Student's Journal of Health Research Africa
Vol. 4 No. 9 (2023): September 2023 Issue
https://doi.org/10.51168/sjhrafrica.v4i9.450
Original article

# FACTORS ASSOCIATED WITH OCCURRENCE OF PNEUMONIA AMONG CHILDREN UNDER FIVE YEARS AT ISHONGORORO HEALTH CENTRE IV IN IBANDA DISTRICT: A DESCRIPTIVE CROSS-SECTIONAL STUDY.

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## Abstract

**Background**:

Pneumonia is an infection of the lungs, caused by among other etiologies, bacteria, or viruses. It is an infection of the lung parenchyma and is caused by a wide variety of organisms in pediatric patients. The study focussed on assessing the socio-demographic, environmental, and health-related factors associated with pneumonia among children under five years.

**Research Methodology:**

A descriptive cross-sectional study design was used using a structured questionnaire amongst 85 respondents who were selected using a systematic sampling method to participate in the study.

**Results:**

From the study, the majority 50% were married, most 45 had attained primary level, the majority 62% of the respondents were from rural areas, the majority 43% were peasants, and 57% were having more than 3 children, Results showed that 475% agreed that there was window on respondents' house and more on their house, majority 78% of the respondents were leaving their windows open daily, majority 28(70%) of the respondents were having their household near the street, majority 68% of the respondents were using wood for cooking,

**Conclusion:**

According to the study results and discussions, it was revealed that factors such as mothers' age, parents' level of education, and Household monthly income levels were associated with pneumonia among children aged five years and below Furthermore kind of fuel respondents do use for cooking such as wood, respondents were not leaving their windows open daily, the house has less than two windows, not having a window on their house were associated with pneumonia among children aged five years and below.

**Recommendation**:

The researcher recommends that there should be an organized effort to mobilize communities on health benefits and use kitchens with enough smoke escape roots like windows and/or chimneys and control programs should focus on treatment and prevention of severe pneumonia among children.

***Keywords:*** Etiologies, Paediatric patients, Determinants and Smoke, Submitted: 2023-04-29
Accepted: 2023-07-29

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## 1. Background of the study.

Pneumonia is an infection of the lungs, caused by among other etiologies, bacteria, or viruses (Izadnegahdar, Cohen, Klugman, &Qazi, 2019). It is an infection of the lung parenchyma and is caused by a wide variety of organisms in pediatric patients (Izadnegahdar et al., 2019). Anyone can be affected, but young children and the elderly are most susceptible. Pneumonia is most often preceded and triggered by a cold or bout of flu (Barson, Kaplan, &Torchia, 2019).

Globally, severe pneumonia is the number one infectious killer of children under the age of 5 years, contributing to mortality estimated at 2400 children a day (WHO, 2020). Severe Pneumonia accounted for 16% of the 5.6 million under-five death, killing around 880,000 children in 2019 (UNICEF, 2020).

Every year, nearly 1 million children die of pneumonia worldwide and approximately about 15% of all deaths occur in children under the age of five (Kumdin S et al, 2022).

In Sub-Saharan Africa, the estimated proportion of death in children attributed to pneumonia was 17–26%. Approximately 2400 children were expected to die each day and it accounted for approximately 896,000 under-five deaths. An estimated 880,000 under-five children deaths were reported in 2018 globally, where most of the deaths were children < 2 years old (Getaneh S, et al, 2019).

In East African countries different researchers had tried to investigate the magnitude of pneumonia in under-five children and have reported prevalence ranges from 5.5% [1 up to 89.8% for instance e prevalence of pneumonia among under-five children was found to be 29 in Eritrea, 22.62 in Ethiopia, 64.3 in Kenya, 29.71 in Sudan, 22 in Tanzania, and 32.72 in Uganda. They also identified risk factors for pneumonia among under-five children.

In Uganda, Pneumonia is the second leading cause of death among children under five years of age and the highest estimated number of deaths due to clinical pneumonia. 80% of children under five years that sought treatment from a health worker had symptoms of an acute respiratory infection and Uganda is currently ranked among the 15 countries with the highest estimated number of deaths due to clinical pneumonia (Tramper-Stranders, 2018). A study was done at Mulago National Referral Hospital in Uganda and recorded a prevalence of 53.7% (Kiconco, G et al, 2021).

Children aged five years and below, being among the most vulnerable group, demand more attention and surveillance than is currently given. This is necessary if we are to reduce pneumonia mortality, a key step towards the achievement of the Millennium development goal on child mortality. Some studies have suggested a close association among socioeconomic status, malnutrition, and infectious diseases, especially pneumonia, leading to a vicious and silent course of disease, especially in vulnerable children. There is evidence that goes both ways on a causal relationship between pneumonia and poor living conditions, the latter frequently encountered in crowding settings, housing with inadequate water and sanitation, where children are repeatedly exposed to viral and bacterial infections. For instance, it has been irrefutably documented that children attending daycare centers are at higher risk of getting pneumonia (Thörn, Minamisava, Nouer, Ribeiro, & Andrade, 2018).

Previous studies indicated that some of the most determinants for pneumonia include the educational status of parents, age of the mother, family child caring practice, family income, age and sex of the child, parental smoking or indoor air pollution from biomass fuel smoke, absence of window in the kitchen, overcrowding, parental asthma, household history of pneumonia, malnutrition, lack exclusively breastfeeding, lack of zinc supplementation, comorbidity condition such as diarrhea, measles, acute upper respiratory infection and previous history of asthma (Kumdin S, et al 2021).

In regions where Haemophilus influenzae type b

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(Hib) vaccination coverage is low or has not been introduced, pneumonia cases are mainly due to Hib and Streptococcus pneumonia. S. pneumonia is the most common etiology of severe pneumonia and the leading cause of vaccine-preventable death in children less than five years of age (Moreira, Cintra, Harriague, Hausdorff, &Hoet, 2019).

It is in the backdrop of these facts that the researcher will research the factors associated with pneumonia among children under five years attending Ishongororo Health Centre IV, Ibanda District.

## 2. METHODOLOGY

### *2.1. Study Design*

The study adopted a cross-sectional and descriptive research design using a quantitative triangulation approach. The design was used because it helped gain an understanding of underlying reasons, opinions, and motivations while providing insights into the problem and uncovering trends in thought and opinions, and diving deeper into the problem.

### *2.2. Study Area*

The study area was Ishongororo Health Centre IV which is found in the Ibanda District and located in the Western region of Uganda. It has got an elevation of 1150 meters. It offers services like dental care, general medicine, HIV/AIDS management, maternal and child health services, surgery both minor and major, and inpatient and outpatient clinics to an estimated population of 6000 people with a daily turnup of about 120 patients. It has a bed capacity of 200 beds, the major services offered are obstetrics/gynecology, pediatrics, surgery, 24-hour emergency service, neonatal/baby unit, vesicovaginal fistula repair and prevention (VVF), pastoral care, intern and outreach programs and patients received per month are usually 100 patients.

