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Knowledge and Perception of Caregivers about Risk Factors and Manifestations of Pneumonia among Under Five Children in Butaleja District, Eastern Uganda

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Authors' contributions

This work was carried out in collaboration between all authors. Authors BA, GK, DML, MLM and EM conceived, designed the study, participated in data collection, analysis and manuscript writing. Author DO was the site preceptor at the Hospital where he supervised the data collection and analysis. Author RN participated in the coordination the entire COBERS program and reviewed the manuscript. Author YG participated in the study conception, design, supervision, preparation for approval and proof reading of the final results and manuscript. All authors read and approved the final manuscript.

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ABSTRACT

Background: Despite the widespread national intervention strategies to curb its occurrence, Pneumonia remains one of the leading causes of morbidity in Butaleja district. This was a cross-sectional study carried out at Busolwe Hospital and aimed at establishing the knowledge and

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perception of caregivers about risk factors and manifestations of childhood pneumonia and it's high prevalence among the under-five children (U5C) in the district.
Methods: Structured researcher administered questionnaires were given to 302 caregivers of U5C visiting the hospital who were enrolled on a continuous random basis from April to May 2018. Microsoft Excel was used to retrieve and analyze the data which was then represented in form of frequencies and proportions.
Results: The study found that the majority of caregivers had inadequate knowledge about the condition, despite 69.5% of their U5C having suffered from pneumonia in the previous year. Additionally, some of the contributing factors to the high prevalence of pneumonia included poor ventilation in the houses, the presence of swamps contributing to coldness, failure to complete the immunisation dose and overcrowding in the households leading to household air pollution.
Conclusion: Pneumonia remains a big health challenge in Butaleja District as evidenced by the knowledge gap among caregivers as well other contributing factors which lead to its increased prevalence. In order reduce the burden, a comprehensive community sensitisation program needs to be rolled out to address most of the factors. It would also be important to look into the possible misdiagnosis of the condition and rule out antibiotic resistance to come up with an effective management strategy for curbing the high prevalence of pneumonia among the U5C in Butaleja District. Finally, the establishment of a National Health Insurance Scheme is strongly recommended.

Keywords: Pneumonia; Butaleja District; under five children; knowledge; caregivers; immunization status; COBERS.

1. INTRODUCTION

Pneumonia is a leading cause of mortality among children under five years of age, and it is also one of the biggest barriers to attaining the fifth birthday by causing 1.6 million deaths per year [1]. It is further reported that the condition causes 15% of deaths among under-five children (U5C) globally, with 2% being newborns [2]. A report by Wojsyk-banaszak and Bręborowicz in 2013 shows that globally, especially in impoverished countries with reduced access to healthcare systems, Pneumonia accounts for 18% of the deaths among children [3]. Nevertheless, pneumonia can be prevented if caretakers are empowered with knowledge to recognise the danger signs and symptoms and seek appropriate treatment on time.

There are many possible causes of pneumonia; however, the most common are bacteria and viruses. In developing countries, *Streptococcus pneumoniae* causes the highest number of bacterial Pneumonia among U5C followed by *Respiratory Syncytial Virus* (RSV), which accounts for the highest number of viral Pneumonia among children under two years of age. Conversely, bacteria are the leading causes of pneumonia in the adult [4]. People at risk for pneumonia are children under five years, people aged above 65 years, and people with preexisting health problems. It is noteworthy that Infants and toddlers with staphylococcal pneumonia are usually toxic and may be anaemic at presentation [5].

Various factors influence the high levels of morbidity and mortality among under-five children. These can be related to different aspects such as maternal, child, environmental, indoor pollution, healthcare access among others. Comorbid diseases, exclusive breastfeeding, its duration as well as the nutritional status of a child are also reported to influence Pneumonia [2].

Many interventions have been put in place and shown to be successful in bringing down the mortality as a result of Pneumonia. According to the World Health Organisation, these interventions include, but not limited to vaccination, pneumonia case management at health facilities, improvement of nutrition and prevention of low birth weight, exclusive breastfeeding for the first six months of life, indoor air pollution prevention, healthy environment provision, as well as prevention and management of HIV infections [6]. Vaccines against measles and pertussis in national immunisation programs have shown to reduce sickness and deaths due to pneumonia among U5C substantially. Finally, it is recommended that HIV infected children should be subjected to Cotrimoxazole prophylaxis and zinc supplementation for children with diarrhoea, as well as hand washing [7].

