

CHILD-RELATED FACTORS ASSOCIATED WITH PNEUMONIA AMONG CHILDREN BELOW FIVE YEARS AT LYANTONDE HOSPITAL, LYANTONDE DISTRICT. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Pneumonia continues to be a major cause of illness and death among children under five, especially in low- and middle-income countries. Child-specific factors like age, nutritional status, immunization coverage, and pre-existing health conditions play a critical role in the development and severity of pneumonia. This study aimed to identify the Child-related factors associated with pneumonia among children below five years at Lyantonde Hospital, Lyantonde District.

Methodology

The study adopted a cross-sectional descriptive design employing quantitative methods of data collection which involved a self-administered questionnaire to collect data from a sample of 30 mothers who were sampled using a simple random sampling method. Data was collected from respondents after seeking consent from them analyzed and entered manually into the computer using Microsoft Excel Office programs 2016 which presented it in the form of tables, graphics, and pie-charts.

Results

14(46.7%) of the respondents mentioned that their children were between 1 and 2 years whereas the least 3(10%) mentioned that their children were between 3 and 5 years. more than a half 17(56.7%) of the respondents mentioned their children were females whereas only 13(43.3%) mentioned that their children were males. 25(83.3%) of the respondents said that they do not feed their children on nutritious foods whereas the minority 5(16.7%) of the respondents said that they do feed them on nutritious foods. 27(90%) of respondents mentioned that their children were delivered at 9 months.

Conclusion

Addressing child-specific risk factors through improved nutrition, immunization coverage, and early diagnosis of comorbidities is vital in reducing pneumonia-related morbidity and mortality in children under five years.

Recommendation

Health workers should provide health education to mothers and caregivers on the importance of immunization, exclusive breastfeeding, and proper nutrition for children to prevent pneumonia.

Keywords: *Child-related factors, Respiratory Disease, Nutrition and Immunization coverage, Lyantonde Hospital.*

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Background of the study

Pneumonia was found most in 13 – 24 months (36,6%). Thirteen of 82 children with normal nutritional status and 24/82 children with undernutrition had severe pneumonia. Undernutrition status was significantly associated with the severity of pneumonia, (Adriani & Simarmata, 2022). Rahmadiena et al., (2021) in their study showed that low birth weight constitutes 16.1% and it stated that this is a risk factor for ARI in infants due to the low number of immune cells in the body of infants with low birth weight, namely T lymphocytes and B lymphocytes. Etiological contributors to pneumonia morbidity globally include *Streptococcus pneumoniae* (pneumococcus), *Haemophilus influenzae* type b (Hib), respiratory syncytial virus,

influenza, and human metapneumovirus, (Tapia et al., 2021).

In Finland, a study showed that of the population of 313 children with pneumonia who were studied, pneumonia was detected in 82 (26%). Positive children were younger (median age 2.6 years, and they had more often a history of preterm birth (16% vs. 5%), (Hartiala et al., 2019). In Chengdu, China a study showed that breastfeeding was protective, but if solid foods were introduced before 4 months, the possibility of developing a lower respiratory tract infection was 2.996 (1.298–6.916). This result confirmed the importance of the WHO recommendation not to introduce complementary foods before six months of age, (Lee & Binns, 2020). A study on the prevalence and

risk factors of pneumonia in under five children living in the slums of Dibrugarh town showed that the prevalence of pneumonia was 16.34%. It was reported that Partially immunized children were two times more prone to develop pneumonia compared to up-to-date/completely immunized children, (Nirmolia et al., 2018).

In Ethiopia, findings among 522 children admitted with severe pneumonia showed that 136 (26.1%) of them had complicated severe pneumonia and 260 (48.2%) children had other comorbidity disease. It was reported that those who had a comorbidity were more likely to have severe pneumonia. This is because those who have comorbid diseases may have their immunity lowered making them more vulnerable to severe disease, (Tegenu et al., 2022).

Garba et al., (2021) in their study reported that among children who had pneumonia, 80.4% were not exclusively breastfed. Inadequate breastfeeding was significantly associated with pneumonia death and severe pneumonia among under-five children. The breastmilk constitutes a variety of immune-protective and nutritious substances that protect the baby since its own immune system is not mature yet.

In Uganda, Pneumonia kills approximately 2,400 children per year. Evidence has shown a variety of factors that influence pneumonia incidence and severity. The WHO categorized risk factors for pneumonia as (definite, likely, and possible). Underweight Child-related factors associated with pneumonia such as inadequate breastfeeding, and lack of immunization, among others, are identified as risk factors for childhood pneumonia (Abeja et al., 2022). Therefore, the objective of this study was to identify the Child-related factors associated with pneumonia among children below five years at Lyantonde Hospital, Lyantonde District.

