

Knowledge, Perceptions and Practices of Caregivers on Pneumonia among Children aged below 5 Years in Migori County Referral Hospital, Kenya

Daniel Onyango Amuka¹, Daniel Onguru², George Ayodo³

^{1,2,3}Department of Public Health, Jaramogi Oginga Odinga University of Science and Technology, Kisumu, Kenya

Corresponding Author: Daniel Onyango Amuka

ABSTRACT

Background: Pneumonia is the main cause of under-five mortality worldwide with the burden highest in developing countries such as Kenya. Caregivers are the primary providers for their children and thus their knowledge could be used as a preventive measure for the disease.

Methods: This cross-sectional, mixed-methods study assessed the knowledge; perceptions and practices of caregivers on pneumonia among children aged below five years at Migori County Referral Hospital, and involved 209 child-caregiver pairs. Systematic and convenience sampling were used to select the participants. Data was entered and analyzed on STATA 10.

Results: The prevalence of pneumonia was 27%. More than 90% of caregivers lacked adequate knowledge regarding causes, risk factors and prevention. Management practices mostly were self-treatment with over the counter drugs and for most of the children care seeking started on the second and subsequent days of perceived onset of illness. Dietary practices among the caregivers in case of the episode of pneumonia were also unsatisfactory. Although majority (87.1%) of the caregivers was aware of pneumonia, their knowledge and practices were inadequate while their perception towards pneumonia was adequate. The better understanding and sufficient knowledge was significantly correlated with older age, marriage, higher parity, higher education level, source of information (health facility) and accessibility to television almost every day. A strong association was also found between rural residential area, older age, higher parity, higher education level, younger child age and practices regarding pneumonia management. Caregivers' knowledge and practices about childhood pneumonia is low.

Conclusions: Health education efforts are needed to be implemented both at household and community level to increase knowledge and appropriate practices on pneumonia using appropriate interventions i.e. radio, television and health campaign.

Keywords: Caregivers of under-five, Knowledge, Perceptions, Pneumonia, Practice.

INTRODUCTION

Pneumonia is an inflammation of the parenchymal structures of the lung, such as the alveoli and the bronchioles. During an infection, the alveoli get filled with pus and fluid, resulting in breathing difficulty, which affects first the breathing and gas exchange. Symptoms of pneumonia include coughing, difficulty in breathing, fast breathing and wheezing, and lower chest wall in-drawing (1). Pneumonia is the main cause of under-

five mortality worldwide with the burden highest in developing countries such as Kenya. In 2015, pneumonia killed an estimated 922,000 under-five children globally (1). Most of the deaths occur in South East Asia and Sub-Saharan Africa (2). Appropriate treatment with effective antibiotics, which are often prescribed at a health centre, is critical to prevent pneumonia related deaths. However, children with severe pneumonia are always

hospitalized for supportive treatment with airway suctioning, oxygen therapy, intravenous fluids, nutritional management, antibiotics and close observation (3).

Studies show that prompt health care seeking has been a challenge in developing countries with high mortality rate due to low recognition of pneumonia specific, only about one in five caregivers can recognize danger signs of pneumonia properly (4). Even if they recognize it, a large number of children do not visit health facilities either due to far distance or due to lack of health facilities in some areas, this means that poor children or children from rural areas are likely to die before reaching 5 years than children from urban or reach families (5). Moreover, as failure to recognize symptoms of pneumonia may cause delays in care seeking, World Health Organization has identified three essential steps to address pneumonia specific mortality is by ensuring that caregivers are aware of pneumonia symptoms, seeking appropriate care and treating appropriately with antibiotics (1).

Information of knowledge on causes, recognition of signs and symptoms, prevention measures, perception on danger signs, home care practices and health seeking behavior due to pneumonia, helps policy makers set strategies to decrease pneumonia related childhood mortality. Knowledge of such sources would inform the policy makers of targeted interventions in the community by ensuring optimal use of well accepted and existing resources for health. The purpose of this study was to assess caregivers' knowledge on causes, signs and symptoms, risk factors, prevention measures, perceptions on danger signs and disease severity, and home care practices on children with pneumonia.

METHODS

This descriptive cross sectional study was conducted to assess knowledge, perceptions and practices on pneumonia among caregivers with children aged below 5 years in January, 2020 at Migori County Referral Hospital (MCRH). Migori County

is a low income county whose economy is predominantly agriculture, mining and fishing, with majority of the population dependent on subsistence farming. It has a total population of 1,095,238 persons, with 19% of this population being under-five, total fertility rate of 5.3. The county is divided into 8 sub-counties including Suna East and West, Nyatike, Uriri, Rongo, Awendo, Kuria East and West (6). The study was, however, conducted in MCRH, the main referral hospital in the county. A sample of 209 caregivers were systematically selected and interviewed for quantitative study, while 4 focus groups, with 8 participants each, different from the respondent caregivers but had homogenous characteristics and five health workers from other related health departments within the facility were purposively selected as FGD participants and KIs respectively for interview. To be eligible to participate in the study, caregivers had to be 15 years and above, resident of Migori County for a period of 3 months and had at least one child who was under-five years of age who brought their children for routine immunization and growth monitoring. Caregivers were not included in the study if they were health workers, or had children with chronic disease. A structured questionnaire, FGD and KI guides were prepared according to the study objectives.

For quantitative study, each question on knowledge was weighed based on number of responses. For a question with only one correct answer, a score of 1 was awarded for a correct answer and 0 for a wrong answer. For those questions with >2 possible responses, respondent that got more than 50% of the responses correct, were termed as having good knowledge, while the opposite implied poor knowledge. The discussions and KI interviews lasted around 60 and 45 minutes respectively. At the beginning of the discussions, participants were randomly given identification number based on their sitting arrangements. They were requested to utter their number each time before expressing their opinions to

maintain confidentiality. The discussions were conducted and recorded using a digital recorder in the preferred language, English, Kiswahili or Dholuo, which was translated later into English. Data collection ceased when the point of saturation was achieved and narrative data were rich and had insightful meaning that the additional data would not yield any new information any more. A note taker was present during all the session and notes were taken concurrently for comparison with digital recordings.

The quantitative data were checked for completeness, coded and entered into Microsoft excel program and exported to STATA statistical software version 10 for analysis. Descriptive statistics were used to describe the characteristics of the sample. For qualitative data analysis, tape-recorded

data were transcribed and translated into English and supplemented with field notes. The responses were categorized into themes and analyzed manually. Ethical clearance was obtained from, Jaramogi Oginga Odinga University of Science and Technology Ethics Committee (JOUUST/DVC-RIO/ERC/E2), National Council for Science, Technology and Innovation (NACOSTI) (Ref No: 807971) and Migori County Referral Hospital before study. Written, informed consent was obtained from all respondents and on behalf of their children before they participated in the study. Participation in the study was entirely voluntary and no financial inducement whatsoever was involved. All information about the respondents were handled with utmost confidentiality and used only for intended purposes.

