

SOCIO-DEMOGRAPHIC AND ENVIRONMENTAL 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 remains one of the leading causes of morbidity and mortality among children under the age of five globally, particularly in low- and middle-income countries. Despite advancements in healthcare, the burden of pneumonia among children persists due to various socio-demographic and environmental factors that influence its occurrence and severity. This study aimed to assess the Socio-demographic and Environmental 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

The findings showed that the majority 26 (86.7%) were from rural areas, 28(93.3%) used firewood when cooking, 13(43.3%) stated that they deliver from home and 18(60%) did not practice exclusive breastfeeding. 20(66.7%) did not smoke tobacco at home, 27(90%) never had a well-ventilated shelter and 17(56.7%) mentioned that there were 6 to 10 people in the home environment.

Conclusion

The socio-demographic factors that were found to be associated with pneumonia include young maternal age, rural residence, and low education level. Environmental factors such as exposure to bad smoke and poor ventilation were also associated with pneumonia.

Recommendation

The Ministry of Health should Increase awareness about pneumonia and its prevention strategies among communities through health education programs and media campaigns.

Keywords: Socio-demographic and Environmental factors, Pneumonia among children under five years, Lyantonde District.

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Background of the study

Pneumonia is defined as an acute inflammation of the Lungs' parenchymal structure, (Beletew et al., 2020). It is classified based on place of acquisition: as community-acquired or hospital-acquired; based on its causative agents/ mechanism as bacterial, viral, fungal, Aspiration, or ventilator-associated pneumonia; based on the anatomy of the lungs involved as lobar pneumonia, bronchial pneumonia or acute interstitial pneumonia; and based on its clinical severity as "no pneumonia", "pneumonia" or "severe pneumonia, (Beletew et al., 2020). Under-five children are more vulnerable to pneumonia thus remains

the leading cause of morbidity and mortality in those children, (Alamneh & Adane, 2020).

A cross-sectional study done in Ethiopia showed that in 17.7% of children who were found to be pneumonia-positive, a higher prevalence (31%) of pneumonia-positive in this finding was observed in the age range of 37-59 months. Under-five children from parents who used firewood and charcoal as sources of fuel for cooking were the most pneumonia affected as compared to children whose families used other items as a source of fuel for cooking food. No pneumonia cases were detected among households who were using electric power for food cooking. Under-five-year-old children who lived in urban

areas and located on their mothers' backs during cooking were more likely associated with pneumonia than children who lived in rural areas and outside the cooking house, (Gedif, 2020).

Kaleb et al., (2020) in their study in eastern Ethiopia showed that the odds of pneumonia among children under five living in overcrowded conditions were 3.37 times higher than among participants not living in overcrowded spaces. Children with a history of acute respiratory infections (ARI) were 6.12 times more likely to develop pneumonia and the odds for children with a family history of ARIs were 4.69 times higher than for their counterparts without a family history of ARI. The odds of developing childhood pneumonia were 2.43 times higher in children with acute malnutrition than in children with normal nutritional status.

Pneumonia incidence among under-five children was estimated to be 0.05 and 0.29 episodes per child year in developed and developing countries, respectively. Every year, nearly 156 million new episodes occur worldwide; 151 million episodes are in developing countries, and 7–13% of these episodes are severe enough to be life-threatening and require hospitalization, (Masud et al., 2021). Different primary studies in Eastern Africa showed the burden of pneumonia was found to be 34% and Eight studies found a significant association between the use of wood as a fuel source and pneumonia among under-five children, (Beletew et al., 2020). Therefore, the objective of this study was to assess the Socio-demographic and Environmental 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. A 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, pediatric clinic, 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.

Environmental factors associated with pneumonia among children below five years

Table 2: Shows environmental factors associated with pneumonia among children below five years N=30

Variable	Category	Frequency (f)	Percentage (%)
Smoke tobacco while at home	Yes	10	33.3
	No	20	66.7
Children get exposed to bad smoke like those from cars, and motorcycles.	Yes	7	23.3
	No	23	76.7
Availability of a well-ventilated shelter at home.	Yes	3	10
	No	27	90
Number of people in a home environment	Less than 5	4	13.3
	6-10 People	17	56.7
	11 people and above	19	30

According to table 2, most 20(66.7%) of the respondents stated that they do not smoke tobacco at home whereas only 10(33.3%) said that they do.

In addition, the majority 23(76.7%) of the respondents mentioned that children do not get exposed to bad smoke like those from cars, and motorcycles while the minority 7(23.3%) mentioned that they do get exposed.

Findings also showed that the majority 27(90%) of the respondents never had a well-ventilated shelter while the minority 3(10%) had.

Lastly, more than half 17(56.7%) of the respondents mentioned that there were 6 to 10 people in the home environment whereas only 4(13.3%) said that they were less than 5 people.

Discussion

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

Findings from this study showed that 12(40%) of the respondents reported that they were between 16 and 30 years of age. This age group was typically more likely to have young children and may not have gained sufficient experience in child care, leading to poor health-seeking

behavior and inadequate prevention measures against pneumonia. Additionally, younger mothers may be more susceptible to other infections, which could potentially compromise their infants' health. This finding was in agreement with Islam et al., (2022) in Bangladesh who showed that most mothers (79.68%) of the children with pneumonia were from the 15–24 years age group.

Furthermore, the study showed that the majority 26 (86.7%) of the respondents were from rural areas. This showed that the prevalence of pneumonia may be higher in rural areas due to the use of traditional stoves, inadequate ventilation, and exposure to indoor air pollution. Moreover, rural areas are more likely to have limited access to health facilities and trained healthcare workers, leading to inadequate treatment and follow-up care. This finding was contrary to the study findings by Gedif, (2020) in Ethiopia who showed that in 17.7% of children who were found to be pneumonia positive, under -five years old children who lived in urban areas were more likely associated with pneumonia than children who lived in rural area.