### *2.3. Study Population*

The study population comprised children under five years at Ishongororo Health Centre IV In Ibanda District between July 2022 and February 2023.

### *2.4. Sample size Determination.*

The sample size of the study was estimated using the formula by Kish Leslie (1965).

Where,

Z= standard normal distribution taken at 95%=1.96 C.I

N= sample size

P= estimated prevalence 21% or 0.21 (UDHS, 2014)

q = 1-p = (1-0.21) = 0.79

d = allowable error = 10% or 0.1

Therefore, $N = 1.96^2 \times 0.21 \times 0.79$

$1 \times 0\ 1$

$= 3.8416 \times 0.1659$

0.01

=63.7

=64 respondents

### *2.5. Sampling Technique*

This study employed a simple random sampling technique since it aimed to give everybody equal chances of being picked to participate in the study.

### *2.6. Sampling Procedure*

The study used a simple random sampling method which involved selecting respondents from the study population by chance. The researcher went to the facility where the target population was sampled from and consent was observed, if the respondent of interest consented to the study and meets the inclusion criteria, they were given a questionnaire to fill out with the help of research assistants.

### *2.7. Data collection method and Tool (s)*

The study used self-administered questionnaires as a method of data collection. This ensured a high response rate and will provide data within the shortest time possible.

The study used a pretested question with close-ended questions as a data collection tool. The choice of a questionnaire is justified by the fact that it allows data to be collected from a large number of people within a short time.

### *2.8. Data collection procedure*

The study involved seeking permission from the relevant authorities in Ibanda District. The researcher and the assistants with the help of other health workers will help in the selection of participants for the study.

### *2.9. Study variables*

#### *2.9.1. Dependent variable*

Pneumonia of children aged five years and below.

#### *2.9.2. Independent variable*

Socio-demographic factors, environmental factors, and health-related factors.

### *2.10. Quality Control*

The questionnaires were pretested on 10 randomly picked caretakers in Ishongororo Health Centre IV in Ibanda District to find out if respondents easily understood and answered questions as required and if the mistakes identified were corrected before actual data collection.

The study was piloted at Wakiso Health Centre IV and it was done with the help of research assistants who were trained before participating in the piloting of the study.

The research assistants were trained on how to conduct data collection to equip them with correct data collection procedures and skills before they are given the go-ahead.

The study considered one month as a period for data collection.

### *2.11. Selection Criteria*

#### *2.11.1. Inclusion Criteria*

The study included all children under five years old attending Ishongororo Health Centre IV with cough and fever and whose caretaker consented.

#### *2.11.2. Exclusion Criteria*

Children and mothers or caretakers who have hearing impairments or talking problems and those who will not come to the health facility.

### *2.12. Data Analysis and Presentation*

Data was manually organized by hand tallying and sorting. They were put into categories and kept under lock and key. After organizing, they were analyzed using SPSS and presented in frequency distribution tables, graphs, pie charts, and narratives to attach meaning.

### *2.13. Ethical Consideration*

The findings of this study were approved by the Uganda Allied Health Examination Board (UAHEB) and the research committee of Medicare Health Professionals College. The researcher sought permission to carry out data collection and access to the health facility records from the DHO through the hospital in charge.

To ensure confidentiality, the participants' names were not written on the interview guide.

Consent was also sought before the participants were allowed to take part in the study; those who consented were interviewed whereas those who did not consent were not forced to participate in the study.

Also, a participant was allowed to withdraw from the study if they decided to do so, and they were not punished in any way.

## 3. STUDY FINDINGS

### *3.1. Socio-demographic factors associated with the occurrence of pneumonia among children aged five years*

In this first objective, the researcher sought to find out the Socio-demographic factors associated with pneumonia among the under-fives.

Majority 38(59%) of the respondents were male while the least 26(41%) were female.

Majority 33(52%) of the respondents were in the age range of 2–11 months and the least 13(20%) were 24 – 59 months.

Majority 34(53%) of the respondents were in the age range of 24 - 34 years, 16(25%) were 24 years and less and the least 14(22%) were 35 years and more

Majority 38(59%) of the respondents were married and lastly 11(17%) were divorced

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Table 1: distribution of respondents by Socio demographic factors associated with occurrence of pneumonia among children aged five years

| Variable | | Frequency | Percentages (%) |
|---|---|---|---|
| Gender of child | Male | 26 | 41 |
| | Female | 38 | 59 |
| | **Total** | **64** | **100** |
| Age of child | 2–11 months | 33 | 52 |
| | 12 - 23 months | 18 | 28 |
| | 24 – 59 months | 13 | 20 |
| | **Total** | **64** | **100** |
| Age of mother | ≤24 | 16 | 25 |
| | > 24 to34 | 34 | 53 |
| | ≥35 | 14 | 22 |
| | **Total** | **64** | **100** |
| Marital status of parents | Married | 38 | 59 |
| | Divorced | 11 | 17 |
| | Separated | 15 | 24 |
| | **Total** | **64** | **100** |
| Parents' educational level | No formal education | 12 | 18 |
| | Primary | 32 | 50 |
| | Secondary | 10 | 16 |
| | Tertiary education | 7 | 11 |
| | Others | 3 | 5 |
| | **Total** | **64** | **100** |
| Area of residence | Rural area | 40 | 62 |
| | Urban area | 24 | 38 |
| | **Total** | **64** | **100** |
| Occupation | Housewife | 8 | 12 |
| | Peasants | 28 | 44 |
| | Self employed | 17 | 27 |
| | Others | 11 | 17 |
| | **Total** | **64** | **100** |
| House hold monthly income | less than 100,000 | 36 | 56 |
| | 100,000-500,0 | 16 | 26 |
| | 500,000-1,000,000 | 8 | 12 |
| | 1,100,000 and above | 4 | 6 |
| | **Total** | **64** | **100** |
| Number of under-five children | 1-2 children | 28 | 43 |
| | > 3 children | 36 | 57 |
| | **Total** | **64** | **100** |

half t 32(50%) of the respondents attained primary level and the least 3(5%) attained others such Bachelor's degree.

Majority 40(62%) of the respondents were from rural area and the least 24(38%) were from urban area

Most 28(44%) of the respondents were peasants) and lastly (12%) were Housewives.

Majority 36(56%) of the respondents were earning less than 100,000 shs and minority 4(6%) were earning 1,000,000 and above shs.

Majority 36(57%) of the respondents were having more than 3 children and the least 28(43%) were having 1-2 children.

### 3.2. *Environmental related factors associated with Occurrence of Pneumonia among children aged five years.*

In this second objective, the researcher sought to find out the environmental factors associated with pneumonia among the under fives

Results from figure 1 shows that 35(55%) of the respondents agreed that there was window on respondents' house and lastly 29(45%) did not have a window on their house.

ndicates that majority 24(68%) of the respondents were having two windows and less on their house and the least 11(32%) were having three windows and more on their house

According to figure 2, majority 50(78%) of the respondents were not leaving their windows open daily and the least 14(22%) were leaving their windows open daily.

According to table 3, majority 47(74%) of the respondents were having their household near the street and the least 17(26%) were not having their household near the street.