RESULTS

Demographic characteristics

Table 1: Socio-demographic characteristics of the caregivers (n=209)

Variables	n (%)	Variables	n (%)
Residence		Responsible person	
Rural	132 (63.2)	Father	141 (67.5)
Urban slams	77 (36.8)	Mother	52 (24.9)
Age in years		Others	16 (7.6)
15-24	88 (42.1)	Gender of child	
25-34	98 (46.9)	Females	109 (52.2)
35-44	22(10.5)	Males	100(47.8)
45+	1 (0.5)		
Marital status		Child's age (months)	
Single	39 (18.6)	0-5	85(40.7)
Married	158 (75.6)	6-11	48(23)
Separated	6 (2.9)	12-23	63(30.1)
Widowed	6 (2.9)	24+	13(6.2)
Education level		Female children by age	
None	2(7)	0-5	43(39.4)
Lower primary	6(2.9)	6-11	27(24.8)
Upper primary	50(24)	12-23	32(29.4)
Secondary	104 (49.7)	24+	7(6.4)
Tertiary	47 (22.5)		
Caregivers' occupation		Male children by age	
Self employed	87 (41.6)	0-5	42(42)
Unemployed	63 (30.1)	6-11	21(21)
Formal employment	38 (18.2)	12-23	32(32)
Farming	21 (10)	24+	6(7)
Spouse's occupation		Relationship with under five children	
Self employed	87 (54)	Mother	199(95.2)
Unemployed	9 (5.6)	Father	8(3.8)
Formal employment	49 (30.4)	Others	2(7)
Farming	16 (10)		
Accessibility to TV		Number of children	
Almost every day	103 (49.3)	1	76(36.4)
At least one day	56 (26.8)	2 to 3	89(42.6)
Not a single day	50 (23.9)	4 or more	44(21)

Two hundred and nine (209) caregivers consented to participate in this study and were successfully interviewed giving an overall response rate of 100%. Majority of respondents were biological mothers, aged between 15 and 34 years and were married (158; 75%). Nearly 74% had education level of secondary and above. With regards to source of income, about three-fourth of respondents were engaged in one or the other form of work. Majority (81; 41.6%) of respondents were engaged in self employment followed by formal employment (38; 18.2%). Similarly, (87; 54%) of spouses were engaged in self employment and (49; 30.4%) in formal employment. Regarding characteristics of child, (89; 42.6%) of respondents were looking after 2 to 3 children, more than half (109; 52.2%) of children were females and most (141; 67.5%) of children's health care needs expenses were catered by their fathers. Most of the children (85; 40.7%) were aged between 0 to 5 months, with a mean age of 2.01 (SD ±0.98) months, ranged from 0-59 months (Table 1).

Knowledge on pneumonia

The caregivers' awareness about childhood pneumonia was good. Majority (182; 87.1%) of caregivers reported previously hearing about pneumonia and their commonest source of information about pneumonia was relatives/friends (67; 36.8%) (Figures 1-2). Participants in FGDs indicated relatives, radio, television and hospital as their source of information. A female participant in one of the FGDs said *"I have heard of pneumonia severally in our community, over the radio and hospital"*. In another FGD session, a female participant also said *"I know pneumonia; I heard it in the hospital"*.

Out of 182 caregivers who were aware of pneumonia, only (100; 55%) of caregivers described pneumonia sufficiently as chest (lung) infection. Regarding the causes of pneumonia, majority (172; 94.5%) of caregivers identified "exposure to cold" as the cause of pneumonia. In contrast only

(14; 7.7%) respondents reported germs/micro-organisms as causes of pneumonia (Figures 3-4). Similar findings were observed in group discussions. For instance, one female participant said *"I can't actually describe what pneumonia is, but I know the cause, pneumonia is caused by cold, it gets through the legs of the child, moves and attacks the ribs until now you cannot breathe properly and sometimes it kills"*.

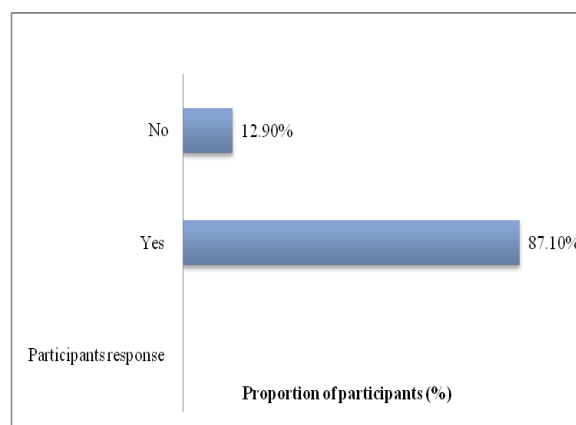


Figure 1: Pneumonia awareness among Caregivers

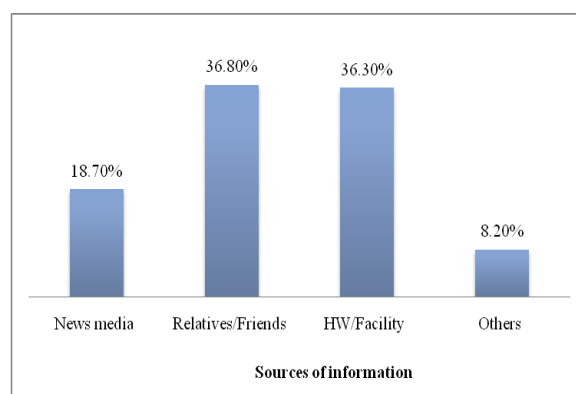


Figure 2: Distribution of sources of information on pneumonia

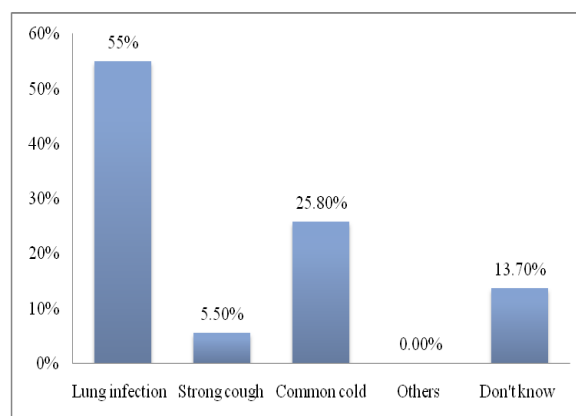


Figure 3: Knowledge on definition of pneumonia

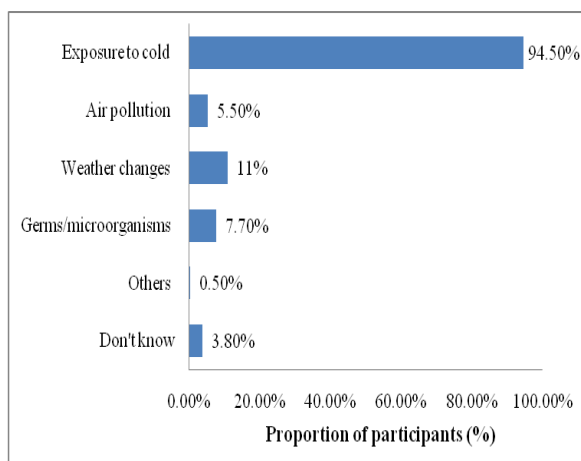


Figure 4: Knowledge on causes of pneumonia

A participant in another FGD explained how cold causes pneumonia, “When a child is exposed to cold weather or sited in cold water for a long time, the cold can get into the body through the legs and move up to the chest which makes the child to develop fever and not getting it easy to breathe”. Furthermore, other views sampled attributed the cause of pneumonia to ingesting cold drinks or food; they indicated that, “A child can get pneumonia from drinking cold water (especially from fridge), eating cold food or chewing ice creams.”