Methodology

Study Design and Rationale

The researcher used a descriptive cross-sectional design, employing quantitative methods. Cross-sectional design was chosen because it allowed the collection of data at a single point in time.

Study Setting and Rationale

The study was conducted at Lyantonde Hospital in Lyantonde district. It is approximately 67.5 kilometers by road east of Mbarara Regional Referral Hospital. This is about 73 kilometers west of Masaka Regional Referral Hospital. Lyantonde district is found in the central region of Uganda. Lyantonde Hospital is a general public hospital with a bed capacity of about 100 beds and offers services that include general medicine, a pediatric clinic, an antenatal clinic, immunization programs, outreach programs, minor laboratory services, HIV services, gynecological services, and dispensing drugs. The researcher chose this facility because of increased cases of pediatric pneumonia in children below five years.

Study Population

The study targeted all mothers with children below five years who were available at the hospital at the time of the study.

Sample Size Determination

The sample size was determined according to UNMEB guidelines 2009 which states appropriate sample size should be not less than 30 respondents. Therefore, the study took 30 respondents. This was manageable due to limited time and resources for data collection.

Sampling Procedure

The researcher used a simple random sampling procedure which gave each participant an equal chance to participate in the study. This was done through the researcher drawing a sample frame of 60 participants. The researcher made 60 papers and where he wrote on a separate piece of paper YES or NO, the papers were folded, churned, and put in a box, one paper was picked and only those with YES papers were allowed to participate in the study.

Inclusion Criteria

The study included only mothers of children below five years at Lyantonde Hospital, Lyantonde District who voluntarily consented to participate and were available at the time of study.

Exclusion criteria

The study excluded mothers of children above five years.

Definition of Variables

Independent variables

These were factors associated with pneumonia among children below five years.

Dependent variables

The dependent variable was pneumonia among children below five years.

Research Instruments

The researcher used a self-administered questionnaire to collect data from the participants because it ensured autonomy, privacy, and confidentiality. The questionnaire consisted of both open and closed-ended questions in English language which were explained to the participants who did not understand it by the researcher.

Data Collection Procedures

The data collection procedure involved several steps described below;

Pre-visiting

The researcher made an informal visit to the study area. This was important to confirm acceptability by the stakeholders of Lyantonde Hospital, Lyantonde District, and to scan the environment for social amenities and

understand any obstacles that would interfere with data collection.

Training of research assistants

Research assistants are data collectors, they are important to reduce the burden and time of data collection. In the present study, the sample size was small and, manageable. The researcher collected data by himself. Therefore, this eliminated the need to train and have the research assistant.

Data Management

Data was edited before leaving the study area to ensure that there were no mistakes or areas left blank. The questionnaires were coded for easy reference and confidentiality. The collected questionnaires were kept under lock and only accessed by the researcher.

Data Analysis

Data was analyzed and thereafter findings were entered into the computer using soft office programs where data was presented in the form of tables, graphs, and pie charts to establish the accuracy of the facts and then interpretation was done.

Ethical Consideration

Before conducting the research, Ethical clearance was obtained from the Lubaga School of Nursing and Midwifery Research and Ethics Committee, and thereafter administration, Clarence was obtained from Lyantonde Hospital. Participation in the study was entirely voluntary. After an explanation of the purpose of the study, informed written consent was obtained from every mother/ primary

caregiver of under-five children. All information was handled with strict confidentiality.

Ethical approval

Ethical approval for this study was obtained through formal procedures. An introductory letter from the Principal of Lubaga Hospital Training Schools was presented to the Medical Superintendent of Lyantonde Hospital. The study team engaged with healthcare workers to ensure support and guidance during the research process. Respondents were assured of maximum privacy and confidentiality, and only numbers instead of names were used to identify the respondents. The study only commenced after the objectives of the study had been well explained to participants and they had consented to participate in the study.

Informed consent

Participants were provided with clear and easily comprehensible details about the study's purpose, objectives, procedures, potential benefits, and risks. They were informed of their voluntary participation, the freedom to withdraw at any point, and the assurance of confidentiality regarding their responses. Furthermore, they were made aware that their participation could contribute to increasing awareness of Sickle Cell Trait testing and enhancing access to relevant healthcare services.

