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RESEARCH ARTICLE

REVISED Caregivers' perceptions of childhood pneumonia in Western Kenya: a theory of practice perspective

[version 2; peer review: 1 approved with reservations]

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Abstract

Caregivers' beliefs about their children's health, perceived causes of illness, and approaches to treatment significantly influence health-seeking behavior. Using Bourdieu's Theory of Practice, we explore the influence of caregivers' social and cultural capital within a specific social environment that shapes pneumonia perceptions. An ethnographic study, drawing on multiple qualitative methods, was conducted between April and October 2024. A total of 14 in-depth interviews, 3 focus group discussions, and 11 caregivers participated in the participant observation. Transcribed interviews were analyzed using a phenomenological hermeneutic approach by reading and re-reading transcripts to identify recurrent themes and interpret the understanding of childhood illnesses, perceptions of pneumonia, and how they influence health-seeking behavior. Caregivers have reported three main causes of pneumonia: exposure to cold, hereditary factors, and pathogens. All caregivers identified exposure to cold, such as cold weather or riding motorcycles, as a cause of pneumonia. Few knew that germs could cause pneumonia, while a few believed that pneumonia was hereditary. Asthma, perceived as a hereditary condition, is also believed to cause pneumonia. However, there is confusion regarding whether pneumonia and asthma are distinct illnesses or the same condition. Regardless of the specific belief, exposure to the cold remained the most dominant and widely accepted explanation for pneumonia across all caregivers.

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1. **Prashant Kulkarni**, Johns Hopkins University, PUNE, India

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Additionally, there was no widely recognized local terminology for pneumonia; instead, caregivers described it using literal descriptions of observed symptoms, such as coughing, chest congestion, and difficulty in breathing. Caregivers' symptom-based interpretations reflected reliance on observable signs rather than biomedical diagnostic labels. Perceptions of pneumonia and terminologies were predominantly shaped by cultural beliefs and interactions within the social environment. To minimize the gap between biomedical and culturally mediated knowledge, culturally sensitive health education programs that emphasize the recognition of key pneumonia symptoms using locally understandable languages and concepts should be developed and initiated.

Keywords
Pneumonia perceptions, healthcare-seeking behavior, theory of practice

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REVISED **Amendments from Version 1**

The authors revised the description of the study from a combined mixed-methods qualitative study to *drawing on multiple qualitative methods* to more accurately reflect the study design.

In the second-to-last sentence of the third paragraph, the authors replaced the term *findings* with *studies* to improve conceptual accuracy. In the final paragraph, the justification and objectives of the study were revised to align with the changes made to the results and discussion sections.

The study design was revised to explicitly include the specific qualitative studies that were conducted. In addition, the authors introduced a dedicated section, *Operationalizing Bourdieu's Theory of Practice*, to provide a comprehensive account of how the theory of practice was applied in this study.

The results section was initially largely descriptive, which limited the depth of analysis and theoretical engagement with the findings; we have therefore incorporated analytical statements to deepen the analysis and strengthen the interpretation of results.

The discussion section has been strengthened to more clearly demonstrate how the findings are interpreted through Bourdieu's Theory of Practice, linking empirical results to the concepts of habitus, capital, and field, and situating the study within the broader literature.

Any further responses from the reviewers can be found at the end of the article

Introduction

Globally, pneumonia remains a leading cause of morbidity and mortality, accounting for an estimated 502,000 deaths among children under five years of age in 2022.[1–4] These deaths are largely preventable through readily available interventions.[5] However, healthcare-seeking behavior is often suboptimal for childhood respiratory illnesses, attributed to caregivers' perceptions and beliefs.[6] Studies in other contexts have shown that knowledge of pneumonia symptoms is poor.[7–9] Symptoms are frequently misattributed owing to their overlap with those of other childhood illnesses and are often perceived as mild, leading caregivers to rely on home remedies.[10,11] Caregivers' beliefs about their children's health, perceived causes of illnesses, and how to resolve them can greatly impact health-seeking behaviors. Beliefs, such as those related to causative agents and perceived severity, are often acquired through primary socialization, which plays a key role in shaping caregivers' perspectives and health-seeking practices.[12,13]

The use of traditional medicines is based on core belief systems about illness causation, such as supernatural, social, or biomedical agents/natural causes.[14–17] The supernatural causes of illness include witchcraft, sorcery, breaching taboos, and disease-causing spirits. Belief in God/Allah was prevalent in many studies in Africa and was held responsible for causing illness.[17,18] Regardless of the basis of the individual's belief system, it can inhibit preventive efforts, delay or complicate medical care, or result in the use of traditional medicine that can be beneficial or toxic.[18] In the context of divergent health belief systems, caregivers may face decision-making dilemmas regarding the best course of action for sick children.