Majority (172; 94.5%) of caregivers indicated cold weather as the major risk factor of pneumonia. In contrast no caregiver mentioned inadequate breastfeeding as a risk factor for childhood pneumonia (Figure 5). Majority of participants in group discussions reported “cold” as the major risk factor. For example one of the participant in a FGDs explained that “The child can get pneumonia very fast if (child name) plays in cold, especially when it’s raining and the child is playing in rains or when you give the child cold things to play with”. A participant in another FGD further explained that “A child can easily get pneumonia if you wear (child name) with light clothes, which makes the cold to get into the body easily”.

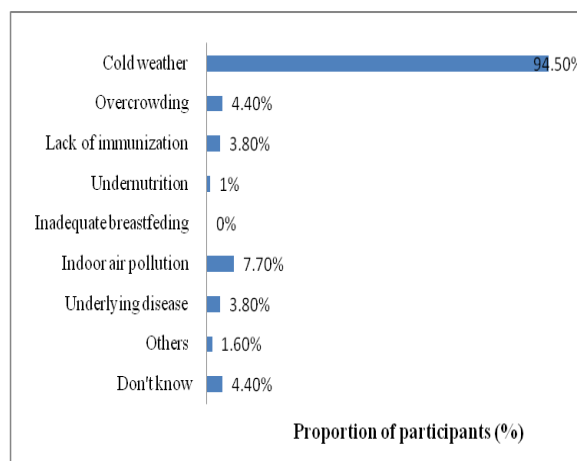


Figure 5: Knowledge on factors increasing the risk for childhood pneumonia

Most respondents identified cough/cold (134; 73.6%), fever (104; 57.1%) and difficulty in breathing (49.5%) as major signs and symptoms of pneumonia (Figure 6). Participants in FGDs reported the same symptoms. A participant clearly explained how pneumonia in a child can be recognized, “When I see strange breathing and some sound from the chest I know my child has pneumonia”. A participant in another FGD explained how a child develops the symptoms, “A child with pneumonia can develop difficulty in breathing and may lose appetite because difficulty in breathing may prevent the child from breastfeeding well”.

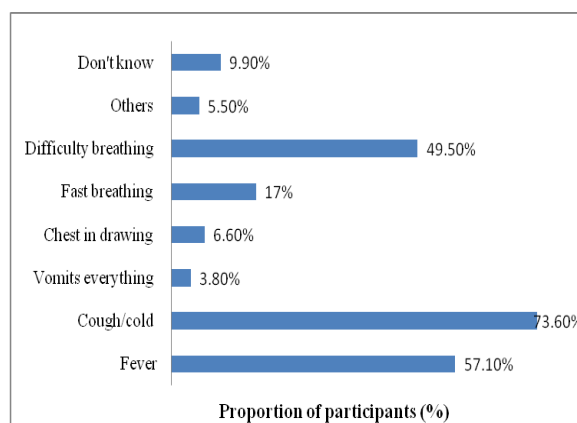


Figure 6: Knowledge of signs and symptoms of pneumonia

Regarding the knowledge on prevention measures, majority cited avoidance of cold (148; 81.3%) and wearing of warm clothes (163; 89.6%) as the best ways of preventing childhood pneumonia

(Figure 7). Majority of caregivers in the FGDs stressed the importance of avoidance of cold or wearing warm clothes to children as the best strategy to prevent childhood pneumonia. A participant spelled out the preventive methods of pneumonia as, “Childhood pneumonia can be prevented by wearing the child warm clothing, avoiding giving cold foods/ water or preventing the child from playing in the rains”. A participant from different FGDs expanded that “Childhood pneumonia can be prevented through avoiding exposure to cold (leaving the baby in bathing water for long) and wearing the child warm clothing after bathing”.

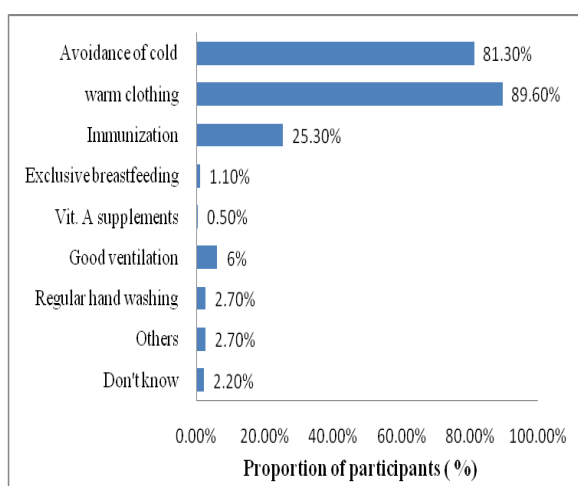


Figure 7: Knowledge on prevention of childhood pneumonia

Level of pneumonia knowledge

Regarding awareness of pneumonia, majority (182; 87.1%) were aware of pneumonia, and over half (55%) define pneumonia correctly as infection of the lungs. Regarding the causes of pneumonia which had only one correct response, (92.3%) had poor knowledge. On knowledge of risk factors, which had 6 possible responses; majority (99.4%) knew less than 50% of the correct response. On knowledge regarding signs and symptoms of pneumonia, which had 7 correct possible responses, majority (157; 86.3%) mentioned less than 50% of the correct responses. Regarding pneumonia danger signs, only (90; 49.5%) mentioned difficulty in breathing, fast breathing (31; 17%), chest

in-drawing (12; 6.6%), while only (22; 12.1%) mentioned both difficulty in breathing and fast breathing. Majority (99.4%) had poor knowledge on pneumonia prevention (Table 2). Similarly during the FGDs it was noted that majority of participants were aware of pneumonia but did not have correct information regarding the causes, risk factors, danger signs and prevention measures of pneumonia.