A study held between November 2005 and August 2007 aimed at determining the likely causes of death and care-seeking actions among 67000 people in Mayuge district showed that children with fatal pneumonia received the low quality of care due to delay in seeking health care as well as mistreatment with antimalarials [8]. Furthermore, between 2008 and 2012, 78.7% of children in Uganda suspected to have pneumonia were reported to have sought medical care [9]. It is also important to note that to reduce on the effects of the condition and proper management, over the past years, different countries have set up dedicated centres which are meant to provide aetiology data about pneumonia [10]. From the District medical records, pneumonia is reported as one of the leading causes of sickness among U5C in Butaleja District despite the ongoing intervention strategies to curb its occurrence like routine childhood immunisation. In Busolwe hospital, the district hospital for Butaleja, pneumonia is among the top five causes of admissions and mortality in the pediatric ward and outpatient department. Unfortunately, there was limited published data on the factors attributed to this increase in this part of the country. Therefore, the study aimed to determine the knowledge and perception of caregivers about risk factors and manifestations of pneumonia and the causes of its high prevalence among u*nder-five children in Butaleja District, Eastern Uganda.*

2. MATERIALS AND METHODS

2.1 Area of Study

The research was conducted in Butaleja District in the Eastern part of Uganda which is bordered by Budaka and Kibuku districts in the North, Mbale in the East, Tororo district in the South East and Namutumba in the West as shown on the map [11]. Butaleja district has a total population of 244153 people of which 119466 (48.9%) are males and 124687 (51.1%) females [11].

Map 1. Map of Uganda showing the location of Butaleja District [11]

2.2 Target Population

The research targeted the parents or primary caregivers of the under-five children that visited Busolwe hospital during the period of data collection. Under-five children with their parents and caregivers who were severely ill or had hearing impairments or speaking problems were excluded from the study.

2.3 Study Design

The research followed a hospital-based cross-sectional study design and questionnaires were constructed to collect data from the participants. The study employed a quantitative method.

2.4 Sampling Strategy

To calculate the sample size, Fisher formula: $n=z^2pq/d^2$, was used [2]. With n being the sample size, Z being the standard normal deviation (1.96) corresponding to 95% confidential interval, P is the prevalence of pneumonia in Uganda which was reported at 53.7% [12], and 73% (number of U5C suspected of having pneumonia who reported to health facilities [13]. For purposes of this work, the P was taken for the upper limit which was 73%. Q= (1-p), and d the degree of accuracy. Therefore, n was 302. On each day, participants were selected using a random sampling technique where they were given folded papers with either number “5” or “10” and a person randomly picked a paper. Those who picked papers with number “10” participated in the study. Enrolment was on a continuous basis until the sample size of 302 was achieved.

2.5 Data Collection

A Structured interviewer-administered questionnaires were used to collect data on the factors contributing to the increased prevalence of and risk factors of pneumonia among U5C that visited Busolwe hospital from April to May 2018. Assessing the level of knowledge about pneumonia was addressed by the same interviewer-administered questionnaire. The interviewer-administered questionnaire was pretested on students of Iganga School of Nursing and Midwifery to ascertain the effectiveness of the questionnaire tool.

2.6 Research Clearance, Approval and Ethical Considerations

The study and all the protocols were approved and cleared by the Busitema University Faculty of Health Sciences Higher Degrees and Research Committee as part of the Community Based Education, Research and Services (COBERS) Program for the 2017/2018 Academic year under the Course of Community Diagnosis and Communication Projects. Permission to conduct the study was sought from the District Health Officer Butaleja and the Medical Superintendent of Busolwe Hospital. Written informed consent from caregivers of the U5C was obtained before they participated in the study. Participants were informed that their privacy and confidentiality would be respected and that there was no potential harm associated with participating in the study. It was made clear to the participants that participated in the study was voluntary and that they were free to opt out of the study at any time without any negative consequences.

