disproportionately bear about 81% of the overall under-five pneumonia morbidity burden. In a case control study in Pakistan, younger children were found to be at increased risk of pneumonia compared to older children under the age of five years (Musher & Thorner, 2014) .There is also evidences on the difference in incidence of pneumonia between boys and girls, with the higher episodes of pneumonia occurred among boys (Joseph. L. Mathew, AK Patwari , P Gupta, D Shah, T Gera, S Gogia, P Mohan, R Panda, 2011). However, this result is in contrary to other finding where gender of the child did not affect the occurrence of child hood pneumonia (Cardoso, Nascimento-Carvalho, Ferrero, Alves, & Cousens, 2011). Being the socio cultural factor, birth order is among the lists of factors that affects the risk of pneumonia in children (Webb et al., 2012).

Children born to younger mothers are likely to develop pneumonia than are children born to older mothers and educational status of parents and did not affect the probability of their child to acquire pneumonia infection (Roca et al., 2010). Similarly, a case control study in Kenya found

that educational status of parents was not significantly associated with the development of pneumonia (Onyango et al., 2012). Comparatively, children born from well to do family are less risky to develop pneumonia than are their counterparts from poor family (Webb et al., 2012). Children whose parents are smoking have 60% probability of developing pneumonia (Makokha et al., 2016). Occupational status of parentsappeared to have no effect on 02 -59 months old pneumonia. However, a report from case control study in Uganda revealed that maternal occupation was significantly associated with pneumonia in under-fives (Tuhebwe, Tumushabe, Leontsini, & Wanyenze, 2014).

2.3.2. Environmental factors

Safe water source for both drinking and other uses including hand washing and improved sanitation facility can for the most part prevent pneumonia (Singh & Aneja, 2011). Indoor air pollutionis known to accelerate the risk of pneumonia and pneumonia caused deaths (Cardoso et al., 2011). A research done on 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% (Joseph. L. Mathew, AK Patwari , P Gupta, D Shah, T Gera, S Gogia, P Mohan, R Panda, 2011). The result that came out of the randomized trial control among participants in rural Guatemala, showed that wood made stove with chimney did not reduce the risk of pneumonia. Charcoal use for cooking, carrying on the back of a child during the time of cooking and place of cooking were statistically significantly associated with pneumonia after controlling for the possible extraneous variables, but animal dung use for cooking has shown no relationship with the incidence of pneumonia (Shah Anna K Weiss et al., 2011). Half of the 2 million premature deaths in low income countries are due to pneumonia caused by indoor air pollution from solid fuel use (Makokha et al., 2016). Living in the crowded household environment enhances the transmission of pneumonia to the health child (Jain et al., 2015).

2.3.3 Co Morbidity

Co morbidity has been found to elevate the risk of pneumonia. Diarrheal diseases is one of the determinants of under-five pneumonia as established by child health epidemiology reference group (CHERG), an academic review group started on by WHO. Diarrhea caused acute respiratory tract infection including pneumonia in a cohort study among children in Ghana and Brazil (Enarson, Enarson, & Gie, 2014). Measles is an established risk factor for pneumonia. Pneumonia mortality caused by measles reached as high as 86% (Lassi et al., 2014). Measles actually accelerates the fatality rate of pneumonia (Jain et al., 2015) through immune suppression. Case control study in Pakistan supports this finding that children who had history of measles were susceptible to the development of pneumonia compared to those children who reported no history of measles (Shah Anna K Weiss et al., 2011). Lack of measles immunization is among the leading risk factors that predispose the 02 -59 months old children to pneumonia (Tuhebwe et al., 2014).The Child Health Epidemiology Reference Group(CHERG) revealed that other co morbid diseases such as HIV/AIDS, Malaria and Malnutrition were identified to be associated with increased occurrence of pneumonia (Fox et al., 2013). Anemia in children is recently studied to be significantly associated with the development of pneumonia (Lassi et al., 2014).

