PREVALENCE AND RISK FACTORS OF PNEUMONIA AMONG CHILDREN AGED BELOW 5 YEARS ATTENDING KIRYANDONGO HOSPITAL

BY

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BMS/0034/141/DF

A RESEARCH PROPOSAL SUBMITTED TO THE FACULTY OF CLINICAL MEDICINE AND DENTISTRY IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF DEGREE OF BACHELOR OF MEDICINE AND SURGERY OF KAMPALA INTERNATIONAL UNIVERSITY

MARCH, 2019.

DECLARATION

I hereby declare that this research report is my original work and has never been submitted to any institution of learning for any academic award.

Signature……...…Date: ……

FARDOWSA ABDI DAHIR

APPROVAL

This is to certify that the research entitled ‘Prevalence and risk factors of pneumonia among children aged below 5 years attending Kiryandongo hospital’ has been done by the student under my supervision.

Signature.....Date……..……

DR.MICHEAL ATUHAIRWE

Supervisor.

DEDICATION

Special dedication to my lecturers and supervisor and everyone who has ever helped me in this journey of life. My Sincere dedication and appreciation to my mom whose hard work and sacrifice got me where I am today.

ACKNOWLEDGEMENT

My utmost appreciation is to my supervisor who tirelessly guided me in reaching this far. I wish to also acknowledge the support of the local community, the participants and my hard working team. I thank you all sincerely.

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OPERATIONAL DEFINITIONS

Respiratory rate: the number of respirations in one full minute (also called breathing rate)

Respiratory distress: respiratory difficulty manifested by nasal flaring, grunting, supraclavicular or intercostals retractions and lower chest in drawing.

Pneumonia: child having cough with fast breathing

Co morbidity: diseases associated with another disease, pneumonia in this case.

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: Pneumonia is the number one infectious killer of children under age 5 years, killing an estimated 2400 children a day globally and in Uganda, pneumonia is the second leading cause of death among children under the age of five years. The main aim of this study was to determine the prevalence and factors associated with pneumonia among children under 5 years old attending Kiryandongo hospital.

Methods: Hospital based cross-sectional study was employed on 100 child-mother pairs. Data were 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: The mean age of the children was 18.4 months ± 14.1 SD and majority, 60 (60%) of the children were males. Prevalence of pneumonia among under-five children in this study was 20%.Children aged≤11 months were 6.6 times more likely to develop pneumonia as compared to children aged ≥12 months (AOR=6.6; 95%CI=2.160, 20.169; p=0.001).Children whose mothers were unemployed were less likely to have pneumonia compared to those whose mothers were employed (AOR=0.03; 95%CI=0.005,0.134; p<0.001).Children from households without kitchen were 7 times more likely of develop pneumonia as compared to children from household has kitchen. (AOR=7.0 95%CI=2.333, 21.004; p=0.001). Children who breastfed for a period of less than 12 months were 7 times more likely to get pneumonia than children who breastfed for at least 12 months (AOR=7.0;95%CI =2.333, 21.004; p=0.001).Children who had a history of diarrhea were 7.9 times more risk of developing pneumonia as compared to children with no history of diarrhea (AOR=7.9;95%CI=2.580, 24.122; p<0.001). Children who had a normal nutritional status had a less risk of developing pneumonia as compared to children who were malnourished (AOR=0.01; 95%CI=0.002, 0.121; p<0.001).

Conclusion: Prevalence of pneumonia in under-five children in the study area was high. Identified risks can be prevented and controlled through community mobilization on health benefits of improved ventilation in cooking places, breastfeeding for at least two years, and taking children for vaccination to prevent under five pneumonia

CHAPTER ONE: INTRODUCTION

1.1 Background

Globally, pneumonia is the number one infectious killer of children under age 5 years, killing an estimated 2400 children a day(WHO, 2016). 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 pneumonia remains a leading killer of 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 pneumonia 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). Moreover, 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 in Uganda(UBOS, 2016).

A number of risk factors of pneumonia in children under five years have been reported by different studies. 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 in Uganda reported severe malnutrition and hypoxemia as the risk factors for pneumonia (Rebecca Nantanda, Ostergaard, Ndeezi, & Tumwine, 2014).