Results from table 4 shows that majority 35(54%) of the respondents were cooking in the living room and lastly 14(16%) were cooking in the separate kitchen.

According to figure 4, majority 48(75%) of the respondents' children were held on the back and the least 16(25%) were staying out of the cooking room.

According to table 5, majority 44(68%) of the respondents were having some family member who smoked cigarette and the least 20(32%) were not having any family member smoking.

According to figure 5, majority 33(75%) of the respondents were fathers who smoked and the least 11(25%) were other family such as (mother, siblings and grandparents).

### 3.3. *Health facility related factors associated with occurrence of pneumonia among children aged five years.*

In this third objective, the researcher sought to find out the Socio demographic factors associated with pneumonia among the under-fives.

According to figure 6, majority 42(65%) of the respondents were having child been treated pneumonia in 2 weeks and the least 22(35%) were not having child been treated pneumonia in 2 weeks.

hows that majority 43(67%) of the respondents had an history of Asthma and the least 21(33%) had no history of Asthma.

Results from Table 7 shows that majority 38(59%) of the respondents had been with Lower respiratory tract infection in the past 2 weeks Asthma and the least 26(41%) had not been with Lower respiratory tract infection in the past 2 weeks.

Results from figure 7 shows that majority 44(52%) of the respondents agreed that there was a family member with TB infection history the least 41(48%) had no family member with infection history.

Results from figure 8 shows that majority 41(65%) of the respondents were taking their children to private health facilities for treatment and the least 23(35%) were taking their children to government facilities for treatment.

Results from table 8 shows that majority 44(68%) of the respondents reported that they had never vaccinated their children of pneumonia in 2 weeks and the least 20(20%) had vaccinated their children of pneumonia in 2 weeks

Results from table 9 shows that majority 40(63%) of the respondents stayed very far from their places of treatment and the least 8(12%) stayed near.

Majority of the respondents 53(83%) never found the pneumonia drugs at the health facil-

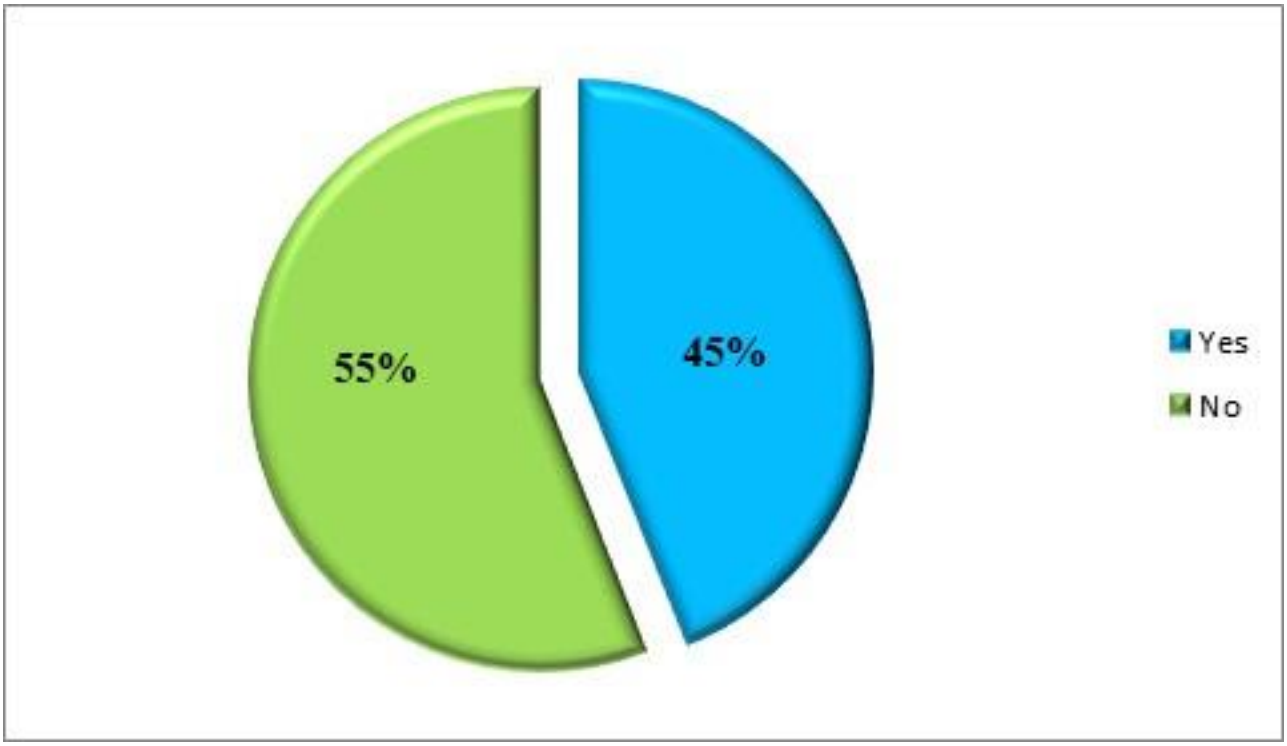


Figure 1: Showing distribution of respondents by whether there is a window on respondents' house **(n=64)**

Table 2: Showing distribution of respondents by the number of windows on house n=35

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Two and less | 24 | 68 |
| Three and above | 11 | 32 |
| **Total** | **35** | **100** |

Table 3: Showing distribution of respondents by whether Household near the street (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 47 | 74 |
| No | 17 | 26 |
| **Total** | **64** | **100** |

Table 4: Showing distribution of respondents by where they do cooking (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| In the living room | 35 | 54 |
| Kitchen attached to living room | 19 | 29 |
| In the separate kitchen | 10 | 16 |
| **Total** | **64** | **100** |