2.3.4. Other factors

Local health care system namely maternal and pediatric care, access to health care and low birth weight are found to predict pneumonia in under- fives. Altitude, annual rainfall, number and nature of the seasons and average monthly temperatures are the factors listed by CHERG as factors of under-five pneumonia (R Nantanda et al., 2014). Although the risk of vitamin D in the development of pneumonia remains undecided, a recent cross sectional survey has found that low blood level of vitamin D significantly increased the risk of pneumonia among adolescents (Joseph. L. Mathew, AK Patwari , P Gupta, D Shah, T Gera, S Gogia, P Mohan, R Panda, 2011). An Indian hospital based case control study suggested that the deficiency state of vitamin D considerably boosted the probability of childhood pneumonia (Fox et al., 2013). These findings are, however, no longer supported by the other recent study in children conducted in Canada in 2014 where there found no association between this vitamin and risk of pneumonia (Padilla Ygreda et al., 2010). Also, Randomized placebo-controlled trial in 2010 was carried out among

children 3 years or younger to see whether vitamin D supplementation can cure childhood pneumonia. The result, nonetheless, showed that there were no difference in improvement between the two groups of the disease except its effect on the risk of recurrence, where the treatment group were less likely to re-acquire pneumonia compared to the children in the placebo group (Enarson et al., 2015). Such factors as race, Asthma, Diabetes Mellitus, Congestive heart failure and Chronic Obstructive Pulmonary Disorder(COPD) are evidently found to largely put adolescents at risk of pneumonia. The primary care taker's knowledge of pneumonia plays a considerable role in reducing the burden of the problem through helping the child to seeking appropriate care on timely manner. The health seeking behavior of primary care taker increases when they are able to diagnose the ill child as having pneumonia ,which in turn decreases the morbidity and mortality burden of pneumonia (Webb et al., 2012).

CHAPTER THREE: METHODOLOGY

3.1. Study design

A hospital based cross sectional quantitative survey was employed.

3.2 Study area

The study was conducted in Eastern Uganda, Jinja district, at Jinja regional referral hospital. The hospital is situated in Jinja municipality with 780 bed capacity. It is a referral hospital for the districts of Bugiri, Iganga, Kaliro, Kamuli, Mayuge, Kayunga and parts of Mukono. Jinja RRH offers both general and specialized services and is a teaching hospital.

3.3 Study population

Children aged two months up to 5 years were considered for the study

3.4 Sample size determination

The size of study participants recruited in to the research was calculated using the formula below. Considering the prevalence of under-five severe pneumonia to be 15% (Tuhebwe et al., 2014), and setting the level of confidence at 95%, and margin of error 5%, the sample size was calculated as follows:

Sample size n = $\frac{\boldsymbol{Z^2(p(1-p))}}{\boldsymbol{w^2}}$

Where p- proportion of severe pneumonia cases

q- proportion of children who have no pneumonia

W-margin of error

z- normal standard deviation at 95% confidence interval.

Substituting the values for each of these variables in the above formula,

$$\mathbf{n = \frac{1.96^2(0.15(-0.15))}{0.05^2}}$$

The sample size estimated to be 196. Plus, a 10% non-response rate = 216.

3.5 Sampling procedures

Simple random sampling was used in the recruitment of participants. All patients who were admitted on pediatric ward starting from the date of commencement of data collection, and fulfilled the selection criteria, were successively recruited for the study. A lottery method using

names from admission register was used to select consecutively 10 study participants at random on daily basis. The recruitment continued until the intended sample size (216) was achieved.

3.6 Inclusion and Exclusion criteria

3.6.1Inclusion criteria

- Children under 5 years of age and primary caretaker's pair

3.6.2 Exclusion criteria.

- Children and mothers or caretakers who were severely ill and or had hearing impairments or talking problem.

3.7 Variables of the study

3.7.1 Dependent variable

- Severe Pneumonia of under 5 years old children

3.7.2 Independent variables

- Socio demographic characteristics
- Environmental characteristics
- Past co morbidities

3.8 Data collection procedures

Interviewer administered structured questionnaire was used to collect data on severe pneumonia from the selected participants. The questionnaire was developed in English and translated in to local language (LUSOGA), during data collection. One diploma nurse was recruited as a data collector and was trained for two days.

3.9 Data quality control and assurance management

The questionnaires were checked for completeness and consistency after data collection to ensure the quality of the data, and, the researcher visited the data collector twice a day to check whether she was collecting the data appropriately. Pre-test was carried out on the 10% of the sample in none study area and the questions were revised based on the responses obtained so that questions that induced ambiguity were rephrased.

3.10 Data Analysis procedures

The data analysis was done with the software SPSS version 25.0. Results were presented using tables and charts. Bivariable and multivariable logistic regression analysis was performed to determine significant association and interpreted as significant at a p-value of <0.05 and 95% CI.