2.7 Data Management

Completed questionnaires were checked for completeness and consistency prior to further data management. Data were double entered into a password-protected Microsoft excel sheet. All data related to the persons were coded to protect the integrity of the participants' responses. Hard copies of the data were kept in locked file cabinets, and only members of the study team had access to project data.

2.8 Analysis of the Data

Data coding, entry, cleaning and analysis was done using Microsoft Excel and results were presented using normal frequency distribution tables. Simple proportions were used to describe categorical and numerical data.

3. RESULTS

Results for the study in this section are presented under three main subsections namely: Socio-demographic characteristics of the respondents; Housing, occupancy and cooking conditions, as well as Knowledge, perceptions and attitudes about pneumonia.

3.1 Socio-demographic Characteristics of Respondents

A total of 302 caregivers participated in the research on pneumonia in Busolwe Hospital, Butaleja district during the study period, 4% of which were male while 96% were female. Majority of the caregivers (73%) were between the ages of 15 and 30. The Majority of respondents were married at 42.1%, while 34.1% were single. As far as the education status of the caregivers of the U5C was concerned, 50% dropped out of school at primary level, 33.4% stopped in secondary and only 5.6% attained tertiary education while the rest (11%) were uneducated. In relation to occupation, 79.1% of the respondents were peasants while 4.3% were civil servants and the rest (16.6%) never disclosed their occupation.

Table 1. Socio-demographic characteristics of respondents (N=302)

Characteristic		Number (n)	Percentage (%)
Sex	Females	289	96
	Males	13	4
Age group	15 – 30	221	73
	31 – 45	72	24
	45 <	9	3
Marital status	Married	127	42.1
	Single	103	34.1
	Divorced	29	9.6
	Other	43	14.2
Maximum Education Level Attained	Primary	151	50
	Secondary	101	33.4
	Tertiary	17	5.6
	Uneducated	33	11
Occupation	Peasants	239	79.1
	Civil Servants	13	4.3
	Undisclosed work	50	16.6

Table 2. Housing, occupancy and cooking conditions of the respondents (N=302)

Factor/ Condition		Number (n)	Percentage (%)
Distribution of Residents per household	2 – 4	128	42.3
	5 – 10	153	50.7
	10 <	21	7.0
Consumption of Selected Fuels	Firewood	242	80.1
	Charcoal	60	19.9
	Other Sources	0	0
Place of Cooking	Kitchen	239	79.1
	Main House	19	6.3
	Open Space	44	14.6
Number of Windows on Main House	1 – 2	161	53.3
	3 and above	105	34.8
	None	36	11.9
Number of Windows on Kitchen	1 – 2	86	28.5
	3 and above	13	4.3
	None	203	67.2
Cigarette Smokers in the household	Present	36	11.9
	Absent	266	88.1

Table 3. Knowledge, perceptions and attitudes about pneumonia by the respondents (N=302)

Questions and Responses		Number (n)	Percentage (%)
Ever heard about pneumonia	Yes	222	73.5
	No	80	26.5
Source of Information about Pneumonia	Hospital	131	43.4
	Mass media	9	2.9
	Village talk	82	27.2
	None	80	26.5
Risk Factors for Pneumonia	Coldness	94	31.1
	Smoking	13	4.3
	Failure to Immunize	4	1.3
	Don't Know	191	63.3
Transmission of Pneumonia	Close contact	7	2.3
	Respiratory droplets	50	16.6
	Sexual	2	0.6
	Genetics	238	78.8
	Don't Know	5	1.7
Signs and Symptoms of Pneumonia	Chest indrawing	10	3.3
	Difficulty in breathing	83	27.5
	Coughing	30	9.9
	Fever	19	6.3
	Loss of weight	5	1.7
	Don't Know	155	51.3
Preventive Measures	Immunization	23	7.6
	Warm clothing	52	17.2
	Avoiding contact	0	0.0
	Balanced diet	7	2.3
	Good hygiene and Sanitation	5	1.7
	Visiting the hospital	20	6.6
	Don't know	195	64.6
Has the Child ever suffered from Pneumonia in the previous year?	Yes	210	69.3
	No	92	30.7
Immunisation status of Children	Fully immunised	118	39
	Partially immunised	169	56
	Not immunised	15	5