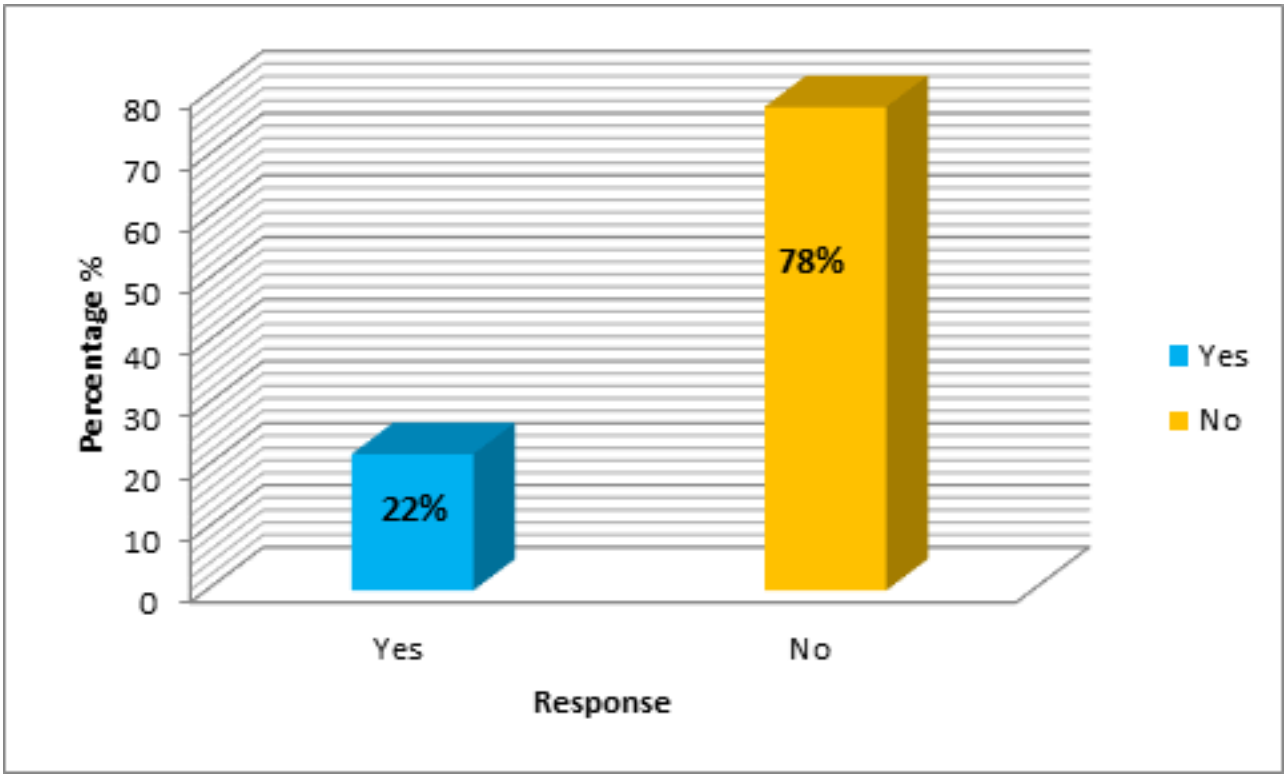


Figure 2: Showing distribution of respondents by whether they leave windows open daily (n=64)

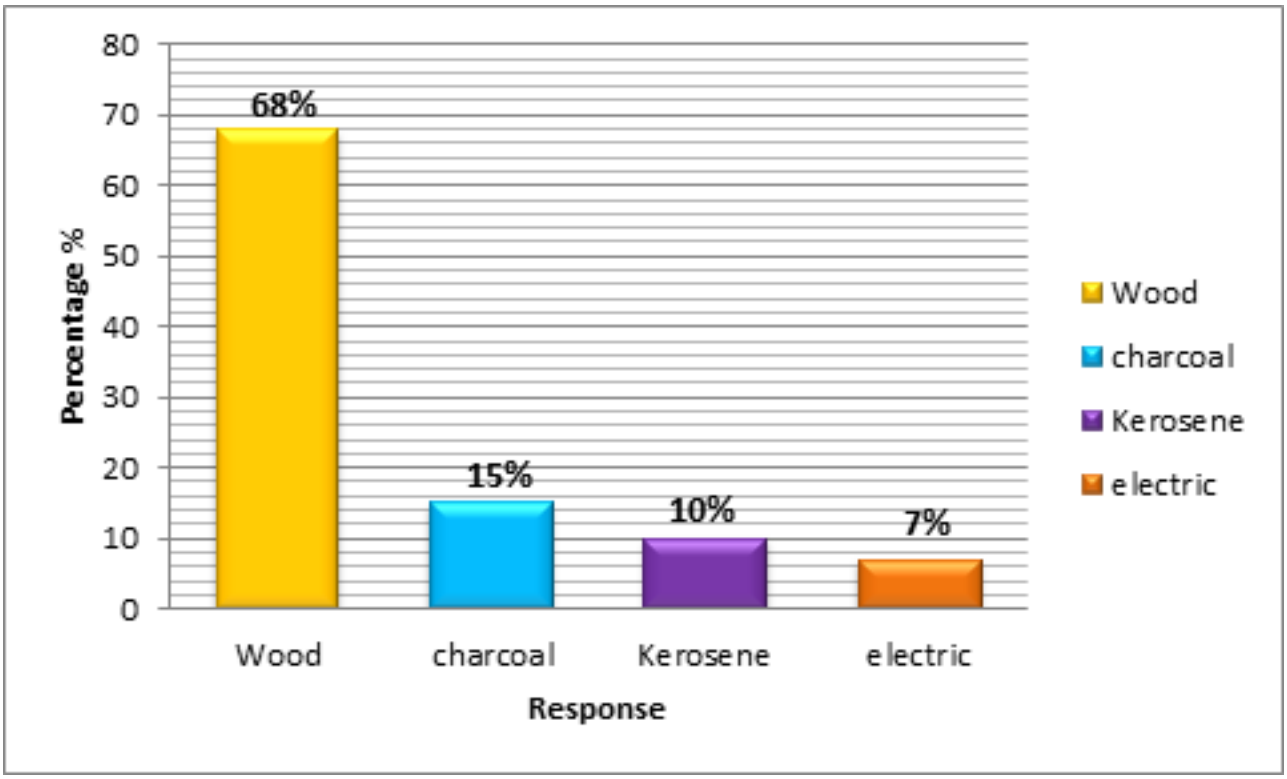


Figure 3: Showing distribution of respondents by the kind of fuel respondents do use for cooking (n=64)