3.11 Ethical consideration

Ethical clearance for the study was obtained from the dean faculty of clinical medicine and Dentistry School KIU western campus**.** Permission to collect data was obtained from the administrator Jinja regional referral hospital.

Verbal and written informed consent were obtained from participants after a detailed explanation on the purpose and benefit of the study right before the individual data collection.

CHAPTER FOUR

PRESENTATION OF RESULTS

4.1 Socio demographic characteristics of the respondents

The study population consisted of children in the age group of 2 to 59 months. 216 mothers /primary care takers and children's pair were included in the study with a response rate of 100%. Majority of study participants 156 (72.2%) were from rural setting and the largest proportion of the respondents189 (87.5%) were peasants.However, only 16 (7.4%) had completed tertiary education.

The mean age of the children was 21 months ± 16 standard deviation and majority, 178 (82.4%) of the children were females. Table 1 below shows the details.

Table 1:Socio-demographic characteristics of the respondents (N=216 mothers and children's pair)

Variable	Frequency	Percentage (%)
Residence		
Urban	60	27.8
Rural	156	72.2
Total	**216**	**100.0**
Education level		
never completed primary	105	48.6
Primary	58	26.9
Secondary	37	17.1
Tertiary	16	7.4
Total	216	100.0
Occupation of the caretaker		
Peasant	189	87.5
self employed	21	9.7
formally employed	6	2.8
Total	**216**	**100.0**
Age of the child		
2-11	85	39.4
12-23	50	23.1
24-59	81	37.5
Total	**216**	**100.0**
Sex of the child		
Male	38	17.6
Female	178	82.4
Total	**216**	**100.0**

4.2. Environmental characteristics of the respondents.

Majority of the study participants, 156 (72.2%) were using wood for cooking and 185 (85.6%) of the participants did not have a smoker in their house hold. However, only 61 (28.2%) of the participants were using piped water as the main source. Table 2 below shows details.

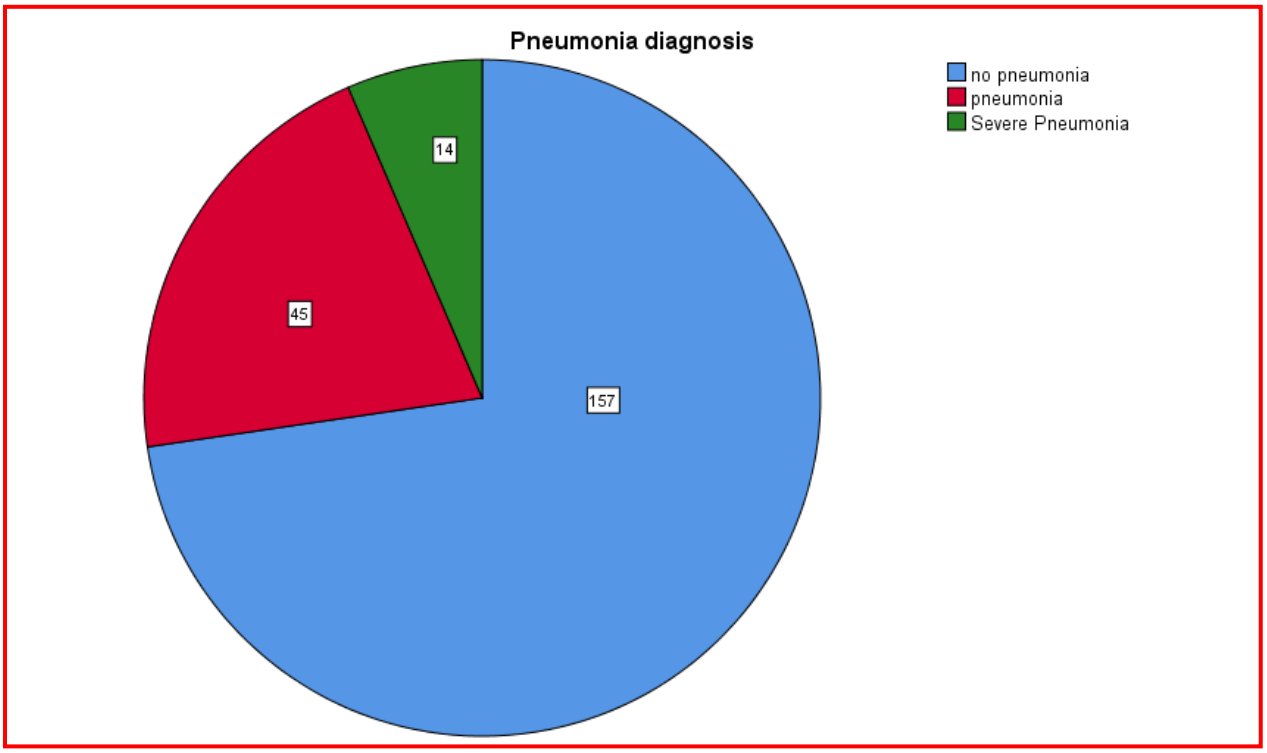
Table 2: Environmental characteristics of the respondents (N=216 mothers and children's pair)