Results

Socio-demographic factors associated with pneumonia among children below five years

Table 1: Shows socio-demographic factors associated with pneumonia among children below five years, N=30

Variable	Category	Frequency (f)	Percentage (%)
Age	18-25 Years	9	30
	26-30 Years	12	40
	31-35 Years	5	16.7
	36-40 Years	3	10
	41-46 Years	1	3.3
Place of residence	Rural	26	86.7
	Urban	4	13.3
Level of education	Nonformal	15	50
	Primary	13	43.3
	Secondary	2	6.7
Energy used while cooking at home	Firewood	28	93.3
	Charcoal	2	6.7
The community is highly populated.	Yes	27	90
	No	3	10

Place of delivery	Home	13	43.3
	Public Hospitals	6	20
	Private health facilities	3	10
	Traditional birth attendants	8	26.7
Practice exclusive breastfeeding.	Yes	12	40
	No	18	60

Findings from Table 1 showed that 12(40%) of the respondents reported that they were between 16 and 30 years of age whereas the least 1(3.3%) was between 41 and 46 years. Regarding marital status, most 22(73.4%) of the respondents were married while the least 1(3.3%) were separated.

Regarding the place of residence, the majority 26 (86.7%) of the respondents were from rural areas while the minority 4 (13.3%) were from urban areas.

Concerning what is used at home when cooking, the majority 28(93.3%) of the respondents mentioned that they use firewood whereas the minority 2(6.7%) mentioned charcoal.

In addition, about the population of the community, the majority 27(90%) of the respondents reported that the

community is highly populated while the minority 3(10%) of the

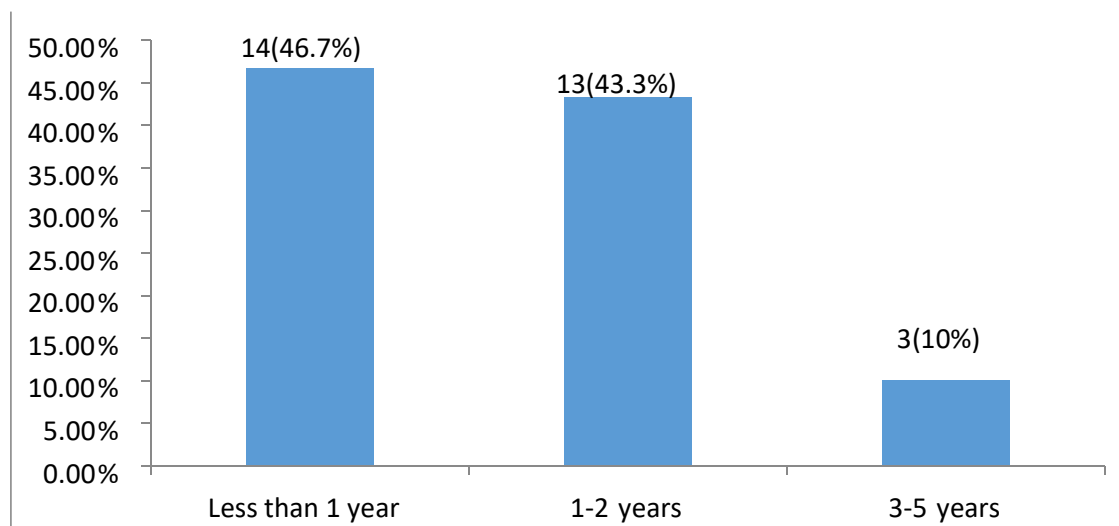
respondents reported that it is not.

Regarding place of delivery, most 13(43.3%) of the respondents stated that they deliver from home while the least 3(10%) stated from private health facilities.

Regarding the practice of exclusive breastfeeding, most 18(60%) of the respondents said that they do not practice exclusive breastfeeding while only 12(40%) said that they do.

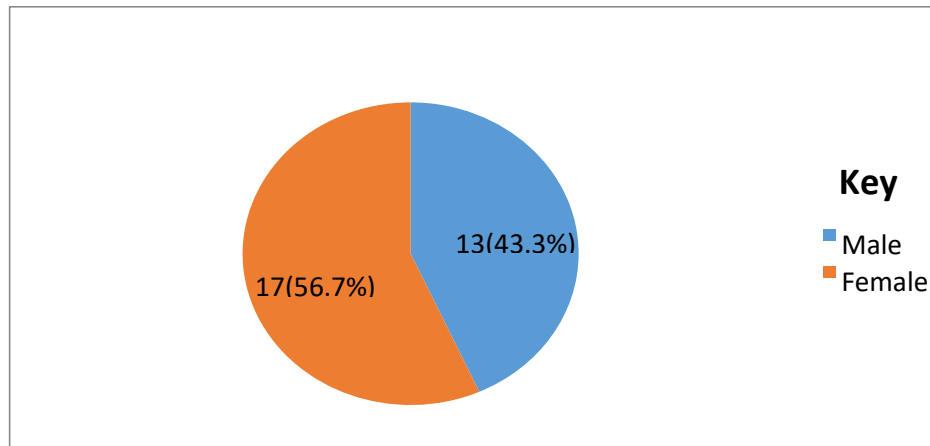
Child-related factors associated with pneumonia among children below five years