This study also showed that the majority 28(93.3%) of the respondents mentioned that they used firewood while cooking at home. This shows that this was a significant risk

factor for pneumonia due to the resulting indoor air pollution. Inhaling smoke and other toxic emissions from cooking fuels can lead to respiratory infections, including pneumonia, especially in children who spend significant amounts of time indoors. This finding was similar to the study findings by Gedif, (2020) in Ethiopia who showed that children from parents who used firewood and charcoal as sources of fuel for cooking were the most pneumonia affected as compared to children whose families use other items as a source of fuel for cooking food.

In addition, about the population of the community, the majority 27(90%) of the respondents reported that the community was highly populated. This implied that it could lead to overcrowding and increased transmission of infectious diseases like pneumonia. Moreover, crowded living conditions may increase the likelihood of exposure to indoor air pollution, leading to a higher incidence of respiratory infections. This finding was simultaneous with Naz & Ghimire, (2020) in Pakistan who showed that childhood pneumonia was 1.27 and 1.21 times higher in overcrowded houses.

Regarding the place of delivery, 13(43.3%) of the respondents stated that they delivered from home. This implied that this was a risk factor for pneumonia due to the lack of access to skilled birth attendants and inadequate neonatal care. Home deliveries were more likely to be associated with unhygienic practices that can lead to infections, including pneumonia. This finding was related to the study findings by Fadl et al., (2020) in Egypt who showed that.

6.9% of children who were delivered from home had pneumonia compared to 1.6% of those delivered from hospitals.

Regarding the practice of exclusive breastfeeding, 18(60%) of the respondents said that they do not practice exclusive breastfeeding. This showed that exclusive breastfeeding is a crucial preventive measure against pneumonia. Exclusive breastfeeding provides essential nutrients and antibodies that can protect infants against infections, including pneumonia. Not practicing exclusive breastfeeding may be due to various reasons, including lack of knowledge, social norms, and insufficient support from healthcare providers and family members. This finding was in agreement with Garba et al., (2021) who reported that of children who had pneumonia, 80.4% were not exclusively breastfed.

Environmental factors associated with pneumonia among children below five years

According to the study, 20(66.7%) of the respondents stated that they did not smoke tobacco at home. This indicated a positive finding. Tobacco smoke is a known risk factor for pneumonia as it damages the lining of the airways and weakens the immune system, making children more susceptible to infections. The fact that most respondents do not smoke tobacco at home suggests that this may not be a significant contributing factor to the

incidence of pneumonia in this population. This finding contradicts Roux et al., (2021) in South Africa who showed that among children hospitalized with pneumonia, maternal smoking (43%), was found to increase the likelihood of severe childhood pneumonia since it was a source of exposure of children to smoke which sometimes is comprised of bacteria microorganisms.

In addition, the majority 23(76.7%) of the respondents mentioned that children did not get exposed to bad smoke like those from cars, or motorcycles. This was another positive finding as exposure to smoke from vehicles can also increase the risk of pneumonia, especially in young children. The fact that most respondents reported that their children do not get exposed to this type of smoke suggests that this may not be a significant contributing factor to the incidence of pneumonia in this population. This finding was contrary to the findings by Veras et al., (2022) in their study which showed that 67% of children under five years exposed to high levels of air pollution are at high risk for developing pneumonia. Exposure to greater levels of nitrogen dioxide produced by vehicle traffic was associated with the likelihood of pneumonia occurrence among under-five children after adjustment of cigarette exposure.

Findings also showed that the majority 27(90%) of the respondents never had a well-ventilated shelter. This implied that most respondents reported not having a well-ventilated shelter thus suggesting that this may be a significant contributing factor to the incidence of pneumonia in this population. This was probably because poor ventilation can increase the concentration of indoor air pollutants, which can cause respiratory infections such as pneumonia. This finding was about Wu et al., (2020) in China who showed that improved ventilation is beneficial for children's respiratory health. The study indicated that the important factors of home environment exposures contribute to the occurrence of childhood pneumonia.

Lastly, more than half 17(56.7%) of the respondents mentioned that there were 6 to 10 people in the home environment. This suggested that this may be a significant contributing factor to the incidence of pneumonia in this population. This was probably because overcrowding in households can also increase the risk of pneumonia as it facilitates the spread of infectious agents. This finding was in line with Keleb et al., (2020) in their study in eastern Ethiopia which showed that the odds of pneumonia among children under five living in overcrowded conditions were 3.37 times higher than among participants not living in overcrowded spaces.

Conclusion

The socio-demographic factors that were found to be associated with pneumonia include young maternal age, rural residence, and low education level. Environmental factors such as exposure to bad smoke and poor ventilation were also associated with pneumonia. On the positive side, the study found that a majority of the respondents did not smoke tobacco at home and did not expose their children to

bad smoke. Additionally, efforts should be made to increase awareness of the importance of avoiding exposure to bad smoke and ensuring proper ventilation in homes.

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 Increase awareness about pneumonia and its prevention strategies among communities through health education programs and media campaigns.

The Ministry of Health should improve access to health facilities and services in rural areas where the majority of the study respondents come from.

The Ministry of Health should advocate for policies that promote the practice of exclusive breastfeeding and proper nutrition for children to improve their immunity against infections.

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List of Abbreviations

ARI:	Acute respiratory infections
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 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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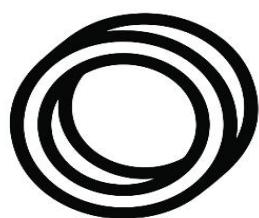
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