Variables	Frequency	Percentage (%)
Source of water		
Piped	61	28.2
Protected wells	37	17.1
Non-protected wells	90	41.7
River/lake	28	13.0
Total	**216**	**100.0**
Type of toilet		
Open pit	76	35.2
VIP	54	25.0
Flush toilet	5	2.3
Open field/bush	18	8.3
Non-VIP latrine	63	29.2
Total	**216**	**100.0**
Type of fuel used for cooking		
charcoal	58	26.9
Wood	156	72.2
Gas	2	0.9
Total	**216**	**100.0**
Place of cooking		
Main house	1	0.5
Kitchen	95	44.0
Out doors	120	55.6
Total	**216**	**100.0**
Number of windows in the living house		
One	2	0.9
Two	90	41.7
Three	57	26.4
More than three	67	31.0
Total	**216**	**100.0**
cigarette smoker in the house hold		
Yes	31	14.4
No	185	85.6
Total	**216**	**100.0**

4.3 The prevalence of severe pneumonia among childrenaged 2 -59 months

The prevalence of pneumonia was assessed using WHO classification in children 2-59 months based on signs and symptoms. Where, (cough and cold = no pneumonia, Fast breathing and or/ chest indrawing = Pneumonia while in addition to above, presence of any danger sign = severe pneumonia). Among 216 children in the study, 157(72.7%) of them had cough with no pneumoniawhile only 14 (6.5%) of the children had Severe pneumonia as illustrated infigure 1 below shows more details.

Figure 2: The prevalence of 2 -59 months old children (N=216)



4.4. Factors associated with severe pneumonia in under-five (02 -59 months) old children.

Association of each independent variable on outcome variable was assessed by bivariable logistic regression. Socio demographic, environmental and household variables were tested for their association with the presence of severe pneumonia among under-five children in the study area. Factors that were found significant ($p<0.05$) included; never completed primary education, having primary education, being a peasant, and using wood for cooking as demonstrated in table 3 below.

Table 3: Bivariate logistic regression to determine the factors associated with severe pneumonia among children 2-59 months at Jinja regional referral hospital, 2018

Variables	Severe pneumonia		COR (95% CI)	P-value
	Yes	No		
Residence				
Urban	7	53	2.81(0.942,8.391)	0.064
Rural	7	149	1	
Level of education				
Never completed primary	6	99	0.182(0.045,0.737)	**0.017***
Primary	2	56	0.107(0.018,0.654)	**0.015***
Secondary	2	35	0.171(0.028,1.058)	0.057
Tertiary	4	12	1	
Current occupation				
peasant	9	180	0.100(0.016,0.620)	**0.013***
self employed	3	18	0.333(0.041,2.699)	0.303
Formally employed	2	4	1	
Sex of the child				
Male	4	34	1.967(0.855,6.673)	0.272
Female	10	168	1	
Age of the child				
2-11 months	8	77	2.701(0.691,10.564)	0.153
12-23 months	3	47	1.660(0.322,8.562)	0.545
24-59 months	3	78	1	
Main source of water				
Piped	7	54	1.685(0.327,8.684)	0.533
protected wells	1	36	0.361(0.031,4.197)	0.416
non-protected wells	4	86	0.605(0.105,3.490)	0.574
River/lake	2	26	1	