Figure 1: Shows the age Age of children, N =30



From Figure 1, 14(46.7%) of the respondents mentioned that their children were between 1 and 2 years whereas the least 3(10%) mentioned that their children were between 3 and 5 years.

Figure 2: Shows the Sex of children, N=30



According to Figure 2, more than half 17(56.7%) of the respondents mentioned their children were females whereas only 13(43.3%) mentioned that their children were males.

Figure 3: Shows how the Children feed on nutritious foods, N=30

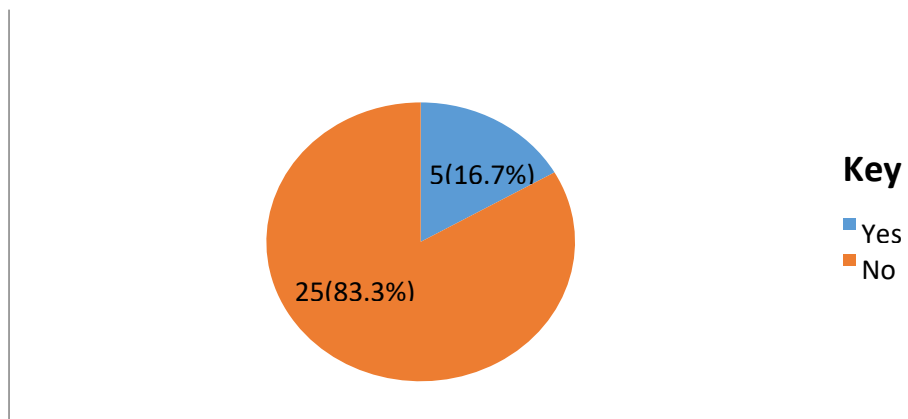
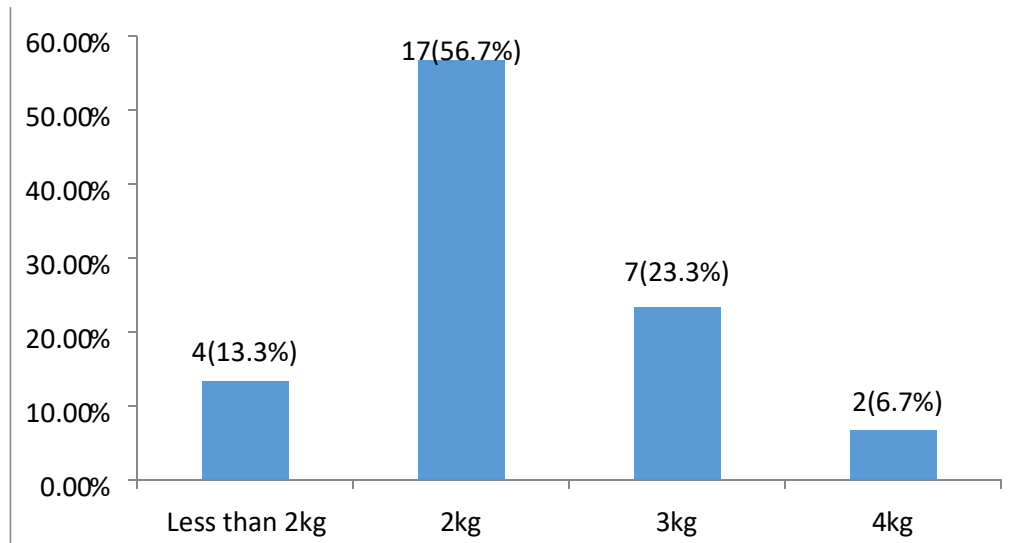
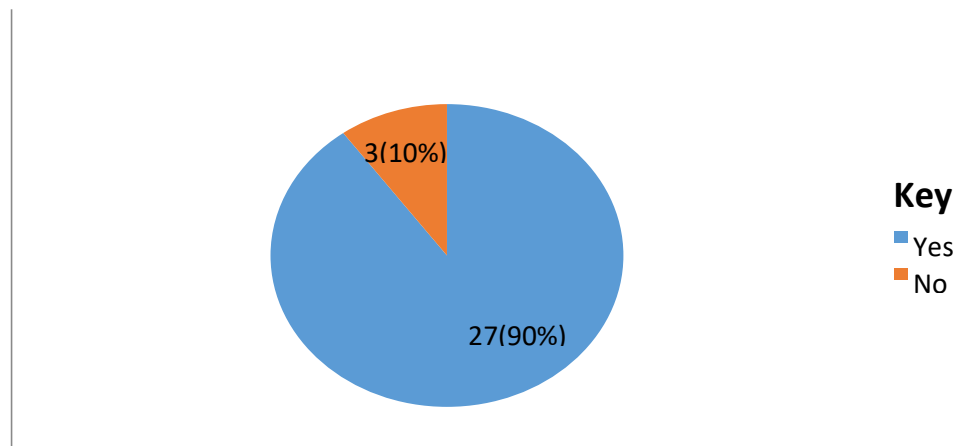