3.2 Housing, Occupancy and Cooking Conditions

In any given household, 50.7% of the respondents had five to ten residents, 42.3% had two to four residents, while 7% had more than ten residents in their household. In regards to the percentage consumption of selected fuels, the fuel used for cooking is largely firewood (80.1%) though charcoal is seldom used by 19.9% of the respondents and other known sources of fuel for example gas and electricity have not been adopted by the respondents. The majority of the caretakers (79.1%) use the kitchen for cooking through a few individuals are still lagging on this aspect with 6.3% cooking in the main house and 14.6% cook in the open space. Most of the respondents had less than two windows in their main house (53.3%) while 11.9% had no windows on their main house with the remainder (34.8%) having more than three windows, an indication that not so much importance is attached too windows. Similarly, results for the percentage distribution of windows in the kitchens of the caretakers indicated that many never had them! Most of the kitchens at 67.2% had no windows, 28.5% of the respondents claimed to have at least less than two windows in their kitchen while 4.3% said that they had more than three windows on the kitchen. Fortunately, the number of cigarette smokers in the households of the caretakers is low with only 11.9% of the respondents having a cigarette smoker in their household. 88.1% of the

caretakers did not have cigarette smokers in their households.

3.3 Knowledge, Perceptions and Attitudes about Pneumonia

A large percentage of the respondents claimed to have heard about pneumonia (73.5) through the irony in the responses received on the basic knowledge of the disease proved otherwise. The source of information was largely from health workers (43.4%) and also village talk among colleagues (27.2%).

Most of the caretakers failed to identify a single risk factor or worse still any sign and symptom associated with pneumonia (51.3%). Loss of weight (1.7%) and chest in the drawing (3%) were the least mentioned signs and symptoms. Difficulty in breathing was the most mentioned sign of pneumonia (27.5%) with a few who mentioned fever too (6.3%).

As far as transmission on pneumonia is concerned, the majority of respondents (78.8%) believed it to be a genetic condition, indicating the lack of knowledge and thus problems related to its prevention.

Coldness as a risk factor arising from the swampy nature of the District was cited by most of the respondents (31.1%) which was followed in line by smoking (4.3%) and 1.3% of them mentioned the failure to immunise. Majority of the caretakers, however, were clueless about the risk factors associated with pneumonia in the under-five children (63.3%).

The majority of the respondents had no idea however on how pneumonia is prevented (64.6%) with the exception of a few who had some views for example immunization (7.6%), warm clothing (17.2%), visiting the hospital (6.6%), balanced diet (2.3%), good hygiene and sanitation (1.7%).

As far as the history of pneumonia is concerned, 69.5% of the caregivers' children had ever suffered from pneumonia in the past year. The highest percentage of the under-fives in the study area were partially immunised (56%), which was followed subsequently by those who were fully immunised (39%) and then 5% who were not immunised. It is important to note that fully immunised in this case was taken as the child has gone through and completed all the mandatory immunisation doses.

4. DISCUSSION

Pneumonia is a significant public health problem among under-five children which is mostly preventable, however, for great strides to be made collaborative effort among the health workers, policymakers and caregivers of under-five children is a milestone. Based on these findings, it was observed that neither do the majority of the caretakers of the U5C know the signs and symptoms of pneumonia based on the IMCI guidelines nor its mode of transmission and measures taken to prevent it. It is therefore imperative that initiatives to bridge this knowledge gap are put in place.

The many positive responses on having heard about the disease before was a manifestation of its increased prevalence. Although 73.5% of the respondents claimed to have an idea about pneumonia, they could hardly cite any risk factor attributed to the same, and this is similar to study that was done in Bangladesh, and the primary caretakers of pneumonic children had inadequate knowledge about pneumonia. Most of them could not recognise whether their child had pneumonia or not [14]. Similarly, it was revealed that 69.5% of the children had suffered from pneumonia in the previous year, indicating the extent of the effect of the disease in this area.