Table 3 continuation

Type of toilet				
Open pit	2	74	0.399(0.071,2.252)	0.298
VIP	5	49	1.505(0.383,5.913)	0.558
Flash	1	4	3.688(0.330,41.220)	0.289
Bush	2	16	1.844(0.309,10.988)	0.502
no-VIP	4	59	1	
Fuel used for cooking				
Gas	1	1	0.115(0.006,2.092)	0.144
wood	7	149	0.047(0.003,0.832)	**0.037***
charcoal	6	52	1	
Place of cooking				
main house	0	1	0	1.001
kitchen	9	86	2.407(0.779,7.437)	0.127
outdoors	5	115	1	
kitchen separate from mainhouse				
Yes	4	83	0.573(0.174,1.891)	0.361
No	10	119	1	
cigarette smoker in the household				
Yes	4	27	2.593(0.759,8.855)	0.128
No	10	175	1	

CHAPTER FIVE

DISCUSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

5.1.1 Prevalence of severe Pneumonia

This study aimed at identifying prevalence and risk factors of severe pneumonia among children aged 2-59 months in Jinja regional referral hospital. Results show that, of the 216 children recruited in the study, 14 were diagnosed with severe pneumonia giving a prevalence of 6.5%. This prevalence is slightly lower than that of Mukono district which was found to be 9.4% in a study by Tuhebwe et al., (2014). This difference could have been due to different methods of data collection and difference in study setting. However, this finding is in line with the findings from a cross sectional survey in Eastern Asia which found the prevalence of under-five pneumonia to be 6.8% (Farooqui et al., 2015). The prevalence of severe pneumonia in children in this study setting is also not consistent with the findings from a cross sectional survey in Mulago (Uganda) which was found to be significantly higher at 53.7% (Nantanda et al., 2014). The discrepancy in the difference in the prevalence of severe pneumonia could be due to the difference in the setting in which these two studies were conducted, the latter being done in the National referral hospital of Uganda. And other factors which might be linked to differences in community of origin, environment and sociocultural, income differences

5.1.2 Risk factors of severe pneumonia among children aged 2-59 months

In this study never completed primary [OR=0.18, 95%CI (0.045,0.737), P=0.017], having primary education [OR=0.11, 95%CI (0.018,0.654), p=0.015] and using wood for cooking [OR=0.05, 95%CI (0.003,0.832), p=0.037] were found significantly associated with having severe pneumonia.

Similar findings are reported in a study conducted in Kenya (Webb et al., 2012) where risk of acquiring severe pneumonia was higheramong children from householdswhere wood was used for cooking.Moreover,a study conducted in Mulago hospital Ugandafound that children exposed to smoke from wood were more likely to present withsevere pneumonia and bronchiolitis (Nantanda et al., 2014). Furthermore, thefinding agrees with study conducted in Mukono,

Ugandawhere significant association was observed between nothaving completed primary education and occurrence of ARIin under-five children(Tuhebwe et al., 2014). Cooking with wood increases risk of air pollution which increases vulnerability of children to acquire ARI including severe pneumonia. This is also comparable to the findings from the cross sectional survey in Pakistan where severe pneumonia prevalence was associated with cooking with wood(Musher & Thorner, 2014).

The prevalence of severe pneumonia in under-fives was not affected by the residence**.** This finding is consistent withthe findings from a case control study in Kenyawhere there was no a statistically significant difference in the prevalence of severe pneumonia between urban and rural(Onyango et al., 2012). This case control study, however, reported that maternal occupation had been found to be significantly associated with severe pneumonia, which is in contrary to the finding in this study. This difference could be explained by the difference in the methodology and skills of data collectors. Similarly, this finding is supported by the report from the cross sectional survey in Mukono Uganda where educational status and occupation of the parent did not illustrate significant association with severe pneumonia in children (Tuhebwe et al., 2014).

Also, this study did not find any significant difference in the occurrence of severe pneumonia with sex of the child. This finding is consistent with the findings from a case control study in Kenya (Makokha et al., 2016). However, this is not supported by the report by Lassi et al.,(2014)which showed higher occurrence of severe pneumonia in boys than in girls. The difference in the methodology could be the reason for this discrepancy.

In this study, there was also no difference in the occurrence of severe pneumonia with the age of child. This finding is not in line with the report from Peru which revealed higher occurrence of pneumonia in children younger than 2 years of age (Padilla Ygreda et al., 2010). Similarly, a case control study from India showed that severe pneumonia tend to occur more frequently in younger children; the prevalence decreases as the child gets older(Zakariya, Bhat, Harish, Arun Babu, & Joseph, 2011). This difference may be due to the difference in the methodology.