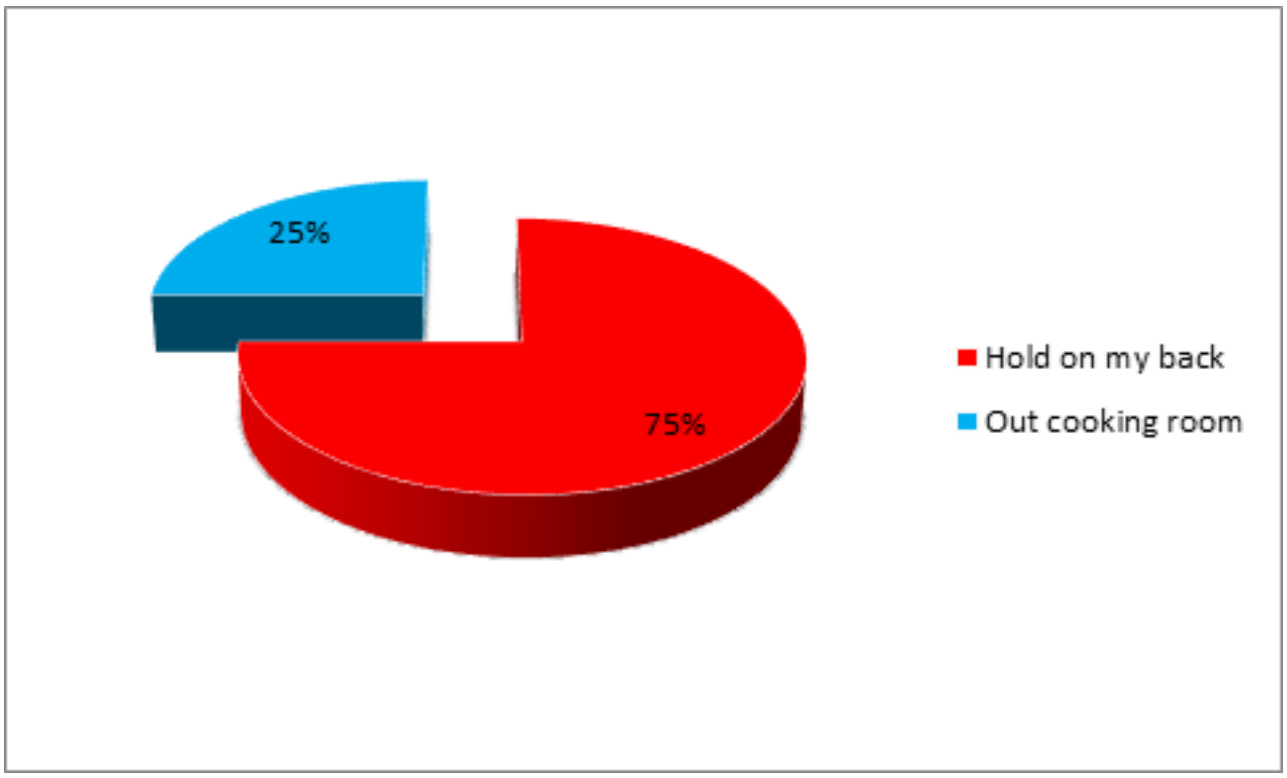


Figure 4: Showing distribution of respondents by where their children stay during cooking (n=64)

Table 5: Showing Distribution of respondents by whether there is any family member who smokes cigarette (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 44 | 68 |
| No | 20 | 32 |
| **Total** | **64** | **100** |

Table 6: Showing Distribution of respondents by their children have a history of Asthma (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 43 | 67 |
| No | 21 | 33 |
| **Total** | **64** | **100** |

Table 7: showing Distribution of respondents by whether their children been with Lower respiratory tract infection in the past 2 weeks (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 38 | 59 |
| No | 26 | 41 |
| **Total** | **64** | **100** |