In Kiryandongo hospital, prevalence and risk factors of pneumonia in children under 5 years are not available as not study has been conducted. Thus, this study seeks to bridge this gap by determining prevalence and risk factors of severe pneumonia among children under 5 attending Kiryandongo hospital.

1.2 Problem statement

Childhood pneumonia has been the commonest cause of suffering worldwide among under-five children, with the developing countries 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 disease 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 reported to be due to pneumonia (Rebecca Nantanda, Tumwine, Ndeezi, & Ostergaard, 2013). The huge discrepancy between the current absurdly high prevalence of pneumonia reflects poorly designed prevention strategies in the poor settings like Uganda (Nantanda et al., 2014).

Although the above studies (Jain et al., 2015; Nantanda et al., 2014) highlight the problem in Uganda at a national level, little is known about the prevalence and associated factors of pneumonia in the study area. This study therefore intended to bridge this information gap by determining the prevalence of pneumonia among children under 5 years and its associated factors in Kiryandongo hospital.

1.3 Objectives of the study

1.3.1 General objective

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

1.3.2 Specific objectives

I. To determine the prevalence of pneumonia among children aged below 5 years attending Kiryandongo hospital.
II. To identify risk factors pneumonia among children aged below 5 years attending Kiryandongo hospital.

1.4 Research questions

I. What is the prevalence of pneumonia among children aged below 5 years attending Kiryandongo hospital?
II. What are the risk factors of pneumonia among children aged below 5 years attending Kiryandongo hospital?

1.5 Significance of the study

Under-five 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 kill millions of children worldwide which calls for innovative strategies that will come about only through systematic researches. The widespread nature of the problem in Uganda has already killed millions of children which calls for the need to look for lasting solution to end the problem.

The under-five pneumonia morbidity burden also costs the health services program as health services are passed on to cure high pneumonia morbidity cases. Pneumonia is not only the problem 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. Above all, there are no previous studies in the study area that could determine the prevalence of the problem.

1.6 Study scope

1.6.1: Geographical scope

This study took place in Kiryandongo Hospital, Kiryandongo district in western Uganda.

1.6.2 Content scope

This study assessed the prevalence and risk factors of pneumonia among children aged below 5 years attending Kiryandongo hospital.