Table 2: Respondents' level of knowledge on pneumonia (n=182)

Variable	Knowledge on pneumonia		P-Value
	Inadequate, n (%)	Adequate, n (%)	
Definition	82 (45)	100(55)	0.179
Causes	168(92.3)	14(7.7)	0.000
Risk factors	181(99.4)	1(0.6)	0.000
Signs and symptoms	157(86.3)	25(13.7)	0.000
Prevention (n=173)	172(99.4)	1(0.6)	0.000

The study revealed that caregivers aged between 25 to 34 were 20% more likely knowledgeable than those aged between 15-24 (OR 0.80, 95% CI; 0.35-1.82), while those aged between 34 to 44 were nearly three times more likely knowledgeable as compared to those caregivers aged between 15 to 24 years (OR 3.31, 95% CI; 0.40-26.98). The study also showed that there is a statistically significant association of educational status of caregivers and knowledge on pneumonia, where caregivers with upper primary education were three times more knowledgeable on pneumonia as compared with those had lower education (OR 3.16, 95% CI; 0.18- 54.56), while those with secondary education were six times more knowledgeable than those with lower education (OR 6.42, 95% CI; 0.37-108.76) and those with tertiary were all knowledgeable. Regarding marital status, married caregivers were three times more knowledgeable than single respondents (OR 2.5, 95% CI; 1.05-5.98), while separated respondents were two times more knowledgeable than single respondents (OR 1.72, 95% CI; 0.17-16.59) (Table 3).

Table 3: Associations of level of knowledge on pneumonia with selected demographic variables (n=209)

Variables	OR	(95% CI)		P Value
		Lower	Upper	
Age of caregivers				
15-24	Ref			
25-34	0.80	0.35	1.82	0.609
35-44	3.31	0.40	26.98	0.262
45+	1			
Marital status				
Single	Ref			
Married	2.52	1.06	5.98	0.036
Separated	1.72	0.17	16.59	0.637
Widowed	1			
Level of education				
None	Ref			
Lower primary	1	0.04	24.54	1.00
Upper primary	3.16	0.18	54.56	0.427
Secondary	6.42	0.37	108.76	0.197
Tertiary	1			
Accessibility to TV				
Almost every day	Ref			
At least one day	0.38	0.13	1.08	0.071
Not a single day	0.18	0.07	0.50	0.001
Number of children				
1	Ref			
2 to 3	1.34	0.51	3.50	0.542
4 or more	0.45	0.17	1.17	0.105

Caregivers with 2 to 3 children were 1.34 times more likely knowledgeable on pneumonia as compared to those with one child. However, participants with one child were 55% more knowledgeable on pneumonia those with four children and above. Respondents who accessed TV almost every day were 62% more knowledgeable than those who accessed TV at least one day (OR 0.38, 95% CI; 0.13-1.08), while those who assessed TV almost every day were 81% more knowledgeable

than those who accessed TV not a single day (OR 0.19, 95% CI; 0.07- 0.50). Respondents whose first source of information about pneumonia was from health workers/health facility were four times more knowledgeable than those who obtained the information first via news media (OR 4.06, 95% CI; 0.35-46.49) (Table 3).

Perceptions on pneumonia

Majority (92.4%) of respondents believed that pneumonia is the leading cause of death among under-five children. Majority (83.6%) also perceived fast/difficulty breathing and chest in-drawing as the danger signs of pneumonia after being read to them (Table 4). Similar results were observed among FGDs. However, majority of participants did not perceive chest wall-drawing as pneumonia danger sign. A participant in FGDs perceived, *“If a child has difficulty in breathing, elevated fevers, and cough that can make (child name) to vomit, this can tell you things are bad”*. Another caregiver added that: *“When (a child name) has difficulty in breathing and not eating anything. You can begin asking yourself what is the problem with the child. That makes you to decide and run to the hospital”*. *“The child will have difficulty in breathing and oxygen is not getting in well”* a focus group discussant.

Table 4: Perceptions on pneumonia among caregivers

Responses	Agree	Don't know	Disagree
Pneumonia is one of the leading causes of death among under-five globally	(169) 92.4%	11(6%)	3(1.6%)
Fast/difficulty breathing and chest in-drawing are danger signs of pneumonia	153(83.6%)	26(14.2%)	4(2.2%)

Practices on children with symptoms of pneumonia

Out of the 209 under-five children, (56; 27%) had cough accompanied with difficulty in breathing within two weeks preceding the survey and most (40.07%) were aged between 12 to 23 months. Majority of the caregivers sought care for their children from chemists/drug shops before seeking hospital care. Only (15; 26.8%) caregivers sought care directly from health facilities (Figure 8-10).

In the FGDs it was observed that majority of caregivers first sought care from drug shops as explained by one female participant, *“My child just had cough but I just went to the nearby chemist and explained to the sister I got there about the condition of the child, bought the drugs and gave the child”*. When asked about the condition of the child after giving the drugs, the participant reported that cough disappeared. *“People are different. Some caregivers have seen the disease in their*

children and know how it's treated but with me, I have never seen anybody with pneumonia. I will just take (child name) to the hospital" a focus group discussant.