Previous studies have revealed beliefs about witchcraft, which are attributed to the use of traditional remedies.[14,18] Symptoms such as convulsions and fever are often attributed to bewitchment, especially when the improvement is slow or the disease becomes severe. In such cases, the disease is treated using traditional remedies.[14,15,19,20] In contrast to findings from malaria and Ebola-related studies, there is limited literature linking the use of traditional remedies for pneumonia to bewitchments. For instance, a study conducted among fathers in the Philippines found that they utilized the services of traditional healers for pneumonia because it was widely accepted and easy to prepare; no other reasons were established for this study.[21] Similarly, a study in Sierra Leone examining healthcare-seeking behavior for pneumonia reported the use of traditional remedies because they were cheaper than treatments at government hospitals.[22] Additional motivating factors include social expectations and obligations, such as respect for elders, in-laws, and herbalists,[22–24] as well as the perception that traditional remedies are suitable for diseases that do not require biomedical treatment.[20] These studies highlight that traditional remedies are often deeply embedded in individuals' dispositions, cultural norms, and social structures.

According to Hartog *et al.* and Workneh *et al.*, healthcare is more than illness and pain; it reflects the basic worldview and values within the culture that, in turn, influence health and illness behavior.[25,26] Therefore, communities comprehend health problems and solutions within their cultural frames of reference.[17,27] For example, in the rural Bangladeshi community, it was believed that pneumonia could cause asthma and heart disease and require quick medical attention.[28] Although some communities did not appreciate the severity of pneumonia,[29] it was perceived as a serious illness requiring

immediate attention in Nigeria, rural Ghana, and rural Bangladesh.[9,21,27,28,30–32] Opwora *et al.* further stated that caregivers' failure to appreciate the severity of pneumonia may hinder the prompt treatment of the illness.[31] Although pneumonia is often acknowledged as a severe illness, the criteria for what constitutes "severe" can vary culturally. For example, some symptoms may not be perceived as alarming within a particular cultural frame of reference, leading to delayed response. This variability suggests the need for further exploration of the cultural definitions of severity and how they impact health-seeking behaviors.

Previous literature has reported that pneumonia is caused by a common cold, headache, cough, asthma, hot body, poor hygiene, measles, exposure to cold, dust, and hot summer months.[10,27,28,33] In addition, studies have shown a consensus that pneumonia is caused by environmental variables and existing illnesses; these studies show the importance of causation perceptions in treatment choices.[10,27,28,33,34] Owing to differing perceptions, home remedies for pneumonia vary from community to community. The treatment involved applying a methylated ointment, using hot water, and keeping the child warm.[27,28] It is logical for caregivers to use hot therapy to prevent and treat pneumonia because of the belief that pneumonia is caused by the cold.[27,28,34]

This study drew on Bourdieu's theory of practice to understand caregivers' perceptions of pneumonia.[13,35] Bourdieu's theoretical concepts of field (social environment) and habitus (conceptualized as caregivers' perceptions of pneumonia) were employed to examine how their ingrained dispositions, along with their cultural and social capital, shaped their understanding of pneumonia. The investigation focused on an in-depth understanding of pneumonia perceptions as shaped by caregivers' social and cultural capital and the environment in which they exist.

Childhood pneumonia remains a leading cause of under-five mortality in sub-Saharan Africa despite the availability of preventive and curative interventions.[1–5] In Western Kenya, timely health-seeking remains suboptimal.[36] While existing research has largely focused on access-related and structural barriers, few explore caregivers' perceptions of pneumonia and how these are shaped by their social and cultural capital within their everyday social environments. Applying the theory of practice enables an examination of how these forms of capital interact with embodied dispositions within a specific social context to structure caregivers' interpretations of illness and subsequent health-seeking practices.