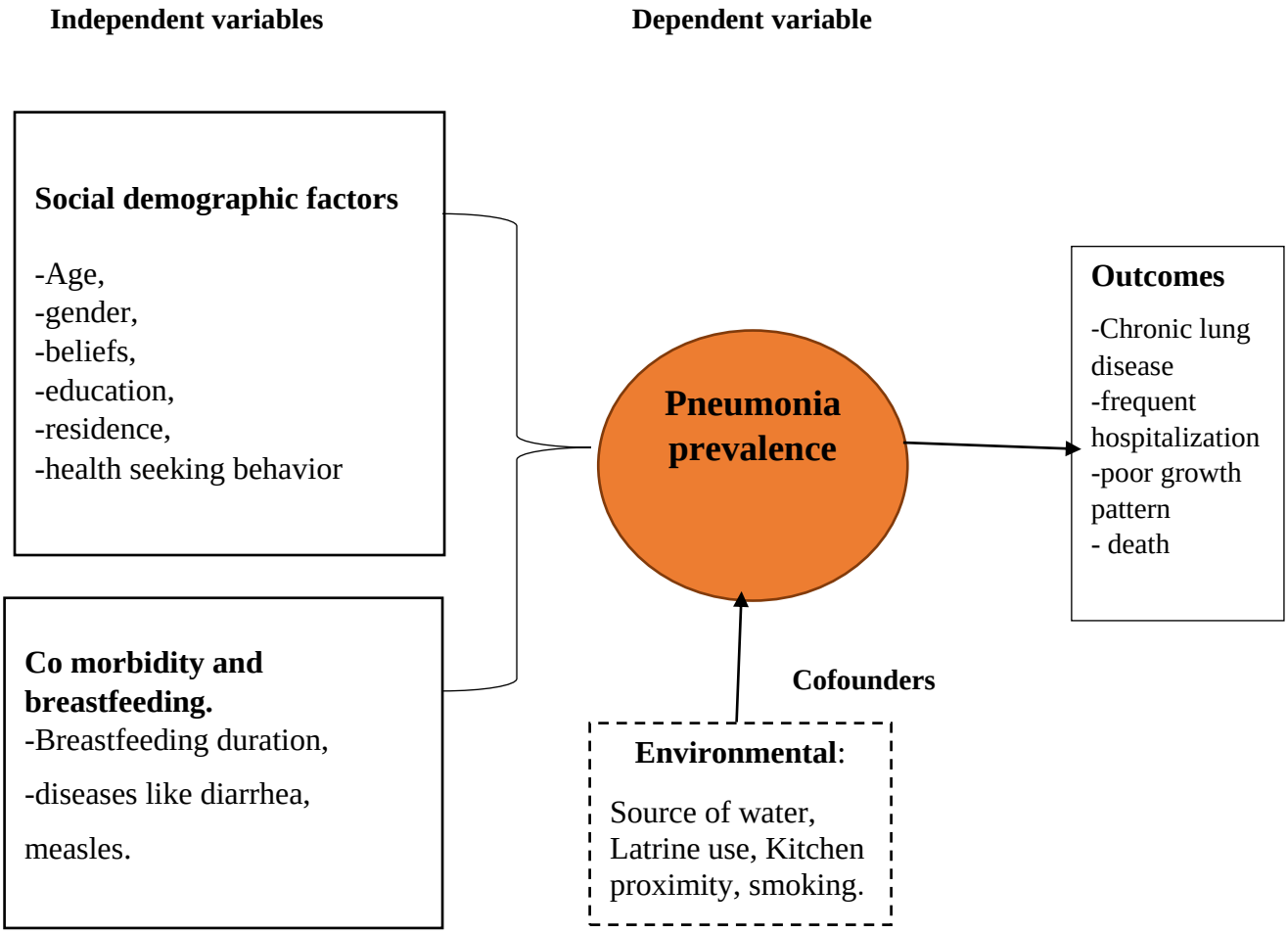
1.6.3: Time scope

The study took place between December 2018 and February 2019.

1.7 Conceptual frame work

The conceptual framework represents a relationship between factors that influence the prevalence of pneumonia among children 2-59 months attending Kiryandongo hospital. They include social demographic, environmental and other co morbidities.

Figure 1: Conceptual frame work for risk factors of pneumonia in under 5 years



Source: designed by the researcher

CHAPTER TWO: LITERATURE REVIEW

2.1 Prevalence of Pneumonia

The rate of new 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 pneumonia was estimated worldwide with the significant variation in the incidence of 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 bear 35 and 61 million new infections in a year respectively. Vilas-Boas et al reported that 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 focused local community based cross sectional study done in Kampala in 2014 found that the prevalence was as high as16%.This study, however, suffered small sample size and, again, the ascertainment is based on mothers or care takers' report like with the UDHS report (Rebecca Nantanda et al., 2014).

2.2 Mortality due to Pneumonia

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, 2016). 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 of 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., 2015).

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., 2016). 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., 2015). Children whose parents are smoking have 60% probability of developing pneumonia (Makokha et al., 2016). Occupational status of parents appeared 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, 2016). Indoor air pollution is 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 Disease (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., 2015).

CHAPTER THREE: METHODOLOGY

3.1. Study design

A hospital based cross sectional quantitative design was employed.

3.2 Study area

This study was conducted in pediatric ward of Kiryandongo hospital in Kiryandongo district. Kiryandongo district, is in Bunyoro Kitara region of western Uganda. It is bordered by districts of Nwoya in the north, Nakasongora in the South, Masindi in the West and Apac in the East. The district has one Town council and It covers a 1399 M^2 area (National Population and Housing Census, 2014).

Kiryandongo Hospital is located 225Km along the Kampala - Gulu highway. The hospital is in Kikube parish, Kiryandongo sub-country, Kibanda Country in Kiryandongo district. It is a 109 bed hospital serving a population of over 400,000 people from areas of Kiryandongo, Masindi, Nakasongola, Oyam, Apac, Amuru and Nwoya districts.

The hospital is offers a number of services including; OPD, inpatient, Ophthalmology, X-ray, ultra sound, Orthopedics, health promotion and education, occupational therapy, HIV care and treatment, Maternal and child health, environmental health, special clinics among others.

3.3 Study population

Children under 5 years will be 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 pneumonia to be 7% (UDHS, 2016), and setting the level of confidence at 95%, and margin of error 5%, the sample size will be calculated as follows:

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

Where p- proportion of 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,

$$\mathbf{n} = \frac{\mathbf{1.96^2(0.07(-0.07))}}{\mathbf{0.05^2}}$$

The sample size estimated to be 100.