Figure 3 shows that the majority of 25(83.3%) of the respondents said that they do not feed their children on nutritious foods whereas the minority 5(16.7%) of the respondents said that they do feed them on nutritious foods.

Figure 4: Shows the Weight of children at birth, N=30

According to Figure 4, more than half of 17(56.7%) of the respondents mentioned that their children had 2kg at birth while only 2(6.7%) mentioned that their children had 4kg.

Figure 5: Shows the produced children at 9 months, N=30

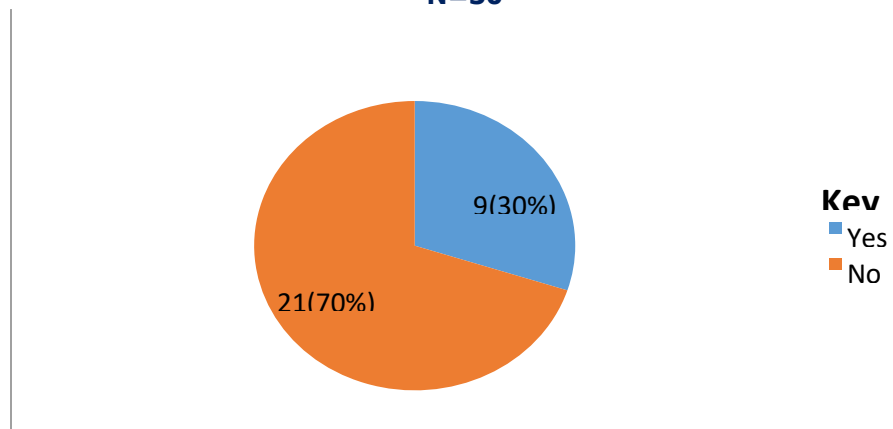
Findings from Figure 5 shows that the majority 27(90%) of the respondents mentioned that their children were delivered at 9 months while the minority 3(10%) said they delivered before 9 months.

Table 2: Shows the Birth order of children, N=30

Variable	Frequency (f)	Percentage (%)
Firstborn	6	20
Second born	8	26.7
Third born	5	16.6
Fourth born	9	30
Fifth and above	2	6.7
Total	30	100

Table 2 shows that most 9(30%) of the respondents said that their children were fourth born while the least 2(6.7%) said that their children were fifth born and above.

**Figure 6: Shows the Children have good breastfeeding behaviors
N=30**



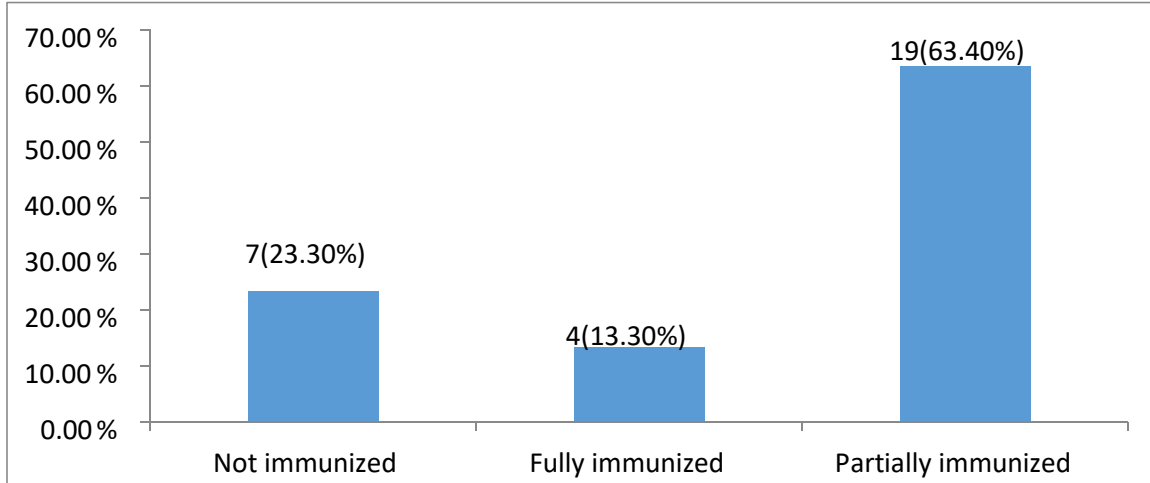
According to Figure 6, 21(70%) of the respondents mentioned that their children do not breastfeed well whereas only 9(30%) said that their children breastfeed well.