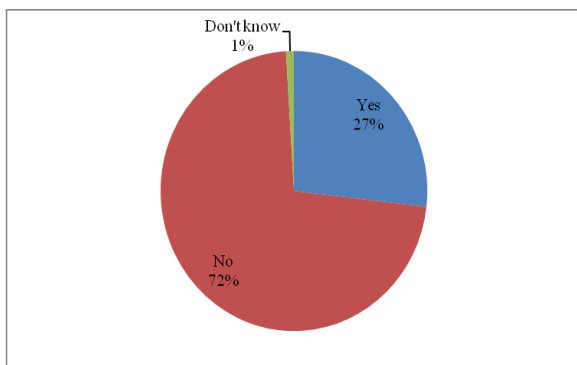


Figure 8: Prevalence of pneumonia among under-five children

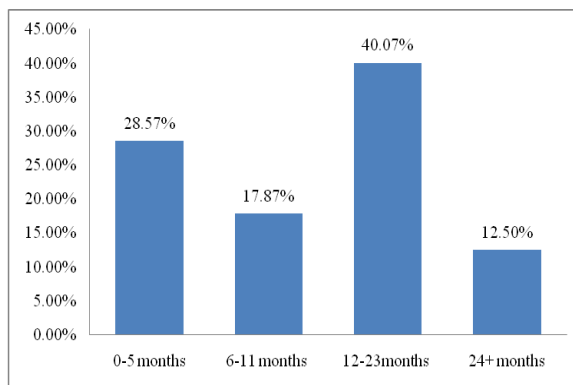


Figure 9: Prevalence of pneumonia according to age of child

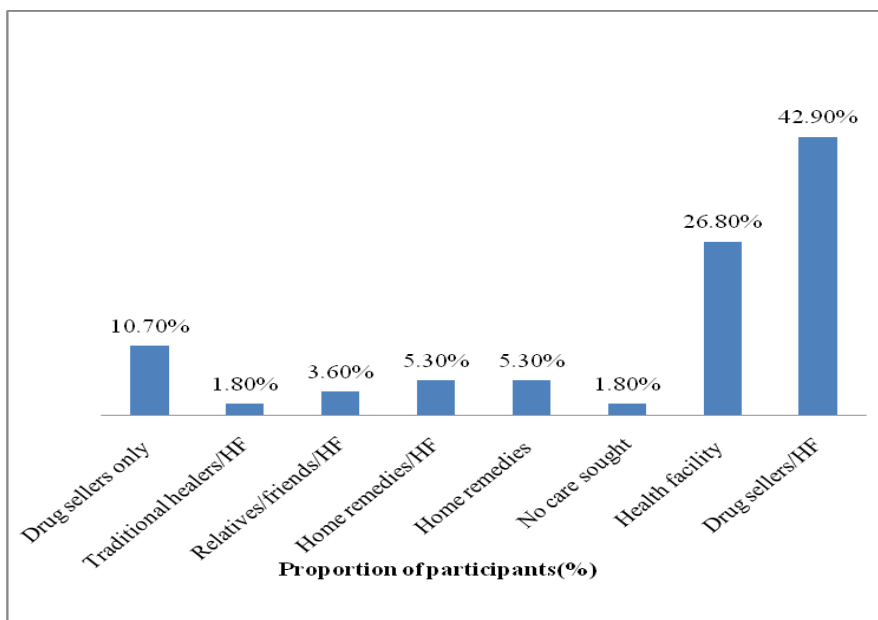


Figure 10: Caregivers' response on health care seeking

Of the total episodes of children with pneumonia, majority of care sought were delayed. More than half (33; 58.9%) of respondents who sought care directly at health facility for their children delayed seeking care (Figure 11). In the group discussion, care was delayed as well, as exclaimed by a participant, "Me as a mother, once I realized any abnormal signs in my child I take (child name) to the hospital because those selling drugs some of them have not studied the diseases of children. When asked how long after recognizing cough and difficulty in breathing in a child she can take before

visiting the hospital. I can observe how the child is progressing with condition but if the condition persists then I can take the child to hospital the following day" a focus group discussant.

Another participant explained her care seeking behaviour, "My child has not developed cough and difficulty in breathing, but in case I see these symptoms in my child. I can't just keep quite because it's a danger sign to the child, so I just have to take (child name) to the hospital. When asked how long she can take to seek health facility care after recognition on pneumonia symptoms, she reported that she can take the child

immediately to the hospital as she fears the disease.

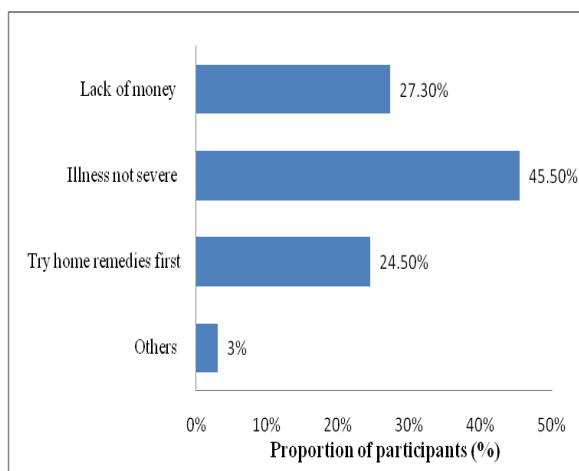


Figure 11: Reasons for delayed hospital care seeking

Most (15; 45.5%) of the caregivers indicated that illness not severe was the main reason for delayed hospital care seeking (Figure 12). When asked the main reason for delayed care seeking in group discussion, majority reported illness not severe as the main reason for the delay. A participant explained that, “Some caregivers say pneumonia is just normal disease for children. Instead they just buy drugs at the chemist and give them, but when the symptoms subside a little give them false believe that their children are okay and have no urge to bring the child to the hospital. They only bring their children to the hospital when their condition worsens”. Health care was mainly sought at the health facility when the conditions of the children worsen (Figure 13).

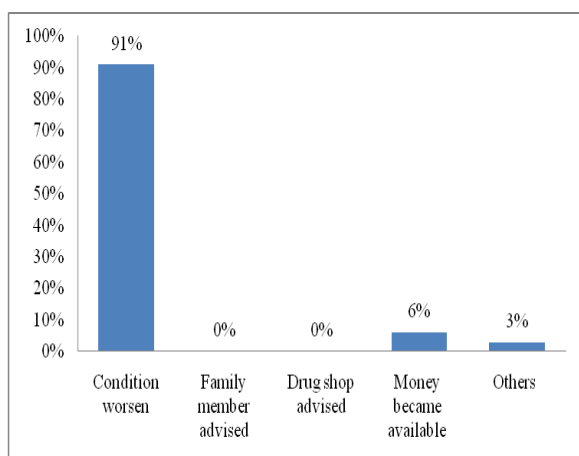


Figure 12: Main reasons for eventually seeking hospital care

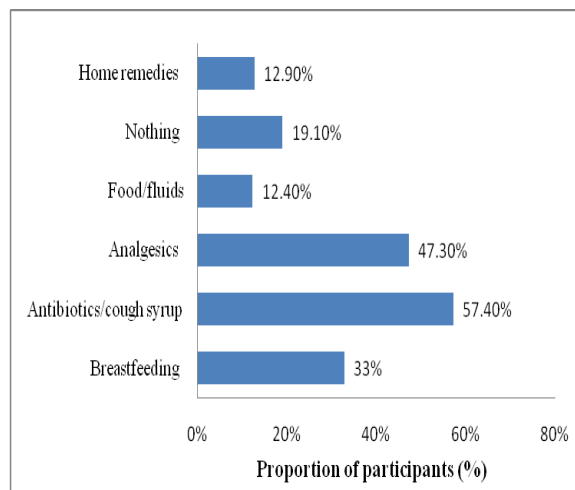


Figure 13: Home management practices prior to hospital attendance

Concerning home management practices, most (120; 57.4%) of caregivers reported that they would give antibiotics/ cough syrup, analgesics (99; 47.4%) and breastfeeding (69; 33%) to their children (multiple responses were given) (Figure 14). In the group discussion, it was also reported that majority used over the counter drugs and other home remedies before seeking hospital care. A participant in a group discussion expressed that “I can cloth (child name) with warm clothes to prevent more cold from getting into the child’s body and thereafter go to a nearby chemist if there is any, to ask for advice or drugs. However, if the condition worsens I can now take the child to the hospital”. Another participant in a different group discussion explained that “If my child has fever, cough and difficulty in breathing, I can take a clean cloth dip it in warm water and then massage the baby with that wet warm cloth, then wear the child warm clothes to reduce child’s fever”.

Other participants’ preferred using warm water on their children either in the form of drinks or bathing. This is particularly done for children to remove cold in their body, as one of female participant in a group discussion reported “I can give her warm water, then bath (child name) in warm water, before I take the child to the hospital”. A participant from another FGD further explained that “When I see the

symptoms of pneumonia in a child, I will do (child name) first aids for about 1-2 hours before taking the child to the hospital". When asked about the first Aids that she can give the child with pneumonia symptoms she reported wearing the child warm clothing and giving warm salty water mixed with lemon juice.