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 met the selection criteria, were successively recruited for the study. Names from admission register were used to select consecutively 10 study participants on daily basis. The recruitment continued until the intended sample size (100) was achieved.

3.6 Inclusion and Exclusion criteria

3.6.1Inclusion criteria

Children under 5 years of age and primary caretaker's pair who consented for the study were included in the study.

3.6.2 Exclusion criteria.

Children and mothers or caretakers whose children were above 5 years and or did not consent for the study were not considered.

3.7 Variables of the study

3.7.1 Dependent variable

- Pneumonia of under 5 years old children

3.7.2 Independent variables

- Socio demographic characteristics like age, gender, beliefs, education, residence.
- Environmental characteristics like Source of water, Latrine use, Kitchen proximity, smoking.
- Past co morbidities like breastfeeding status, duration, diseases like diarrhea, measles

3.8 Data collection procedures

Interviewer administered structured questionnaire was used to collect data on pneumonia from the selected participants. The questionnaire was developed in English and translated in to local language during data collection.

3.9 Data quality control and assurance management

The questionnaire was pretested to ensure validity and was revised based on the responses obtained so that questions that induce ambiguity were rephrased. The questionnaires were checked for completeness and consistency after data collection to ensure the quality of the data.

3.10 Data Analysis procedures

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

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 wassought from the administrator Kiryandongo hospital.

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

3.12 Study limitations

i. The cross-sectional study could not help establish temporal relationship between the possible risk factors of under-five old children pneumonia and the outcome of interest, pneumonia.
ii. Also, this study selectively addressed certain factors of under-five pneumonia while various factors are found to cause the diseases.
iii. And also, the WHO's IMCI is not a confirmatory gold standard diagnostic tool to surely settle pneumonia diagnosis.
iv. The study could not measure indoor air pollution as it needs prospective measurement for its precise ascertainment.

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. 100mothers /primary care takers and children's pair were included in the study with a response rate of 100%. Majority of study participants 72 (72%) were from rural setting and the largest proportion of the respondents 88 (88%) were not formally employed. Only24 (24%) had completed secondary education and above. The mean age of the children was 18.4 months ± 14.1SD and majority, 60 (60%) of the children were males. Table 1 below shows the details.

Table 1:Socio-demographic characteristics of the respondents (N=100 mothers and children's pair)

Characteristics	Frequency	Percent
Age of the child (months)		
≤11	40	40.0
≥12	60	60.0
Total	**100**	**100.0**
Sex of the child		
Male	60	60.0
Female	40	40.0
Total	**100**	**100.0**
Residence		
Urban	28	28.0
Rural	72	72.0
Total	**100**	**100.0**
Mother's education level		
≤Primary	76	76.0
≥Secondary	24	24.0
Total	**100**	**100.0**
Mother's employment status		
Unemployed	88	88.0
Employed	12	12.0
Total	**100**	**100.0**

4.2. Environmental characteristics of the respondents.

Majority of the study participants, 70 (70%) were using wood for cooking and 85 (85%) of the participants did not have a smoker in their house hold. 80 (80%) of the participants had a kitchen. Table 2 below shows details.

Table 2: Environmental characteristics of the respondents. (N=100 mothers and children's pair)

Characteristics	Frequency	Percent
Cooking place		
main house	20	20.0
Kitchen	80	80.0
Total	**100**	**100.0**
Kitchen has windows		
Yes	40	40.0
No	60	60.0
Total	**100**	**100.0**
Fuel used for cooking		
Wood	70	70.0
Charcoal	30	30.0
Total	**100**	**100.0**
Smoker in the household		
Yes	15	15.0
No	85	85.0
Total	**100**	**100.0**

4.3 Nutritional factors, past co morbidities and vaccination status of children in the study

Results show that majority of children (96%) had an up to date vaccination status, 90% had a normal nutrition status and 80% had breastfed for at least one year. Table 3.