Table 3: Shows the Introduction of complementary feeds to children, N=30

Variable	Frequency (f)	Percentage (%)
Before 6 months	15	50
At 6 months	13	43.3
At 1 year	2	6.7
Total	30	100

Table 3 shows that half 15(50%) of the respondents reported that they introduced complementary feeds before 6 months whereas only 2(6.7%) reported that introduced it at 1 year.

Figure 7: Shows the Immunization status of children, N=30



According to Figure 7, most 19(63.4%) of the respondents stated that their children were not immunized while the least 4(13.3%) reported that their children were fully immunized.

Figure 8: Shows the Presence of other health problems in children apart from pneumonia, N=30

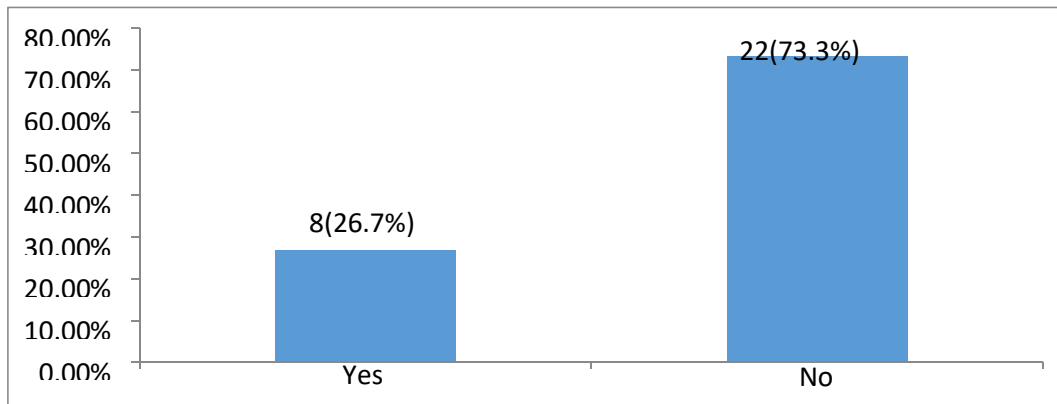


Figure 8 shows that 22(73.3%) of the respondents reported that their children did not have other health conditions apart from pneumonia whereas 8(26.7%) said that they had.

Discussion

From the study findings, 14(46.7%) of the respondents mentioned that their children were between 1 and 2 years old. This implied that this age group was significant as it was more susceptible to respiratory infections due to their weak immune systems and developing respiratory systems. This finding contradicted Fadl et al., (2020) in Egypt who showed that Younger children (age of ≤ 12 months) were found to double the likelihood of developing pneumonia compared to older age group.

According to the study results, more than half 17(56.7%) of the respondents mentioned their children were females. This finding was interesting but not necessarily significant as it may reflect the gender distribution of the population surveyed. This finding was contrary to Atoloye et al., (2022) in Nigeria who showed that males were 66% and females 34%. The study revealed that male gender constituted a significant predictor of acquiring pneumonia. Gender variation can be explained by the stronger immune system in girls than boys. Findings also showed that the majority 25(83.3%) of the respondents said that they did not feed their children on nutritious foods. This finding was concerning as poor nutrition weakens the immune system and increases the susceptibility to infections. Malnutrition has also been

associated with an increased risk of developing severe pneumonia. This finding was in line with Adriani & Simarmata, (2022) in Indonesia who showed that Pneumonia was found most in 24/82 children with undernutrition. Undernutrition status was significantly associated with the severity of pneumonia.