Methodology

Study design

This study adopted an ethnographic design, drawing on in-depth interviews, focus group discussions, and participant observation to generate rich, contextualized data. The study utilized the philosophical paradigm of Martin Heidegger's hermeneutic phenomenology. The ethnographic design enabled prolonged engagement with participants at their homes from April 2024 to October 2024, facilitating a nuanced understanding of the socio-cultural, economic, and structural contexts that shape caregivers' perceptions of childhood pneumonia and their healthcare-seeking behaviors. Through this study design, the use of Martin Heidegger's hermeneutic phenomenology philosophy, and Bourdieu's theory of practice, the study sought to move beyond surface-level descriptions by interpreting how caregivers understand illness and practices within their everyday lives.

Study area

The study was conducted in Opanga village, Karemo division, a predominantly Luo community, within the Health Demographic Surveillance System (HDSS) area in Siaya County, Western Kenya. As of 2022, unpublished data reported that the Karemo division had 11,464 children under five years of age, with 1,674 (14.6%) child deaths, 234 (14%) of which were due to pneumonia. The main health facility, the Siaya County Referral Hospital (SCRH), has 200 inpatient beds. In addition, there were 23 health facilities in the Karemo Division. Opanga village, near Siaya Township and close to SCRH and private hospitals, has an estimated population of 5,122.

Study participants

The study participants were caregivers, who included 22 mothers, 18 fathers, and 2 grandmothers of children less than 5 years old in Opanga village. The study team initially screened participants at their homes and asked the following questions: (1) did the child have a cough in the last two weeks, 2) had an illness with a cough, did he/she breathe faster than usual with short, rapid breaths or have difficulty breathing, and 3) was the fast or difficult breathing due to a problem in the chest or to a blocked or runny nose? (Problem in chest only/Blocked or runny nose only/Both/other. 4) Did you seek advice or treatment from any source? (Yes/No/Do not know)

To be eligible, the respondent had to answer "yes" to questions 1, 2 and 4, and 'a problem in the chest' to question 3.

The study was conducted over seven-month period. One hundred and seventy-three children under the age of five years were screened using the procedures described above, of whom 23 met the eligibility criteria. Of the eligible 23, 12 caregivers were purposively selected for in-depth interviews, and 11 of them also participated in long-term participant observation. In the sixth month, two additional in-depth interviews were conducted with the two male caregivers. Additional selection criteria required participants to have primary caregiving roles for children under the age of five, reside in the study area, and provide informed consent. Finally, three focus group discussions were conducted within the community. The selection criteria were as follows: primary caregiving roles for children under the age of five, residing in the study area, and providing informed consent, one male-only group, one female-only group, and one mixed-gender group. Detailed characteristics of the participants are provided in Table 1 and Table 2.

Data collection

Data collection was conducted between April and October 2024, with in-depth interviews conducted by the lead author at the participants' homes. Most of the interviews were conducted in Swahili. The interviews took approximately 30–50 minutes and were audio-recorded after informed consent was obtained, except for one caregiver who opted out of recording; for this participant, longhand notes were taken instead. Participants were informed of the study objectives before the in-depth interviews and requested to participate in participant observations.

After the in-depth interviews, 11 participants agreed to participate in the participant observation. They were informed of the purpose of the study and provided consent. The caregivers who consented were informed that their entire household would participate in the study.

Participant observation for this research involved spending time with research participants at their homes at least twice a month for approximately six hours at each visit. The activities involved observation and participation in day-to-day childcare activities, including accompanying participants for care-seeking. An observation tool was used to observe and record critical elements, such as the appearance of the home environment and participants, verbal behavior and interaction, physical behavior, care-seeking, and care for the child. Informal interviews were conducted with caregivers during these visits. Research assistants with experience in qualitative methods and social science background were trained on how to note observations and informal conversations.