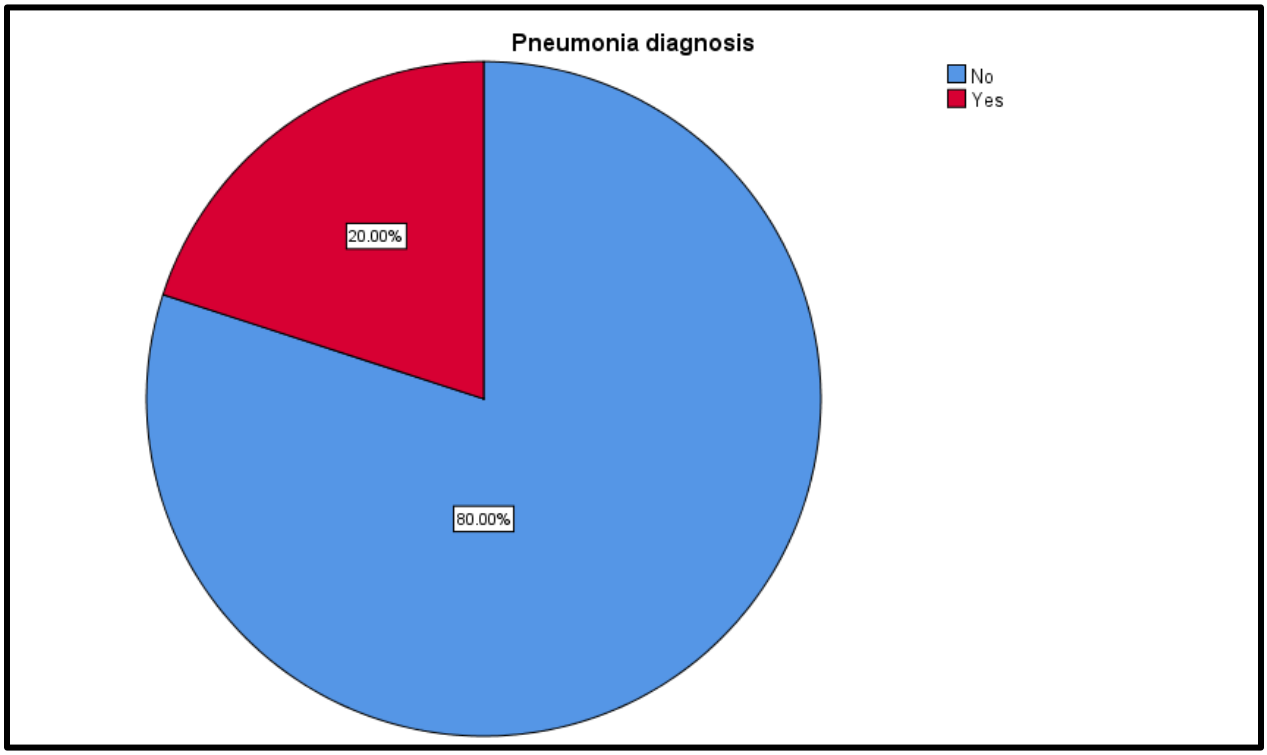
Table 3: Nutritional factors, past co morbidities and vaccination status of children under 5

Characteristics	Frequency	Percent
Duration of breastfeeding		
≤11 months	20	20.0
≥12 months	80	80.0
Total	**100**	**100.0**
Nutrition status		
Normal	90	90.0
Malnourished	10	10.0
Total	**100**	**100.0**
History of diarrhea		
Yes	20	20.0
No	80	80.0
Total	**100**	**100.0**
Vaccination status		
Up to date	96	96.0
Not up to date	4	4.0
Total	**100**	**100.0**

4.4 The prevalence of severe pneumonia among children aged2 -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 in drawing = Pneumonia while presence of any danger sign = severe pneumonia). For purposes of this study, both 'pneumonia and severe pneumonia' were combined and reported as pneumonia.Among100 children in the study, 80 (80%) of them had no pneumonia, while 20 (20%) were diagnosed with pneumonia as illustrated in figure 2 below.

Figure 2: The prevalence of pneumonia among children under 5 years (N=100)



4.5Bivariate analysis of factors associated with pneumonia in under-five years old children.

Association of each independent variable on outcome variable was assessed by bivariate analysis. Sociodemographic, environmental and past co morbidities variables were tested for their association with the presence of pneumonia among under-five children in the study area. Factors that were found significant ($p<0.05$) included; never age of the child, mother's employment status, cooking place, vaccination status, history of diarrhea and nutritional status of the child as demonstrated in table 4 below.