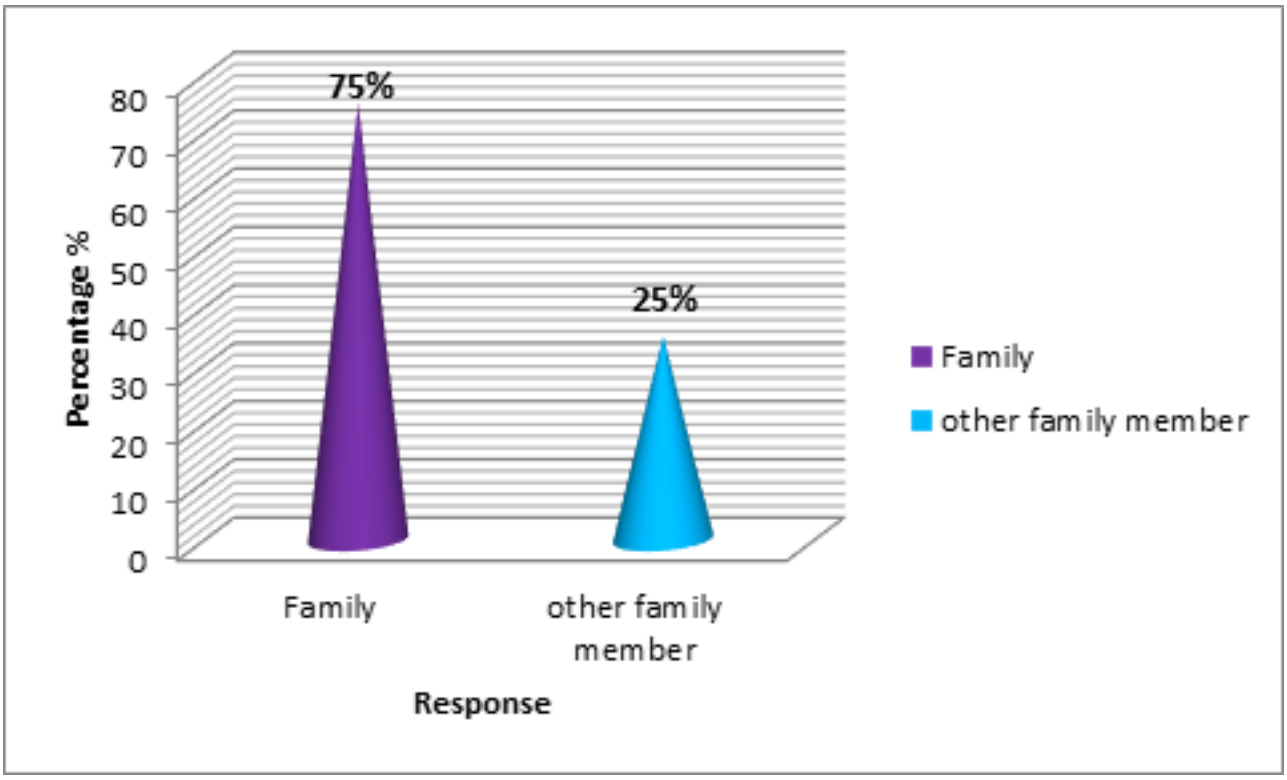


Figure 5: Showing Distribution of respondents by who smoke n=44

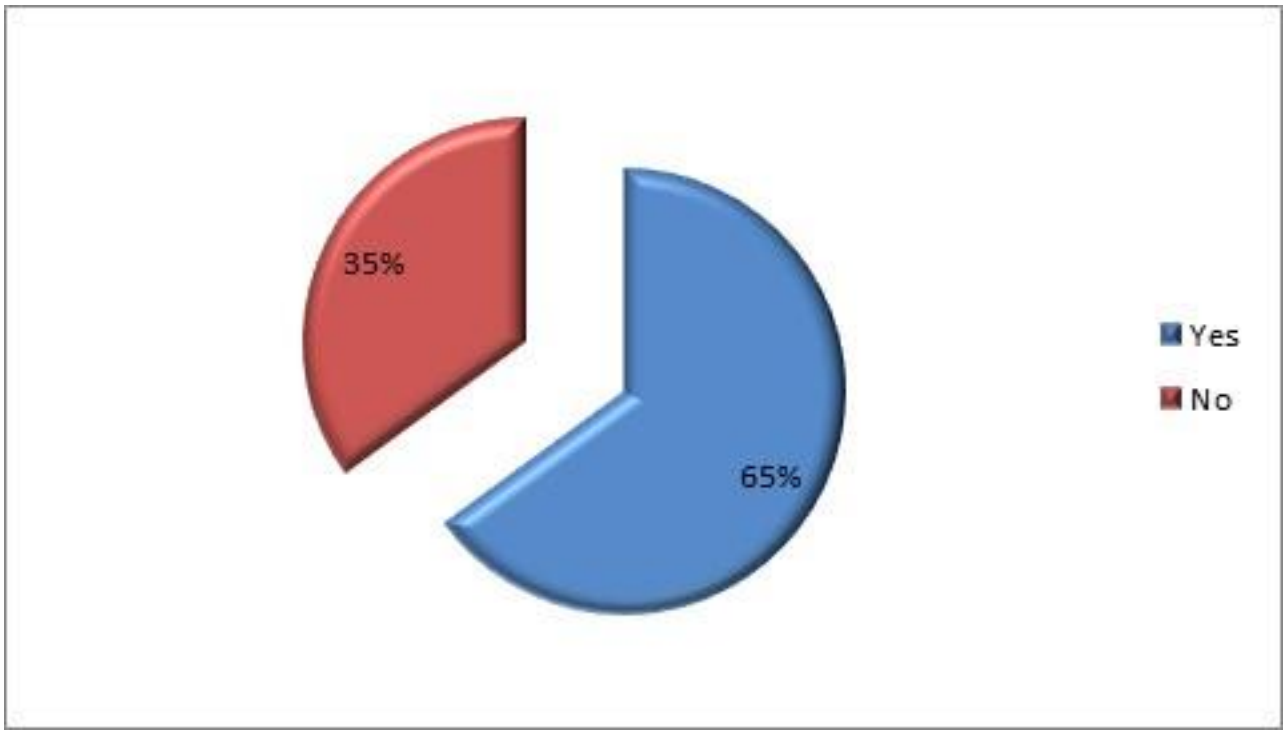


Figure 6: Showing Distribution of respondents by whether their children have been treated pneumonia in 2 weeks (n=64)

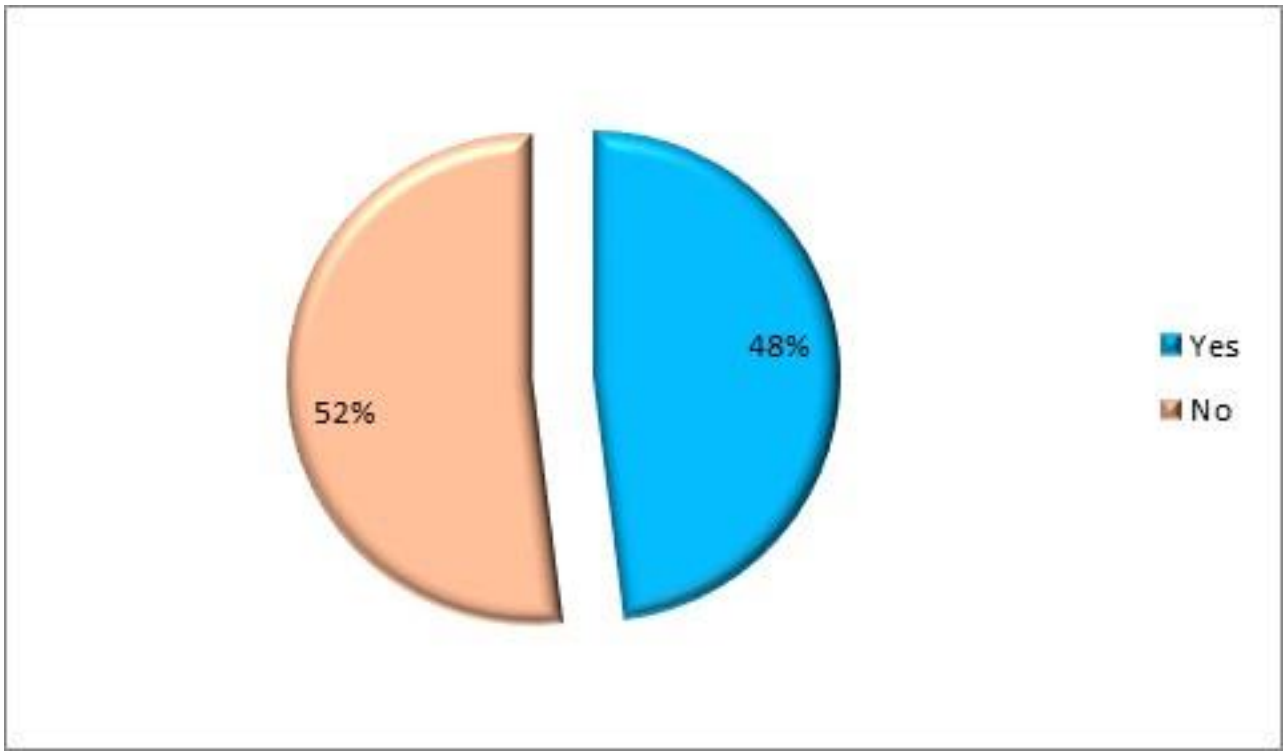


Figure 7: Showing Distribution of respondents by whether there is any Family member with Tb infection history

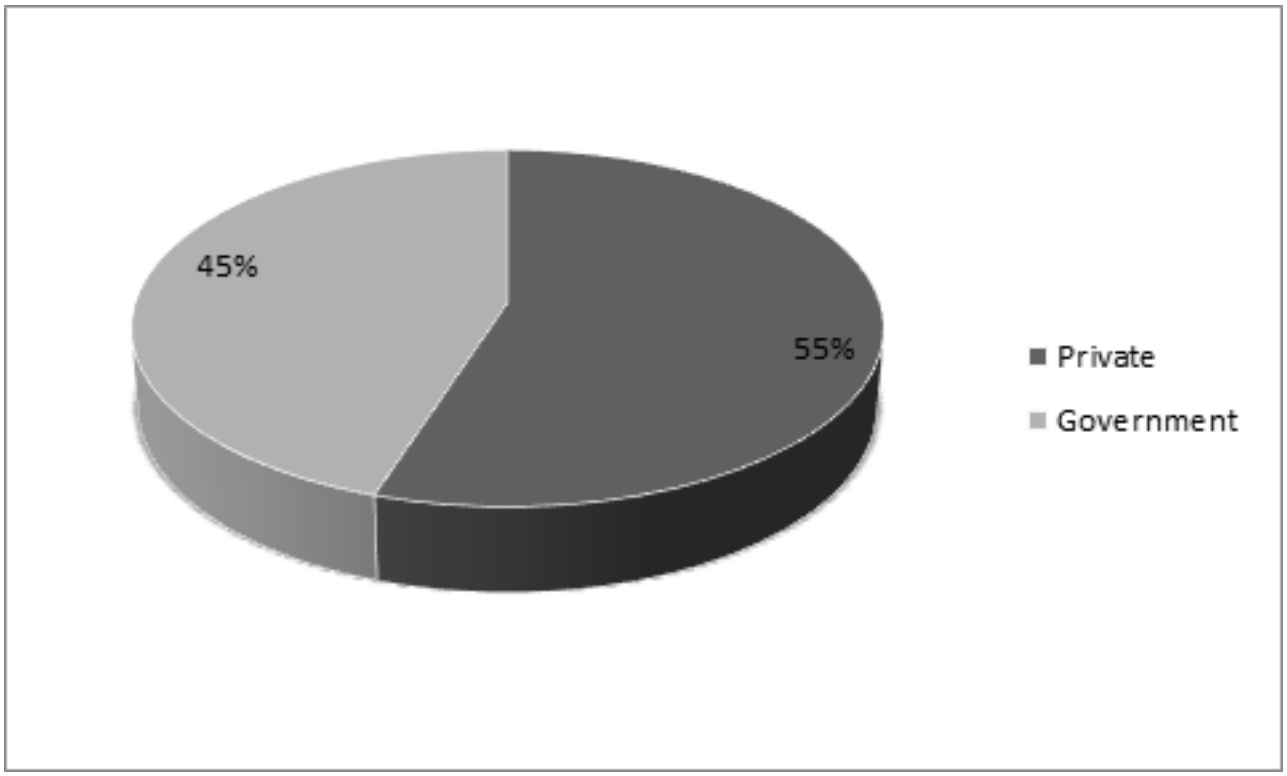


Figure 8: Showing Distribution of respondents by where they take their children for treatment (n=64)