Finally, during the sixth month of the study, Focus Group Discussions (FGDs) were conducted with community members. This method was used as a data collection technique, in which selected caregivers engaged in in-depth discussions about their health-seeking behavior for pneumonia. This technique was used to clarify the data collected through individual in-depth interviews and informal interviews. The method was useful in clarifying the shared community knowledge about probable pneumonia regarding the objectives of the study. The FGD interview guide questions were based on thematic areas previously identified in informal and in-depth interviews. The interviews took approximately one hour to one and half hours, and were audio recorded.

The research team consisted of two research assistants: one with a Bachelor of Arts in Sociology and the other with a Bachelor of Arts in Anthropology. The lead researcher is a PhD candidate in anthropology. The research team was trained in the research procedures to ensure consistency and rigor in data collection and analysis.

Ethical considerations

Ethical approval was obtained from the Maseno University Scientific and Ethics Review Committee (MUSERC) ref number MSU/MUSERC/01330/24 and the National Commission of Science, Technology and Innovation (NACOSTI) ref number NACOSTI/P/24/34015. Written informed consent was obtained from all participants enrolled in this study. We used codes to name the audio recordings and stored them on an offline device. All study staff involved in data collection and transcription were trained to handle confidential information. Raw and refined data were stored in a password-protected device. The storage device was kept in a lockable cabinet and was only accessed by authorized staff. No personal identifiers have been used for reporting or publication.

Data management and analysis

Interviews were recorded and transcribed verbatim. Transcripts in the local languages were translated into English. Quality checks involved comparing portions of the transcripts against audio recordings. Comprehensive field notes were written after every participant observation, guided by an observation template that included observation of the appearance of the house and its occupants, verbal behavior and interactions, physical behavior and gestures, and care-seeking and caregiving. In addition, a narrative guide informed by the tenets of the theory of practice was used to facilitate conversation. Field notes and transcripts were uploaded to Dedoose software for data management. Data analysis utilized a phenomenological hermeneutic approach, where transcripts were read multiple times and significant statements

Table 1. In-depth and participant observation characteristics.

Pseudonym	Age	Child's Age	Ethnicity	Educational Level	Marital Status	Occupation	Spouse Occupation	Monthly income (Ksh)	No. of Family members	No. of Children	Children <5 yrs
Atiela	26	2	Luo	O level	Single	Business	N/A	9,000	5	2	1
Okumu	38	4	Luo	O level	Married	Business	Housewife	20,000	4	2	1
Pascalia	39	3	Luo	Primary	Single	Business	N/A	3,000	3	2	1
Florence*	33	4	Luo	College	Separated	HRO	N/A	10,000	5	4	2
Mercy	24	4, 1	Luo	O level	Married	Online job	Teacher	8,000	4	2	2
Siri	22	0.5, 3, 5	Luo	Class 8	Married	Housewife	Business	Not known	5	3	3
Achieng	29	2	Luo	Bachelor's Degree	Married	Teacher	Engineer	50,000	32	1	1
Atieno	34	4	Luo	Form Three	Married	Business	Driver	7,000	4	2	1
Patricia	26	4, 5	Luo	O level	Married	Business	Business	20,000	4	2	2
Benta	24	2	Gisu	Class 6	Married	Business	Engineer	9,000	3	1	1
Prisca	32	0.5**, 4**	Luo	Bachelor's Degree	Married	Teacher	HRO	50,000	6	4	4
Akumu	22	2	Luo	Form 3	Married	Business	County employee	5,000	3	1	1
Patrick[P]	25	3	Luo	Form 4	Married	Student	Housewife	20,000	3	1	1
Ochieng[P]	28	4	Luo	College	Married	Business	Business	10,000	4	1	1

*Florence did not consent to participant observation.
[P]Patrick and Ochieng were additional IDIs conducted at the end of the participant observation period.
**Twins.
HRO: Human Resource Office.

Open Research Europe 2026, 5:221 Last updated: 11 FEB 2026

Table 2. FGD participant socio-demographic characteristics.