Majority of the households especially in the rural areas use firewood as a major source of fuel for cooking food, and this area is no exception. However, their kitchens are many a time poorly ventilated, yet firewood emits heavy fumes of smoke on combustion which hovers the kitchen thus being inhaled by the under-five children increases the risk of pneumonia. This observation is not different from the study done in Wondo Genet district in Ethiopia where poor ventilation and lack of a separate kitchen from the main house is significantly associated with pneumonia and bronchitis [2]. It is further worth noting that the cigarette smoking status of people living the households of the caretakers gave some positive results, though the vice needs to be completely eliminated. From these findings, it is also important to note that patients who survive these pneumonia maybe left with dysfunctional lungs and may have a higher future risk of developing the chronic obstructive pulmonary disease (COPD) not necessarily associated with smoking but with biomass smoke. This observation is in line with various studies that have reported that in most developing countries, especially in rural areas,

biomass fuels such as wood and coal are used for cooking and heating indoors on a daily basis, whereby women and children have the highest amounts of exposures and are therefore more likely to develop COPD [15–18]. Therefore, exposure to biomass smoke is a serious public health problem because of its negative effects on pulmonary functions. This observation hence calls for serious holistic approaches towards ensuring the embracing and use of greener energies to not only reduce on the risk factors of pneumonia in children but also to prevent future side effects in the children and women due to these earlier and prolonged exposures.

Extensive immunisation programs including the Universal Child Health days, routine immunisation outreaches every Friday are currently being undertaken in Butaleja district. However, based on our results majority of the under-five children were partially immunised. This could partly be attributed to the fact that they are still young and are awaiting the complete doses when the time is right to receive the complete dose or could be due to the complacency of the caregivers to take the children for immunization as some of the under-five were above the stipulated age of receiving the doses but had not received them. The statistics are not very different from the fact that many caregivers had no idea that immunisation is a preventive measure for pneumonia. In a similar study that was done on the case fatality rate in Malawi by Racheal Maganga, she concluded that the lack of immunisation increases the morbidity or mortality of pneumonia. This implies that immunisation status is a major contributing factor to the high prevalence of pneumonia [19].

Findings also showed that 53.3% of the respondents had less than two windows in their houses where they were sleeping, and this predisposed the under-five children to acquire pneumonia because of the poor ventilation of the houses. In this study, statistics showed that 50% of the caregivers were primary, and 79.1% were peasants and hence their education levels, and standards of living were low, and therefore this could lead to poor health-seeking behaviours when it comes to childhood illness, where most times children are not brought to health facility on time. Additionally, the male involvement in the management of pneumonia in Butaleja district was very low, with a few of respondents in this study being males (about 4%). This was not a good indication since most of the decisions about child management were made by the females who accounted for 96%. This means most of the children brought to the hospital were the initiative of the females and males were not involved yet when it comes to financial implications men play very important roles, and hence their presence would be vital.

Among the IMCI danger signs of pneumonia that entail hardship in breathing, chest in the drawing, cough, and stridor [20], difficulty in breathing was the most cited by the caregivers (27.4%). None of the caregivers mentioned all the danger signs. This is likely due to the low literacy levels among the caretakers of the under-fives as noted much earlier. Some of the caregivers could not clearly identify a single sign and symptoms implying that the health workers have not put much effort on emphasising and sensitisation of the caregivers on recognising the danger signs of pneumonia and the importance of seeking early medical care. For example, fever was reported by only 6.3% of the respondents, which would be a direct indication that probably the caretakers in Butaleja do not have the practice to measure the body temperature of children to check for the condition. Conversely, many of the caregivers make an approximate measurement the body temperature of their children (whenever a child feels unwell), but not with conventional methods such as thermometers, but rather by checking with their hands (especially with the back side). Many times, fever is associated with malaria rather than pneumonia, probably explaining why many caregivers may not have identified it as a sign. This may also explain the routine misdiagnosis of pneumonia especially where caregivers do not seek appropriate medical attention and end up giving the children medicines which are for malaria rather than pneumonia, and eventually leading to resistance in the former.