Table 4: Bivariate analysis to determine the factors associated with pneumonia in children

Variables	Pneumonia		Chi square	P value
	No	Yes	X^2	
Age of the child in months			12.76	**0.001**
<11	25	15		
>12	55	5		
Sex of the child			1.04	0.320
Male	50	10		
Female	30	10		
Residence			6.02	0.024
Urban	18	10		
Rural	62	10		
Mother's education level			0.49	0.560
Primary and below	62	14		
Secondary and above	18	6		
Mother's employment status			34.19	**<0.001**
Unemployed	78	10		
Employed	2	10		
Cooking place			14.06	**0.001**
main house	10	10		
Kitchen	70	10		
Kitchen has windows			1.04	0.320.
Yes	30	10		
No	50	10		
Fuel used for cooking			4.76	0.053
Wood	60	10		
Charcoal	20	10		
Smoker in the house			7.84	0.011
Yes	8	7		
No	72	13		
Breastfeeding duration			14.06	**0.001**
≤11 months	10	10		
≥12 months	70	10		
Nutrition status			44.44	**<0.001**
Normal	80	10		
Malnourished	1	9		
History of diarrhea			14.06	**0.001**
Yes	10	10		
No	70	10		
Vaccination status			16.67	**0.001**
Up to date	80	16		
Not up to date	1	3		

4.6 Multiple logistic regressions analysis of independent variables associated with pneumonia

Factors which were associated with pneumonia at binary regression analysis were further analyzed using a multiple logistic regression analysis and results are summarized in table 5 below. Variables which were found significant were; age of child, mothers' employment status, cooking place, nutrition status, breastfeeding duration and history of diarrhea. Children aged≤11 months were 6.6 times more likely to develop pneumonia as compared to children aged ≥12 months (AOR=6.6; 95%CI=2.160, 20.169; p=0.001).Children whose mothers were unemployed were less likely to have pneumonia compared to those whose mothers were employed (AOR=0.03; 95%CI=0.005,0.134; p<0.001).Children from households without kitchen were 7 times more likely of develop pneumonia as compared to children from household has kitchen. (AOR=7.0 95%CI=2.333, 21.004; p=0.001). Children who breastfed for a period of less than 12 months were 7 times more likely to get pneumonia than children who breastfed for at least 12 months (AOR=7.0;95%CI =2.333, 21.004; p=0.001).Children who had a history of diarrhea were 7.9 times more risk of developing pneumonia as compared to children with no history of diarrhea (AOR=7.9;95%CI=2.580, 24.122; p<0.001). Children who had a normal nutritional status had a less risk of developing pneumonia as compared to children who were malnourished (AOR=0.01;95%CI=0.002, 0.121; p<0.001).

Table 5: Multiple logistic regressions analysis of factors associated with pneumonia

Variables	Pneumonia		AOR (95%CI)	P value
	No	Yes		
Age of the child in months				
≤11 months	25	15	6.6 (2.160; 20.169)	**0.001**
≥12 months	55	5	1	
Mother's employment status				
Unemployed	78	10	0.03 (0.005; 0.134)	**<0.001**
Employed	2	10	1	
Cooking place				
main house	10	10	7.0 (2.333; 21.004)	**0.001**
Kitchen	70	10	1	
Breastfeeding duration				
<12 months	10	10	7.0 (2.333; 21.004)	**0.001**
≥12 months	70	10	1	
Nutrition status				
Normal	79	11	0.01 (0.002; 0.121)	**<0.001**
Malnourished	1	9	1	
History of diarrhea				
Yes	10	10	7.9 (2.580; 24.122)	**<0.001**
No	70	10	1	
Vaccination status				
Up to date	79	17	0.1 (0.007; 0.682)	0.022
Not up to date	1	3	1	

CHAPTER FIVE
DISCUSION OF FINDINGS

5.1 Prevalence of severe Pneumonia

This study thought to identify prevalence and risk factors of pneumonia among children aged 2-59 months attending Kiryandongo hospital. Results show that, of 100 children recruited in the study, 20 were diagnosed with pneumonia giving a prevalence of 20%. This prevalence of pneumonia in children in this study setting is 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 similarity in the prevalence of pneumonia could be due to similarity in the setting in which these two studies were conducted, all being done in the large hospitals of Uganda. This finding is also in line with the findings from a cross sectional survey in Eastern Asia which found the prevalence of under-five pneumonia to be 18% (Farooqui et al., 2015). However, the prevalence in this study is higher than that of a study by Tuhebwe and colleagues in Mukono district which was found to be 9.4% (Tuhebwe et al., 2014). This difference could have been due to different methods of data collection and difference in study setting in which the study in Mukono was conducted in lower health units while this study was in a hospital.