This study did not find significant association of severe pneumonia with the presence of a smoker among household members, however, children from households with a smoker were two times

more likely to get severe pneumonia. This is in line with the findings from randomized control trial in rural Guatemala (Blot et al., 2014). This is confirmed by the reports from WHO training package on health sector, where children whose parents smoke were 60% more affected by severe pneumonia(World Health Organization, 2015).

5.2 Conclusion

In this study prevalence of severe pneumonia at under-fivechildren was low (6.5%). The study also identified risk factors for under-five severe pneumonia such as education below primary level and households which use wood for cooking.

5.3 Recommendation

Based on the findings in this study, the followings were recommended.

There should be organized effort to mobilize communities on health benefits and use kitchen with enough smoke escape roots like windows and/or chimneys.

Control programs should focus on treatment and prevention of severe pneumonia among children

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APPENDICES

APPENDIX I: INFORMED CONSENT

The study has been described to me in a language that I understand, and I freely and voluntarily agree to participate. My questions about the study have been answered. I understand that my identity will not be disclosed and that I may withdraw from the study without giving a reason at any time and this will not negatively affect me in any way.

Participant's name: …….

Participant's signature: …….

Date: …… ……

Witness……

APPENDIX II: QUESTIONNAIRE

Date……..

Questionnaire code:…..

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

Part I. <u>Socio demographic characteristics</u>			
No	Questions	Coding category	Skip
101	Usual Residence	Urban----------1 Rural----------2	
102	Have you ever attended school?	Yes----------1 No----------2	→ **104**
103	What is the highest level of schooling you attended?	primary ----------1 secondary----------2 technical/vocational ----------3 Higher level----------4	
104	Has your husband ever attended school?	Yes----------1 No----------2	→ **106**
105	What is the highest level of schooling your husband attended?	primary ----------1 secondary----------2 technical/vocational ----------3 Higher----------4	

106	What is your current occupation?	Housewife----------1 Maid servant----------2 Civil servant----------3 Merchant---------- 4 Student----------5 Other specify--------99	
107	What is your husband's occupation?	Farmer ----------1 Student----------2 Civil servant----------3	

		Merchant----------4 Other specify**-------99**	
108	Age of the child	2-11 months----------1 12 -23 months--------2 24-59 months---------3	
109	Sex of the child	Male----------1 Female----------2	
110	Cough and or difficult of breathing (at the time of survey)	Yes----------1 No----------2 →	**114**
111	Duration of cough	Less than two weeks---1 Two or more weeks----2	
112	Check the respiratory rate of the child		
113	Check chest wall in drawing	Yes----------1 No----------2	
114	Vomiting everything	Yes----------1 No----------**2**	
115	Check convulsion	Yes----------1 No----------**2**	
116	Unable to drink/breast feed/eat	Yes----------1 No----------2	
Part two: questions on environmental factors			