Inadequate knowledge and perceptions about danger signs may compromise the health-seeking behaviour of the caregivers [21]. Although they knew some danger signs, improvement is needed as many of them were not able to mention the danger signs as outlined in the IMCI guidelines. Prevention is better than cure hence knowing how to prevent pneumonia is the baseline for reducing the high prevalence in this area of study. Majority of the caregivers failed to identify a single preventive measure. However, a handful cited proper or warm clothing (17.2%) while others identified immunisation (7.6%). Relatedly, whereas there are some free

health services offered in various national health facilities, lack of a national health insurance scheme in Uganda which would help in ensuring that citizens continuously improve on their health-seeking behaviours has made many shun routine visitation to health facilities, especially when they are not sick. This has therefore left many unaware of and hence propagate many potential risk factors to various conditions including pneumonia in children. Many times, the patients use out of the pocket payments for buying medicines especially during drug stock-outs in health facilities. Consultations and prescriptions are usually free in many governments aided hospitals as well as private not for profit hospitals, but due to continuous drug stock-outs, many shun seeking these health services since they are always assured of not finding the required drugs, hence failure to timely get the necessary treatment. Visiting hospitals for general medical examination when not sick is not a common practice for many Ugandans. Whereas the proposed Uganda National Health Insurance Scheme has been received with mixed reactions and opinions as reported by Orem and colleagues [22], the authors strongly feel that its establishment is long overdue.

Fifty-point seven (50.7) percent respondents had their houses accommodate 5 to 10 residents and 7% their houses accommodated over 10 people and this indicates overcrowding which predisposes them towards the illness in case one individual acquires pneumonia can easily pass it over to other members at home, especially if there is a delay in seeking medical attention. A study by Tiewsoh and colleagues in 2009 had similar findings, showing that independent risk factors for severe pneumonia were household members contact, comorbidity as well as the delayed seeking of medical attention [23]. The reported findings are consistent with other reports which identified the delay in seeking care and home treatment as important barriers to the reduction of mortality in children [24].

It is important to note that Butaleja district is a swampy area where the children are highly predisposed to the coldness especially during the rainy seasons. The humidity and coldness in the area align with the findings of Rudan and colleagues about the epidemiology and aetiology of childhood pneumonia where humidity (coldness) and concomitant diseases like diarrhoea highly predispose children to pneumonia [1]. These are conditions which highly affect under-five children as a result of poor sanitation and adverse weather, despite the fact that they can be addressed just through community sensitisation and preparedness.

Finally, whereas there are a number of other important factors that are relevant to the manifestations of childhood pneumonia, for example, the general information regarding nutritional condition, such as serum albumin, and anaemia of children in Uganda which are associated with the development of pneumonia, the current study mainly focused on the knowledge and perceptions of the caretakers in relation to the same. These contributing factors may, however, if included in other largescale well-funded studies help clarify the detailed situation in the district and region to come up with a complete package of intervention.

5. CONCLUSION

Pneumonia remains a big health challenge in Butaleja District as evidenced by the knowledge gap among caregivers as well other contributing factors which lead to its increased prevalence. Improving the knowledge levels about pneumonia practices and risk factors is a vital step in trying to curb the levels of mortality and morbidity attributed to this disease in Butaleja. Pneumonia among under-fives is poorly understood by the caregivers as evidenced by the fact that most of the responses on any given parameter were either wrong or the caretaker honestly did not know. High prevalence of pneumonia in this area is to a large extent attributed poor ventilation of houses and exposure of children to the adverse cold weather especially in the mornings and during the wet seasons and smoke from wood fuel. Furthermore, the presence of so many swamps in the area which contributes a great deal to coldness exposes them to this risk factor associated with pneumonia occurrence. Incomplete immunisation status of children was another key contributing factor. The factors contributing to the high prevalence of pneumonia among under-fives are numerous therefore efforts to counter this trend ought to be emphasised and prioritised. Some of the recommendations include; Comprehensive and extensive health education programs, Capacity building and training of the Village Health Teams, Institution of teams to handle misdiagnosis and sensitivity tests in treatment for pneumonia, Conducting Continuous Medical Education sessions in the hospitals as well as the establishment of a national health insurance scheme.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

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