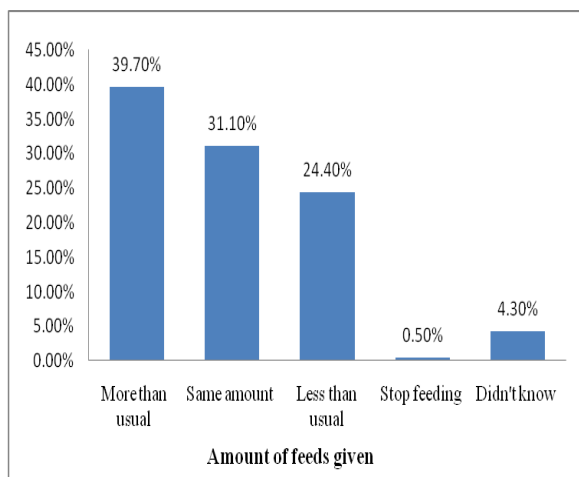


Figure 14: Feeding practices

With regards to feeding practices, over 60% of participants said they would give more than usual or about the same amount of feeds when their children are sick. However, more than half (50; 58.8%) of participants with children less than 6 months suggested that they would give less or same food/breast milk as usual (Figure 15). Majority of the participants in group

discussions believed that solid food can suffocate the child or worsened coughing in a child with cough and breathing difficulty and reported giving liquid feeds such as breast milk, porridge among others to their children. In a FGD session, a female participant supported giving lesser food to a sick child by saying, "When I have a child who has started eating solid foods but the child is coughing and having difficulty in breathing. I can give very little solid food or stop giving solid food, because solid food provoke cough, that can make the child to vomit what (child name) had taken. With breastfeeding I can just breastfeed the child on what (child name) can breastfeed on. While with liquid food I can just give".

A participant in another FGD further explained that "When a child has pneumonia, I can only give warm liquid food such as warm porridge kept in a flask or breastfeeding because as from morning milk that comes from the breast is not cold. Solid food may make the child become over satisfied and may lead to problem of breathing". When asked about the quantity of breast milk that she can give the sick child, she reported that she can give the same amount of food as usual when the child is not sick.

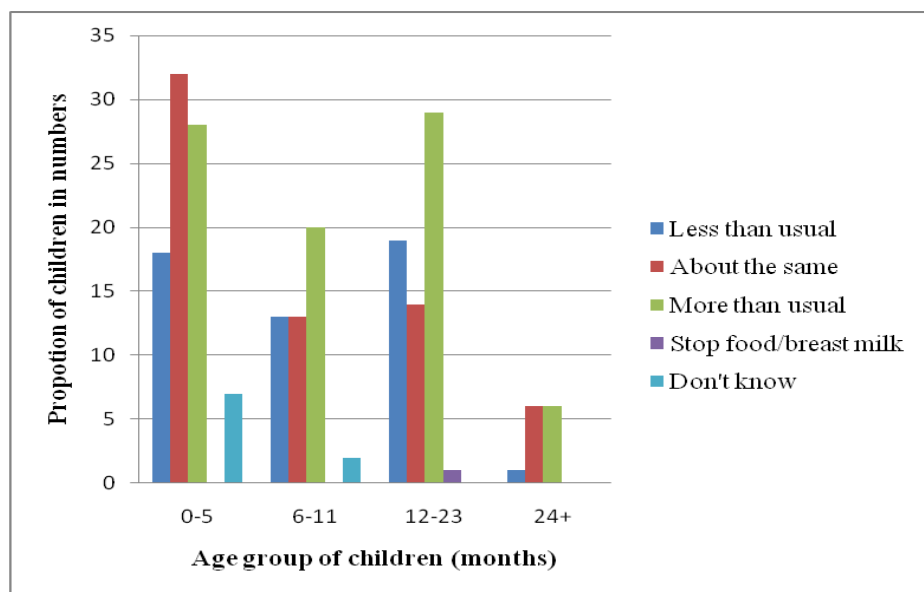


Figure 15: Distribution of feeding practices by age

Majority (156; 75%) of the participants were the key decision maker in their families on treatment seeking for their children (Figure 16). Discussants indicated that, decisions on treatment seeking are most often made by mothers as they take much of their time with the child and can easily notice a sick child but rely on financial support from child's father. In a session of FGD, a female participant explained that *"It's the mother who notices when the child is sick, but in the villages for instance it's the father who works. Once a mother notices that the child is sick, her work is to inform the father to take the responsibility of the sick child at the health facility"*.

"In the family it's the mother who notices when the child is sick because a father is somebody who never stays at home; he leaves in the morning and comes late in the evening when the child is a sleep. When the child is sick and both parents are alive. It's the responsibility of the father to give out the money for treatment and the mother takes the child to the hospital or the father may accompany the mother if he is around" a focused discussant. *"For long period of the day, it's me who is with the child and knows the problem the child is having such as vomiting, diarrhoea. So when the child is sick both of us can give out the money for treatment but in most cases, I tell the father to give out money for treatment"* a focused discussant.

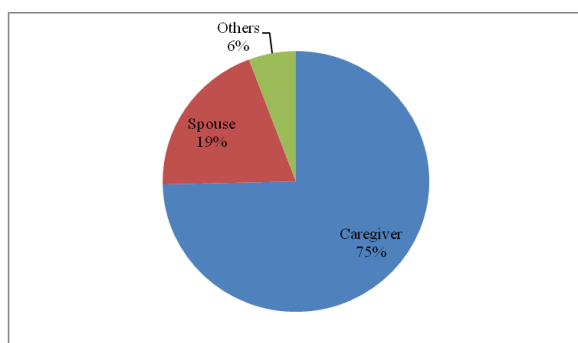


Figure 16: Distribution of key decision maker for health seeking in the family

The study revealed that caregivers who reside in rural areas were 21% more

likely to have appropriate practices as compared to those from urban areas (OR 0.79, 95% CI; 0.45-1.40). Respondents aged between 15 to 24 years were 4% more likely to have appropriate care practices than those aged between 25 to 34 years (OR 0.96, 95% CI; 0.54-1.73), while respondents aged between 35 to 44 years were two times more likely to have appropriate care practices than those aged between 15 to 24 years (OR 1.93, 95% CI; 0.69-5.41). regarding education level, caregivers with lower primary education were two times more likely to have appropriate practices than those with no education (OR 2, 95% CI; 0.07-51.59), while those with upper primary education were two times more likely to have appropriate practices than those with no education (OR 1.63, 95% CI; 0.09-27.64). Respondents with secondary education were 1.12 times more likely to have appropriate practices compared to those with no education (OR 1.12, 95% CI; 0.06-18.42) and those with tertiary education were two times more likely to have appropriate practices than those with no education (OR 2.35, 95% CI; 0.13-40.40) (Table 4).