According to the study, more than half 17(56.7%) of the respondents mentioned that their children had 2kg at birth. This implied that the majority of the children were born with a low birth weight which was also significant as low birth weight is associated with an increased risk of respiratory infections. This finding was in agreement with Rahmadiena et al., (2021) who reported that low birth weight constitutes 16.1% and stated that this was a risk factor for ARI in infants due to the low number of immune cells in the body of infants with low birth weight, namely T lymphocytes and B lymphocytes.

Findings from the study show that the majority 27(90%) of the respondents mentioned that their children were delivered at 9 months. This showed that children were born at term. This finding was not in line with Hartiala et al., (2019) in Finland who showed that of the study population of 313 children with pneumonia who were studied, pneumonia was detected in 82 (26%). Positive children were younger (median age 2.6 years, and they had more often a history of preterm birth (16% vs. 5%).

On the other hand, the study showed that 9(30%) of the respondents said that their children were fourth born. This implied that birth order is associated with pneumonia as being in the least order was a risk of pneumonia due to decreased immunity of the mother due to many deliveries. This study finding was in line with findings from a study done by Mondal & Paul, (2020) in India which showed that the occurrence of pneumonia and other acute respiratory infections was higher among infants (3.4%), and birth order of three or above (3%).

The study furthermore showed that 21(70%) of the respondents mentioned that their children do not breastfeed well. This indicated that children did not take in breast milk as required which leaves their body immunity weak and thus highly susceptible to infections including pneumonia. This finding was contrary to the findings of Lee & Binns, (2020) from Chengdu, China who showed that breastfeeding was protective.

The study showed that half 15(50%) of the respondents reported that they introduced complementary feeds before 6 months. This finding was also concerning as the early introduction of complementary foods increases the risk of infections including pneumonia. This was because the immature gut of the infant may not be able to handle the new food, leading to increased susceptibility to infections. This finding was in agreement with Lee & Binns, (2020) from Chengdu, China who showed that if solid foods were introduced before 4 months, the possibility of developing a lower respiratory tract infection was 2.996 (1.298–6.916).

According to the study, most 19(63.4%) of the respondents stated that their children were not immunized. This finding was a significant factor associated with pneumonia among children below five years. Immunization protects children against vaccine-preventable diseases, including pneumonia, which is often caused by bacteria such as *Streptococcus pneumoniae* and *Haemophilus influenzae* type b. This finding was in line with Nirmolia et al., (2018) who reported that Partially immunized children were two times more prone to develop pneumonia compared to up-to-date/completely immunized children,

Furthermore, findings showed that 22(73.3%) of the respondents reported that their children did not have other health conditions apart from pneumonia. This suggested that pneumonia was the primary health issue affecting the children surveyed. However, it is important to note that the presence of other health conditions may increase the risk of developing severe pneumonia or complicate its treatment. This finding was contrary to the findings by Tegenu et al., (2022) in Ethiopia, who found that 260 (48.2%) children had other comorbidity disease. It was reported that those who had a comorbidity were more likely to have severe pneumonia.

Conclusion

The study has identified various child-related factors such as poor nutrition, early introduction of complementary feeds, and lack of immunization were also identified. However, there were also negative factors such as not feeding their children nutritious foods and not having a well-ventilated shelter. Overall, the findings of this study suggest that there is a need for interventions to address the identified factors associated with pneumonia among children under five in the Lyantonde district, with a focus on improving nutrition, promoting exclusive breastfeeding, and ensuring proper immunization.

The study was limited by the fact that most of the people were illiterate, so it was challenging to interpret the English-written questionnaire. Similarly, some respondents were reluctant to give information due to personal reservations and expectations of financial rewards for their participation in the study.

Recommendation

The Ministry of Health (MOH) should encourage health workers to conduct routine immunization programs to ensure that all children are immunized against preventable diseases, including pneumonia.

Health workers should provide health education to mothers and caregivers on the importance of immunization, exclusive breastfeeding, and proper nutrition for children to prevent pneumonia.

Mothers should practice exclusive breastfeeding for the first six months of the child's life and continue to

breastfeed alongside complementary feeding until at least two years of age.

Mothers should provide nutritious foods to their children to boost their immunity against infections.

Acknowledgment

I humbly give thanks to the Almighty God for my life and the virtue of perseverance He has given me to use in my academic pursuits.

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List of Abbreviations

ARI:	Acute respiratory infections
Hib:	Haemophilus influenzae type b
MOH:	Ministry of Health
VHT:	Village Health Team
WHO:	World Health Organization

Source of funding

This study was not funded

Conflict of interest

No conflict of interest declared

Author contributions

GM designed the study, conducted the data collection, cleaned and analyzed data, and drafted the manuscript, TNS supervised the study from conceptualization of the topic to manuscript writing and submission, and JFN supported in study conceptualization and general supervision as well as mentorship.