Table 8: showing Distribution of respondents by whether their children have been vaccinated of pneumonia in 2 weeks

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 20 | 32 |
| No | 44 | 68 |
| **Total** | **64** | **100** |

Table 9: Showing Distribution of respondents by How far the health facility is from home (n=64)

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Near | 8 | 12 |
| Very far | 40 | 63 |
| Far | 16 | 25 |
| **Total** | **64** | **100** |

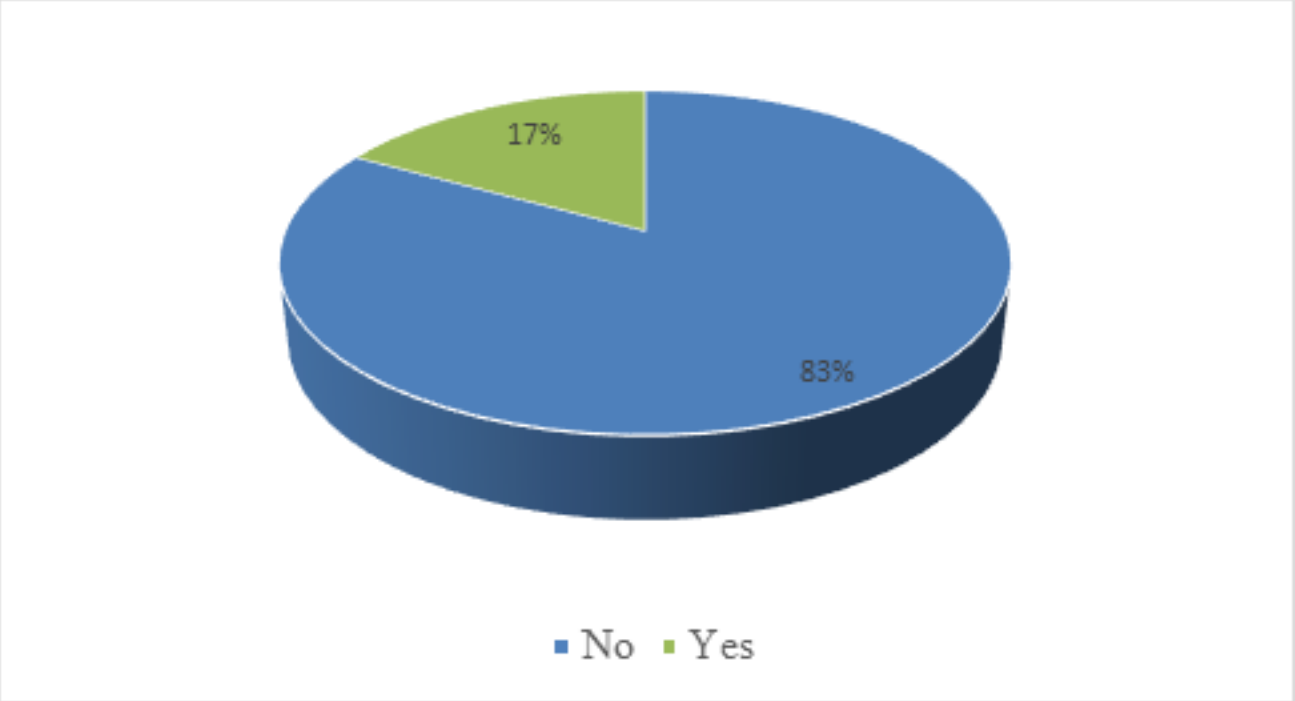


Figure 9: Showing Distribution of respondents by whether they always find the pneumonia drugs at the health facility whenever you are supposed to collect them

ity whenever they were supposed to collect them while 11(17%) found the pneumonia drugs at the health facility whenever they were supposed to collect them.

## 4. Discussion

### *4.1. The socio-demographic factors associated with the occurrence of pneumonia among children aged five years.*

The majority 59% of the respondents were male while the least 41% were female. This implies those males are more vulnerable to pneumonia. This may be because their parents take male children to be stronger than female counterparts.

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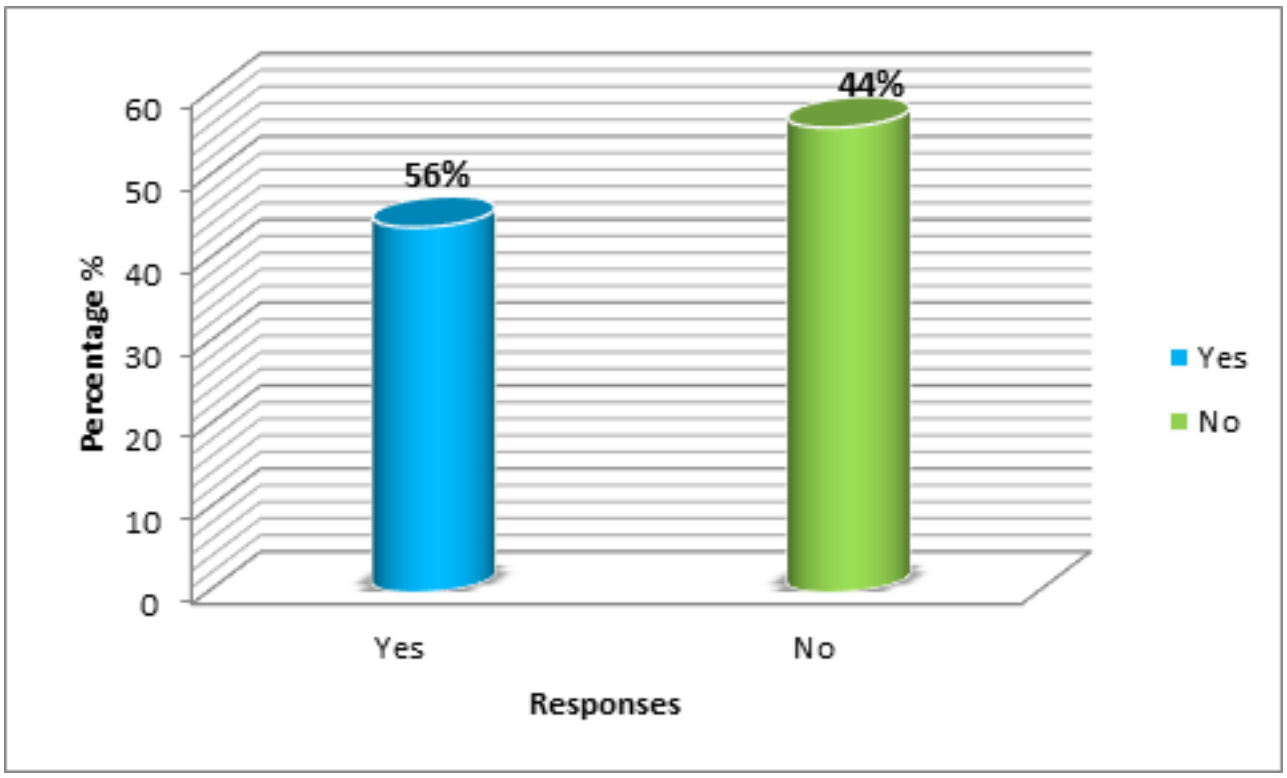