Table 5: Association of Practices with Selected Demographic Variables (n=209)

Variables	OR	(95% CI)		P Value
		Lower	Upper	
Residence				
Rural area	Ref			
Urban slams	0.79	0.45	1.40	0.43
Caregivers' age (in years)				
15-24	Ref			
25-34	0.96	0.54	1.73	0.91
35-44	1.93	0.69	5.41	0.20
45+	1			
Level of education				
None	Ref			
Lower primary	2	0.07	51.59	0.67
Upper primary	1.63	0.09	27.64	0.73
Secondary	1.12	0.06	18.42	0.93
Tertiary	2.35	0.13	40.40	0.55
Number of children				
1	Ref			
2 to 3	1.12	0.60	2.10	0.7
4 or more	1.34	0.62	2.88	0.44
Prevalence of Pneumonia				
Yes	Ref			
No		0.00	0.10	0.00
Don't know	1			
Gender of child				
Females	Ref			
Males	0.43	0.14	1.35	0.15

Respondents with previous prevalence of pneumonia in their children 2 weeks prior to the study were 99% more likely to have appropriate practice than those who did not know that their children had symptoms of pneumonia (OR 0.01, 95% CI; 0.00-0.10). Respondents with female children were 56% more likely to seek care than those who had male children (OR 0.43, 95% CI; 0.14-1.36). Younger children were more likely to be taken to hospital within 24

hours as compared to older children (OR 0.75, 95% CI; -0.81-0.25). Respondents with 2 to 3 children were 1.12 times more likely to practice appropriate practice than those with one child (OR 1.12, 95% CI; 0.60-2.10), while those with four children and above were 1.34 times more likely to have appropriate practices than those with one child (OR 1.34, 95% CI; 0.62-2.88) (Table 5).

Table 6: Key informants view on caregivers' knowledge, perceptions and practices

"Some of the caregivers' mostly educated ones are aware of pneumonia, they have heard of it from the health workers, while others relied on what other people say is pneumonia. They know pneumonia is caused by cold weather or leaving the baby without warm clothes that makes cold to get into the chest and cause chest pain and cough. Nowadays people are seeking care because of health insurance, only a few children are brought to the hospital with severe disease. However, they still give their children some of the over the counter drugs".

"Majority of the caregivers know pneumonia and relate its cause to cold, that children can easily get pneumonia if they are exposed to cold weather, dust and pollen grains and suggest that pneumonia can be prevented through making the child warm or giving a balanced diet. While few caregivers (mostly learned ones) also know breastfeeding and immunization as preventive measures."

When asked about the perception about cough and difficulty in breathing, the KIs responded that *"majority of the caregivers perceived cough and difficulty in breathing as danger signs of pneumonia and it's at this state where most of the caregivers bring children for treatment. When asked about the cause of delays, "being busy at the farm, business, ignorance about symptoms of pneumonia, religious and cultural factors" were the most cited reasons despite health workers efforts to educate the caregivers.*

In-terms of feeding most of the caregivers stop breastfeeding or giving food to their children as they perceived that food may block the child's airway and prevent them from breathing and cause death. But instead prefer giving warm salty water mixed with lemon juice to their children".

"Pneumonia is majorly caused by bacteria and is a major public health problem in this locality. However, majority of the caregivers know that pneumonia is caused by cold and those children who are exposed to cold or dust can easily get pneumonia. Majority of the caregivers know the symptoms of pneumonia such as fever, coughing, breathing problems. However, they delay seeking care at the health facility as they give their children over the counter drugs, home remedies such as; tepid sponging with warm water and wearing warm clothing. Some caregivers cover their children with blanket, heat herbals drugs in a pot for the children to inhale hot smokes from the herbals to clear pneumonia. In-terms of feeding majority of caregivers encourage breastfeeding or feeding during illness but they feed their children's based on the child's demand."

DISCUSSIONS

Early recognition of a child with pneumonia at home allows for prompt health care seeking at health facility where appropriate treatments are given to children to prevent pneumonia related deaths. These observations underlined the conduct of the present study which documented that correct knowledge about description of pneumonia, causes, risk factors, signs and symptoms, preventive measures and practices on children with pneumonia is low among caregivers.

Out of 209 caregivers surveyed, (182; 87.1%) said they were aware of pneumonia and reported to have obtained first information of pneumonia from relatives/friends. However, only 55% of caregivers who were aware of pneumonia described it sufficiently as lung infection.

There were similar findings in Nigeria, Bangladesh, Albania, Uganda and Nepal, where most mothers were aware of pneumonia (8-13). However, only 31.94% of Ghanaian caregivers were aware of pneumonia (14). It can therefore be explained that such high awareness may be dependent on either previous experiences or information obtained during social interaction with elder family members or from the health facility. The present study showed significant association between health workers (as first source of information) and correct knowledge on pneumonia. Likewise significant association between health facility and correct knowledge on pneumonia was also observed among Nigerian mothers (9).

Fewer caregivers in the present study knew the causes of pneumonia and its

common risk factors. A small number of caregivers had knowledge of the danger signs of pneumonia such as fast breathing and chest in drawing. The most commonly reported symptoms were fever, cough and difficulty in breathing. Similar findings were reported in studies conducted in Nigeria, Uganda, Albania, India and Pakistan, where fast breathing and chest wall in-drawing were rarely mentioned as commonly recognized symptoms compared to cough or difficulty in breathing and fever (8, 13, 15-17). Whereas studies done in Nigeria, Pakistan and Egypt show good knowledge on both general and danger signs of pneumonia (9, 18, 19).

Similar to most pneumonia survey worldwide exposure to cold and weather change were the commonly cited causes for pneumonia by mothers. This reflects the widely held public views that pneumonia results from exposure to cold air. This view has been reported among Kenyan, Pakistan and Nigerian mothers and explains why mothers employ warmth producing measures as treatment for pneumonia (12, 15, 20-23). In this study, only 28.9% of caregivers knew that germs cause pneumonia. Reducing exposure to cold weather or avoidance of cold food/drinks and wearing of warm clothes were the most commonly cited ways of preventing pneumonia and that factors that predispose a child to getting pneumonia such as indoor air pollution, overcrowding, lack of vaccination, underlying disease and under-nutrition were least mentioned. Similar findings were observed in studies done in Nigeria and Bangalore (12, 21), but in contrast with a Egyptian study that reported immunization, exclusive breast feeding, frequent hand washing, isolating child from others as best preventive measures (18). Knowledge on causes, signs and symptoms, risk factors and preventive measures need to be emphasized in campaign messages.

In the present study significant associations was found between caregiver's age and level of knowledge on pneumonia. This finding is supported by studies

conducted in Iran and India (16, 24, 25). Whereas studies conducted by in Pakistan and Saudi Arabia found no significant correlation between caregiver's age and level of knowledge (26, 27), which is contradicting to the present study. The current study showed significant association between caregivers' education and level of knowledge. Studies conducted in Nigeria, Pakistan, Kenya and India corresponds with current finding (9, 19, 25, 28). Therefore increasing caregivers' educational level and awareness regarding causes, symptoms and prevention of pneumonia will have a positive impact.