5.2 Risk factors of pneumonia among children under 5 years of age.

In this study, factors associated with under five pneumonia at multivariable logistic regression included, Children aged ≤11 months, children whose mothers were unemployed, children from households without kitchen, children who breastfed for a period of less than one year, children who had a history of diarrhea and children who were malnourished.

Children at age rang≤11 months were 6.6 times more likely to develop pneumonia as compared to older age groups. The result is similar to a study conducted in Pakistan (Musher & Thorner, 2014)where children at age rang ≤11months had 85% higher chance to have pneumonia as compared to older age. A2015 Kenyan study report showed a higher occurrence of pneumonia in children younger than 2 years of age(Webb et al., 2015).Other studies conducted in different regions also revealed that children under the age of twelve months are more likely to be hospitalized for low respiratory tract diseases, especially pneumonia (Vilas-Boas et al., 2014, Roca et al., 2016, Makokha et al., 2016). The immaturity of immunological system of the children put this group vulnerable to pneumonia and other infections.

In this study lack of separate kitchen was significantly associated with occurrence of pneumonia and had a 7 times risk compared to those who separate kitchen. Similar result was reported by a study conducted in Kenya (Makokha et al., 2016) where risk of acquiring pneumonia was higher among children from household in which cooking takes place at main house. Moreover, a study conducted in USA concluded that indoor cooking smoke was associated with childhood pneumonia and bronchiolitis (Jain et al., 2015). Furthermore, the finding agrees with a study conducted in Ndola, Zambia found a significant association was observed between not having a separate room for cooking and occurrence of ARI in under-five children (Lassi et al., 2014). A similar study in India in which cooking near the bed was significantly associated with occurrence of ARI in under-five children (Blot et al., 2014).In these cases, risk of indoor air pollution is high which increase vulnerability of children to acquire ARI including pneumonia.

In this study duration of breast feeding showed significant association with occurrence of pneumonia. Children who breastfed less than one year were 7 times higher chance to acquire pneumonia as compared to child fed for more than a year. Evidences showed that breastfeeding protect infants against infection and has protective factor for reducing risk of respiratory illness among infants (Singh & Aneja, 2016, Guerrera, 2015, World Health Organization, 2015).

CHAPTER SIX

CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

In this study prevalence of pneumonia at under-five children was high (20%). The study also identified risk factors for under-five pneumonia such as; Child's age of ≤11 months, child's mother being unemployed, lack of kitchen, breastfeeding for less than 12 months, having a history of diarrhea and being malnourished.

6.2 Recommendation

Based on the findings in this study, the researcher recommends the following.

There should be organized effort to mobilize communities

- On health benefits of ventilated and improved housing conditions, to use separate kitchen, use kitchen which has windows and/or chimneys.
- Create awareness about breast feeding initiation, termination and their importance to decrease childhood illness like pneumonia
- Infant at age group below 12 months to receive appropriate care and intervention like vaccination
- Further large-scale research should be carried out in this study area that could resolve the limitation of this study.

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APPENDICES

Appendixi: 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

SECTION A: DEMOGRAPHIC CHARACTERISTICS

1. Education status of the mother
    a) Primary and below
    b) Secondary
    c) Tertiary
2. Maternal occupation
    a) House wife
    b) Employed
    c) Business
3. Age of the child
4. Sex of the child
    a) Male
    b) Sex