Figure 10: Distribution of respondents by whether health care workers always available at the health care facility whenever they needed them about pneumonia treatment

Table 10: Distribution of respondents by whether health workers always give enough information about pneumonia

| Responses | Frequency (f) | Percentage (%) |
|---|---|---|
| Yes | 38 | 59 |
| No | 26 | 41 |
| **Total** | **64** | **100** |

The majority 53% of the respondents were in the age range of 24 - 34 years, 30% were 24 years and less and the least 22% were 35 years and more. This implies that those aged 24-34 years were parents who knew less about pneumonia this could be because they are having their first child hence they did not know the causes of pneumonia. This is in agreement with a study carried out in Uganda by Balinga Sophia, (2019) on prevalence and factors associated with pneumonia among children aged five years and below attending kiryandongo general hospital showed that the mothers to children aged five years and below with pneumonia were young below 25 years 15-19 years, 43.5%, 20-24 years, 37.32%, who were married early.

Half 50% of the respondents attained primary level, 15% had attained secondary level, 18% had no formal education, 11% attained Tertiary education and the least 5% attained other such Bachelor's degree. This implies that those who attained the primary level were the majority associated with pneumonia. This is simply because they did not know about it. This is in agreement with a study carried out in Uganda by Balinga Sophia, 2019 on prevalence and factors associated with pneumonia among children aged five years and below attending kiryandongo general hospital showed that 72.9% that their highest level of education was only primary level, 69% rendering most of them unemployed (93.06%).

### *4.2. The environmental-related factors associated with the occurrence of pneumonia among children aged five year*

The majority 54% of the respondents were cooking in the living room, 25(29%) were cooking in the kitchen attached to the living room and lastly, 14(16%) were cooking in a separate kitchen. This implies that children respondents cooking in the living room were vulnerable to pneumonia. This could be because there was not enough exposure to air.

The majority 78% of the respondents were not leaving their windows open daily and the least 22% were leaving their windows open daily. This implies those with no windows open daily is greatly associated with pneumonia. This could be because there is no ventilation hence limiting enough airing.

The majority 68% of the respondents were using wood for cooking, 15% were using charcoal, 10% were using Kerosene and lastly, 7% were using electricity. This implies that those who cook using wood, and their children are vulnerable to pneumonia. This may be because too much smoke causes respiratory challenges which lead to pneumonia.

### *4.3. **The health facility-related factors associated with the occurrence of pneumonia among children aged five years**.*

The majority 67% of the respondents were having any history of Asthma and the least 33% had no history of Asthma. This implies that having any history of Asthma is associated with pneumonia among children aged five years. This could be because asthma is a genetic disease hence a history in the family can lead to pneumonia in their children. This is in line with A study conducted by ChanieG, et al, (2021) on Predictors of community-acquired childhood pneumonia among 2–59 months old children in the Amhara Region, Ethiopia revealed that 51% of Children from households with a history of asthma were 4.9 times more likely to develop pneumonia than children whose parents had no history of asthma.

The majority 63% of the respondents stayed very far from their places of treatment and the least 12% were near. This implies that patients were unable to seek treatment.

The majority 68% of the respondents' children had not been vaccinated for pneumonia in 2 weeks and the least 32% had been vaccinated for pneumonia in 2 weeks. This implies that failure to vaccinate against pneumonia is greatly associated with pneumonia. This is simply because failure to vaccinate gives room to pneumonia infection.

## 5. Conclusion.

According to the study results and discussions, it was revealed that factors such as mothers' age, parents' level of education, and Household monthly income levels were associated with pneumonia among the under fives

Furthermore, it was revealed that the kind of fuel respondents use for cooking such as wood, respondents not leaving their windows open daily, the house having less than two windows, and not having a window on their house were associated with pneumonia among the under-fives.

Health factors associated with pneumonia among the under-fives were; the child being vaccinated against pneumonia in 2 weeks, the distance from home to Health Centers, any Family member with a Tb infection history, the health facility you take your children for treatment, the child being with diarrhea in past 2 weeks and child been with Lower respiratory tract infection in the past 2 weeks

## 6. Recommendations.

The study has stated the following recommendations;

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

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

Avoid early marriages and early pregnancies, rather stay in school to better their employment prospects and better their socio-economic status.

Adherence to good breastfeeding practices such as exclusive breastfeeding has been proven to improve child nutrition and also has a key role in the prevention of mother-to-child transmission of HIV.

Ensure their under-fives receive all the recommended immunizations as directed in the UNEPI.

## 7. Acknowledgment.

With the most humbleness and honor, I begin by thanking Almighty God for his sufficient and abundant mercy and grace which have attained me throughout my life and work up to this time.

I am highly grateful to my entire family for having nurtured and provided for me and always given me hope to persist and persevere even when there seems to be no light at the end of the tunnel.

I cannot forget my supervisor Mr. Kassuja Henry who never folded his hands during my research work by guiding, directing, and encouraging me. May God bless him abundantly.

## 8. List of Abbreviations

**ALRTI Acute** : Lower Respiratory Tract Infection

**CAP** : Community Acquired Pneumonia

**CDC** : Centers for Disease Control and Prevention

**CHWs** : Community Health Workers

**SDGs** : Sustainable Development Goals

**UBOS** : Uganda Bureau of Statistics

**UDHS** : Uganda Demographic and Health Survey

**UNEPI** : Uganda National Extended Program for : Immunization

**UNICEF** : United Nations Children's Fund

**WHO** : World Health Organization

## 9. Publisher details:

**Publisher: Student's Journal of Health Research (SJHR)**
**(ISSN 2709-9997) Online**
**Category: Non-Governmental & Non-profit Organization**
**Email: studentsjournal2020@gmail.com**
**WhatsApp: +256775434261**
**Location: Wisdom Centre, P.O.BOX. 148, Uganda, East Africa.**

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