Data availability

Data is available upon request.

Author Biography

Gerald Mutebi is a student of Diploma in Nursing at Lubaga Hospital Training Schools.

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Jane Frances Namuddu is the principal tutor at Lubaga Hospital Training Schools.

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References

1. Abeja, C. J., Niyonzima, V., Byagamy, J. P., & Obua, C. (2022). Antibiotic prescription rationality and associated in-patient treatment outcomes in children under five with severe pneumonia at Bwizibwera Health Center IV, Mbarara District, South-Western Uganda. *Pneumonia*, 14(1), 1-7. <https://doi.org/10.1186/s41479-022-00095-0>
2. Adriani, A., & Simarmata, V. P. (2022). The Relationship between Nutritional Status and Degree of Pneumonia in Toddlers at Universitas Kristen Indonesia General Hospital. <https://doi.org/10.22270/jddt.v12i3-S.5391>
3. *Journal of Drug Delivery and Therapeutics*, 12(3-S), 129-133.
4. Atoloye, K. A., Lawal, T. V., Adebowale, A. S., & Fagbamigbe, A. F. (2022). A spatiotemporal mapping and Bayesian modeling of risk factors of pneumonia symptoms in under-five children in Nigeria. *MedRxiv*, 2012-2022. <https://doi.org/10.1101/2022.12.19.22283675>
5. Fadl, N., Ashour, A., & Yousry Muhammad, Y. (2020). Pneumonia among under-five children in Alexandria, Egypt: a case-control study. *Journal of the Egyptian Public Health Association*, 95, 1-7. <https://doi.org/10.1186/s42506-020-00043-0>
6. Garba, B. I., Sani, U. M., Isezuo, K. O., Waziri, U. M., Abubakar, F. I., & Ugege, M. O. (2021). Risk Factors and Outcome of Hospitalised Children with Pneumonia in Usmanu Danfodiyo University Teaching Hospital, Sokoto. *Risk*, 8(1), 21-29.
7. Hartiala, M., Lahti, E., Forsström, V., Vuorinen, T., Ruuskanen, O., & Peltola, V. (2019). Characteristics of hospitalized rhinovirus-associated community-acquired pneumonia in children, Finland, 2003-2014. *Frontiers in Medicine*, 6, 235. <https://doi.org/10.3389/fmed.2019.00235>
8. Lee, M. K., & Binns, C. (2020). Breastfeeding and the risk of infant illness in Asia: a review. <https://doi.org/10.3390/ijerph17010186>
9. *International Journal of Environmental Research and Public Health*, 17(1), 186.
10. Mondal, D., & Paul, P. (2020). Effects of indoor pollution on acute respiratory infections among under-five children in India: Evidence from a nationally representative population-based study. *PLoS One*, 15(8), e0237611. <https://doi.org/10.1371/journal.pone.0237611>
11. Nirmolia, N., Mahanta, T. G., Boruah, M., Rasaily, R., Kotoky, R. P., & Bora, R. (2018).
12. Prevalence and risk factors of pneumonia in under five children living in slums of Dibrugarh town. *Clinical Epidemiology and Global Health*, 6(1), 1-4. <https://doi.org/10.1016/j.cegh.2017.07.004>
13. Rahmadiena, Q., Risanti, E. D., Dewi, L. M., & Setiawati, S. R. (2021). Low Birth Weight and Immunization Status: Risk Factors of Acute Respiratory Infection in Children 2-5 Years. *Epidemiology and Society Health Review*, 3(1), 8. <https://doi.org/10.26555/eshr.v3i1.2295>

14. Tapia, M. D., Sylla, M., Driscoll, A. J., Touré, A., Kourouma, N., Sissoko, S., Tamboura, B., Diakité, A. A., Panchalingam, S., & Keïta, A. M. (2021). The etiology of childhood pneumonia in Mali: findings from the Pneumonia Etiology Research for Child Health (PERCH) study. *The Pediatric Infectious Disease Journal*, 40(9), S18. <https://doi.org/10.1097/INF.0000000000002767>
15. Tegenu, K., Geleto, G., Tilahun, D., Bayana, E., & Bereke, B. (2022). Severe pneumonia: Treatment outcome and its determinant factors among under-five patients, Jimma, Ethiopia. *SAGE Open Medicine*, 10, 20503121221078444. <https://doi.org/10.1177/20503121221078445>

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