SECTION B: ENVIRONMENTAL CHARACTERISTICS OF RESPONDENTS

5. Fuel used for cooking
    a) Wood
    b) Charcoal
    c) Electricity
6. Cooking place
    a) Main house
    b) Kitchen
7. Separate kitchen
    a) Yes
    b) No
8. Number of windows in the main house

a) One
b) Two
c) Three and above

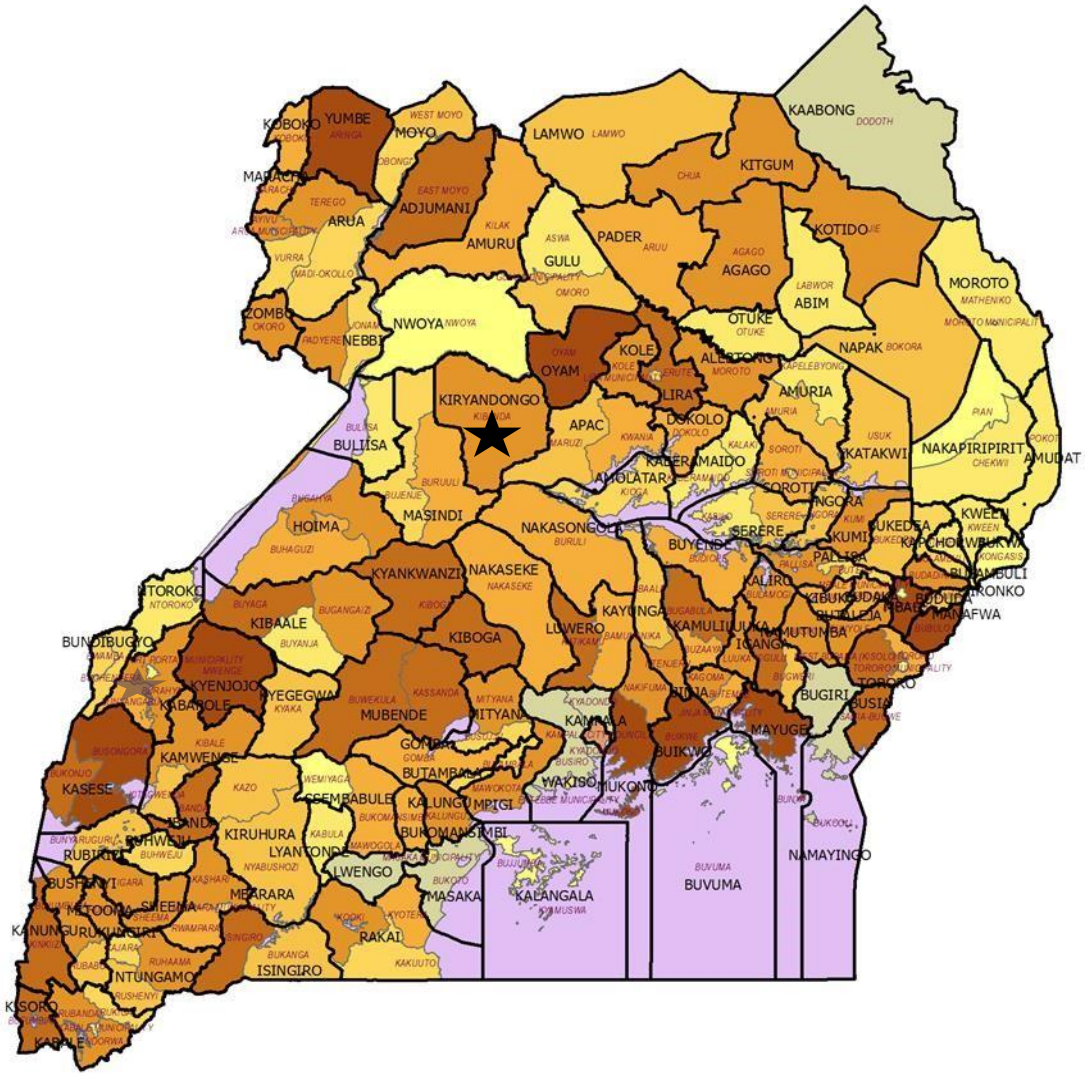
9. Kitchen has windows
    a) Yes
    b) No
10. Place of the child during cooking
    a) Outside cooking room
    b) With the mother in the cooking room
11. Any cigarette smoker in the household
    a) Yes
    b) No

SECTION C: NUTRITIONAL FACTORS, PAST COMORBIDITIES AND VACCINATION STATUS

12. Duration of BF…….
13. Nutritional status…….
14. History of diarrhea
    a) Yes
    b) No
15. Vaccination status
    a) Up to date
    b) Not up to date

Thank you very much for your participation.

Appendix iv: Map of districts of Uganda showing location of Kiryandongo



KEY:

★ Location of Kiryandongo District