Perceptions on pneumonia

Majority of caregivers perceived fast/difficulty in breathing and chest in-drawing as serious signs of pneumonia and pneumonia as the leading cause of death among under-five children. Present finding is comparable with studies conducted in Saudi Arabia and Bangladesh (10, 18), but contradicted in studies conducted in Ecuador and Cambodia, that showed mothers did not recognize difficulty in breathing and chest in-drawing as danger signs of pneumonia to warrant seeking care at health facility as compared to fever and cough (29, 30). In the current study majority of respondents sought care from chemists despite recognizing pneumonia as a serious disease. Hence it could be assumed that positive responses on perceptions about severity of disease were because the statements were read to the participants. This clearly indicates low knowledge on danger signs and may explain the cause of delayed health care in this study.

Practices on children with symptoms of pneumonia

Pneumonia accounted for 27% of the total children included in the study which is a reduction as compared to the study done by Sakisaka et al in Nepal and Granada, in which pneumonia was responsible for 69.3% (31), but is comparable to other studies conducted in Central India, Pakistan

and Cambodia that found prevalence of pneumonia at 22.2%, 19.5% and 30.0% (15, 30-32).

The present study demonstrates that chemists/drug sellers and home remedies were the most preferred treatment options by caregivers. Majority of caregivers delayed seeking care for more than 2 days as they gave over the counter drugs such as antibiotics, cough syrup, analgesics and other home remedies, care was majorly sought when the condition of the children worsen. Similar findings were reported in studies done in Nigeria, Uganda, Kenya, Ghana, Pakistan, Bangladesh and Tanzania where over 50% of mothers delayed seeking care as they preferred giving drugs from drug sellers and home remedies to their children (13, 14, 17, 19, 21, 33-35). The nearest drug sellers are the first point of health care for caregivers. Drug sellers may not provide the best care, they are located nearby and provide low-cost treatment with better conduct, hence, easy to approach and more receptive to caregivers' concerns; therefore, they are perceived as adequate and effective solution. While these drugs and home remedies are seen to be cheap and easily accessible, their use have been associated with delayed care seeking as caregivers always wait for the remedy to take effect before seeking care (36).

The present study revealed poor practices among majority of caregivers. Over half of caregivers with children below 12 months reported that they would give same or less liquid feeds (liquid/breast milk) to their children when sick, but restrict giving solid feeds. The current finding is supported by Irimu et al. study in Kenya, that showed older children were being denied some food stuffs such as fried foods, cold foods, milk and fruits like avocados and bananas. These were believed to be too strong for the sick child and that their consumption would make pneumonia worse while eggs were believed to cause a child with a cough to develop pneumonia (37). Similar finding was observed in Simiyu et al. study that showed 97.4% of caregivers

reported that they would feed their ill children; however, 96.1% of them preferred giving liquid foods such as porridge, milk or soup but not solid foods (22). These findings could be due to previous information the caregivers might have received from their elder relatives. A healthy balanced diet is a necessity for these young children as it boots their immune system to protect against infectious diseases like pneumonia, measles, and diarrhoea among others.

Biological mothers (156; 75%) were the key decision makers on health care seeking, but they depended on the child's fathers for financial support, which may lead to delays in care seeking. Similar finding was reported by Ndungu, et al. study in Kenya, where mothers were the key decision makers on care seeking, but relied on the child's father for financial provision. This caused further delays in seeking appropriate care for pneumonia (20). However, studies done in India, Nepal and Pakistan, contradict this present finding. It showed that majority of the decision were made by husbands or grandmothers (15, 38-40). Caregivers need to be empowered financially or universal health care program to be adopted soon to enable them seek prompt and appropriate care at the facility in order to reduce mortality caused by delays in seeking care.

The present study shows that respondents' with older age, higher education level, higher parity and those from rural areas were more likely to have appropriate practices. The present study corresponds with Ndu et al study in Nigeria (12), but disagreed with Doracaj et al study in Albania (8). Doracaj et al study showed that urban mothers were more likely to seek prompt and appropriate care practices than rural mothers. In the current study it could be further explained that because of the easy accessibility of many drug shops/ chemists in urban slums, caregivers tend to buy drugs from these drug dealers and self medicate their children during illness. Similarly because of poor accessibility to health

facility, caregivers from rural areas may not get accessed to these drugs easily and therefore may more likely seek health care at the health facility compared to caregivers in urban slums. Respondents with higher education level were seen in the current study to be more knowledgeable and had appropriate practices on pneumonia. The present study is supported by studies conducted in Nigeria, Pakistan and Kenya (9, 19, 28). This might be due to the fact that educated caregivers are more likely to be able to read thereby, understand better and adopt appropriate practices in managing and preventing pneumonia as promoted through health education, through outreach programmes or by health workers.

Gender disparities still play a role in health seeking behaviors. Studies conducted in Pakistan, India, Albania and Nepal indicated that prompt care seeking was positively associated with male sex of the child (8, 19, 40, 41). However, the present study contradicts the previous studies. It revealed that caregivers were 0.76 times more likely to seek health facility care if their children were females than males. Age of the child was found to be associated with prompt care seeking for pneumonia. Prompt care seeking was sought more for children less than 12 months than those greater than 12 months. This might be because caregivers understand that younger children have lower immunity than their elder siblings.

CONCLUSIONS AND RECOMMENDATIONS

Based on the study findings it is concluded that respondents were aware of pneumonia, caregivers tend to be aware of the signs and symptoms of pneumonia. However they lack information on causes, danger signs, risk factors and preventive measures. Respondent sought treatment from drug shops which contributed to delay in seeking care at the health facility. In regard to various factors, age, education and parity of the caregivers and sex of the child are the factors affecting knowledge and

appropriate practices of the caregivers. Perception that illness is mild and that it will improve has been shown to be the main cause of delay in health care seeking practices. Health education campaigns by ministry of health at county levels on knowledge; cause, risk factors, danger signs, preventive measures, perception on the severity of disease and appropriate home care and health seeking behaviour is needed at the health facility and in the community so as to reduce morbidity and mortality that are related to pneumonia.

Abbreviations

FGD: Focus Group Discussion; JOOUST: Jaramogi Oginga Odinga University of Science and technology; KI: Key Informants; MCRH: Migori County Referral Hospital; NACOSTI: National Commission for Science, Technology and Innovation; UNICEF: United Nations Children's Fund; WHO: World Health Organization.

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Authors' contributions

DA conceived the idea, designed the study, designed data collection tools, supervised the data collection, entered and analyzed the data and drafted the first manuscript. DO And GA designed the study, critically reviewed drafts and added comments on the manuscript. All authors reviewed and approved the final manuscript.

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