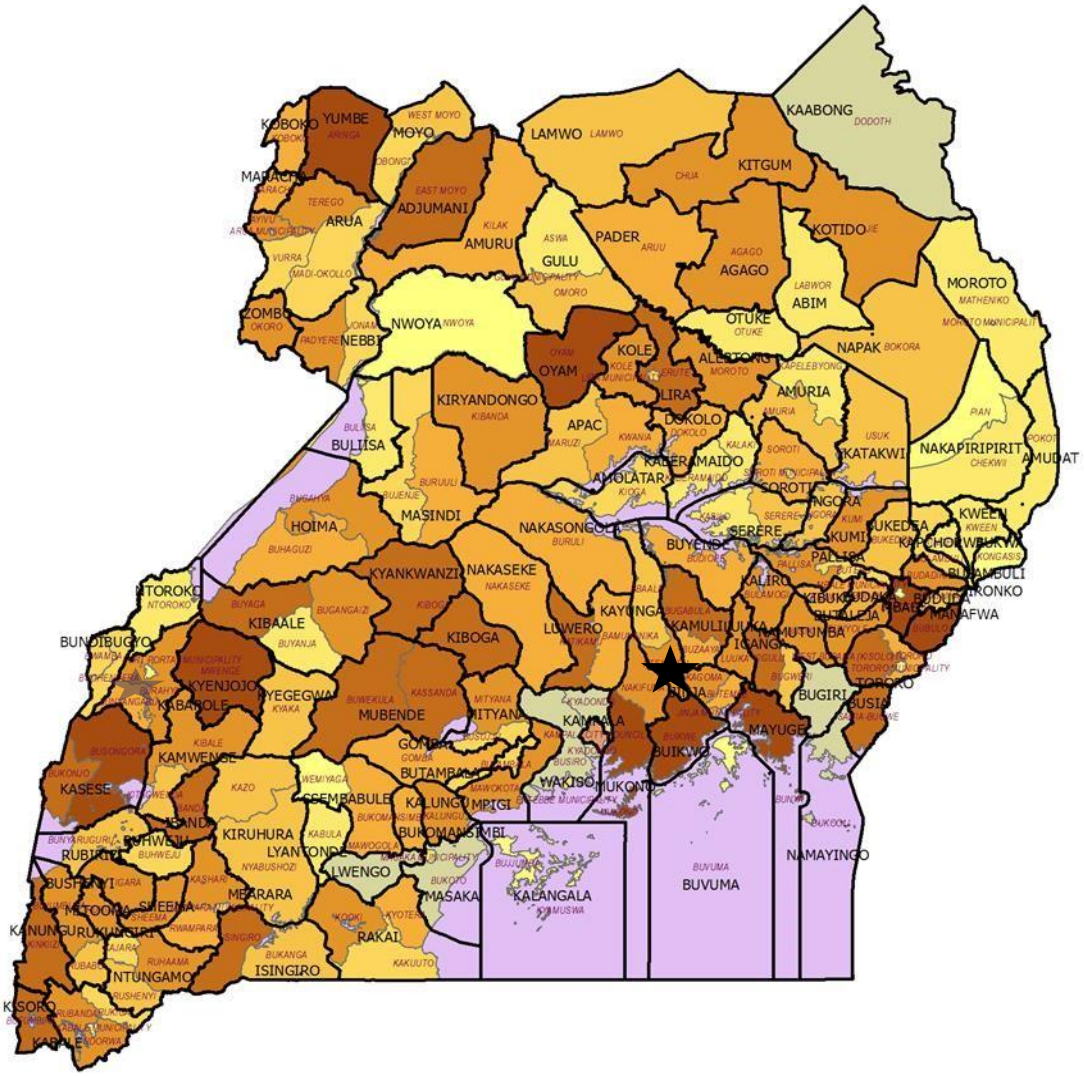
No	Questions	Coding category	Skip
201	What is the main source of drinking water for members of your household?	Piped water----------1 Protected dug well----2 None protected dug well----------3 Spring water----------4 Rain water----------5 River/pond/ /dam----6	
202	What is the main source of water used by your household for Hand washing?	Piped water----------1 Protected dug well----2 None protected dug well----------3 Spring water----------4 Rain water----------5 River/pond/ /dam----6	
203	What kind of toilet facility do members of your household usually use?	Open pit latrine------1 Ventilated improved pit latrine----------2 Pour flush latrine-----3 Compositing toilet---4 Open field/bush--------5	
204	What fuel is used most for cooking in your home	Charcoal----------1 Wood----------2 Electricity----------3 Kerosene----------4 animal dung----------5 Crop wastes----------6 Other specify---------99	
205	Where is the cooking usually done ?	Main House----------1 Kitchen----------2 Outdoors----------3 → Other----------4 → **210**	

206	Is the kitchen separated from the main house?	Yes No	
207	Is there a hood or Chimney in the house or kitchen?	Yes----------1 No----------2	
208	Number of windows in the household	One----------1 Two----------2 Three----------3 None----------4	
209	Number of windows in the kitchen	One----------1 Two----------2 Three----------3 None----------4	
210	Where is the usual location of the child during cooking?	On cooking mothers back or besides the mother----------1 Outside of the cooking house----------2	
211	Is there any cigarette smoker in the member of the household?	Yes----------1 No----------2	

Part three. <u>Questions related to Breast feeding and past co morbidity</u>			
No	**Questions**	**Coding category**	**Skip**
301	Breast feeding status of the child during the first 6 months of life.	Exclusive breast feeding----------1 Partial Breast feeding----------2 Not Breast feeding----------3	
302	For how long have you breast fed your child?	Less than 6 months-----1 6 to 12 months----------2 More than a year--------3	
303	Have your child ever had diarrhea?	Yes----------1 No----------2	
304	Have your child ever had Measles?	Yes----------1 No----------2	

Thank you very much for your participation.

APPENDIX III: MAP OF UGANDA SHOWING JINJA DISTRICT



KEY:

★ Location of Jinja District