Characteristics	N[28]
Sex	
Male	15
Female	13
Ages (Years)	
18–24	8
25–34	13
35–44	7
Education	
Primary incomplete	3
Primary complete	6
Secondary incomplete	5
Secondary complete	8
College	6
Ethnicity	
Mganda	2
Luhya	4
Luo	21
Teso	1
Marital Status	
Married	27
Single	1
Occupation	
Informal employment	6
Formal employment	1
Self employed	19
Housewife	2

were highlighted and coded. These codes were then grouped into themes that captured the essence of participants' experiences. The Hermeneutic Circle was employed, with the researcher engaging in a continuous process of interpreting the data, moving back and forth between the parts (individual statements) and the whole (overall understanding), to deepen the interpretation to get the 'essence' of the lived experiences of the participants. Illustrative quotes were used to provide textual descriptions of the qualitative data.

Credibility involved prolonged engagement with informants through participant observation for a period of six months. The multi-method approach facilitated the data triangulation needed to validate the information collected across the two different data sources. To minimize bias, conformability was achieved by reflecting upon interviews and narrative data obtained from FGDs, participant observations, and IDIs before analysis. Two researchers independently analyzed the data and then discussed and reached an agreement. Finally, a homogeneous sample with maximum diversity in demographic characteristics, marital status, education level, and caregiver relationship with the child was ensured to maximize the generalizability of the findings.

Operationalizing Bourdieu's Theory of Practice

Bourdieu's Theory of Practice guided both data interpretation and analytical framing. The concept of habitus was operationalized as caregivers embodied, unapparent dispositions regarding illness causation, symptom recognition, and appropriate care-seeking actions, shaped through intergenerational socialization and everyday caregiving practices. Cultural capital was examined through caregivers' illness knowledge, symptom interpretations, and use of local terminology to describe pneumonia and breathing difficulties. Social capital was explored through caregivers' access

to advice and information from elders, peers and healthcare workers, which shaped explanatory models of pneumonia. The field was conceptualized as the social space where household practices, community norms, and biomedical health systems intersect, often producing competing logics of illness and care.

During analysis, themes were interpreted not only descriptively but also analytically, by examining how caregivers' practices reflected the interaction between habitus, capital, and field. This approach enabled an understanding of pneumonia perceptions as socially structured practices rather than individual knowledge deficits.

Results

Participants' characteristics

The study enrolled 14 caregivers (11 females and 3 males. One female caregiver was the maternal grandmother of the child for in-depth interviews. Refer to Table 1.

More males (n15) than Females (n13) participated in FGDs. Education levels varied considerably, although most of the participants were from the Luo ethnic group. The majority of participants were either self-employed, such as motorcycle taxi riders (Boda Boda), or informally employed, which included working for other people in the informal sector (jua kali sector). Refer to Table 2.

Caregivers' sociodemographic information was utilized to contextualize and interpret the results, providing deeper insights into the factors influencing their health-seeking behavior.

Thematic findings

Local beliefs and perceptions of pneumonia causation by caregivers

Participants across all categories of data collection methods described a range of local beliefs about what causes pneumonia, including exposure to cold, hereditary factors, and pathogens. The most common cause of pneumonia was exposure to cold, while causation by hereditary factors and pathogens was rarely mentioned across all categories. Caregivers also use a variety of terms and phrases to describe pneumonia and its symptoms.

Exposure to cold

All caregivers in this study had the prevailing notion that pneumonia is caused by exposure to cold, cold water, and cold weather. Caregivers often believed that cold could 'enter' the bodies of the children and cause pneumonia if they were not wearing socks, were exposed to cold through their feet, were not dressed warmly enough, or rode on motorbikes and were exposed to cold.

Achieng, a university-educated young mother of a 3-year-old, shared her experience with her son's recent episode of pneumonia. Reflecting on the situation, she attributed her child's illness to his daily use of a motorbike to attend school. In the excerpt below, Achieng explains that she took precautions by dressing her child in warm clothing, believing that this would protect him from the chills of a moving motorbike, especially since her child preferred to sit at the front. However, the motorbike rider strongly objected, insisting that the child should not sit in front of the motorbike because cold air enters through the mouth and nose, potentially causing pneumonia. When the child became sick from pneumonia, Achieng immediately linked the illness to motorbike rides.

- I just thought maybe he was playing and maybe injured his back or chest but at the time he [the doctor] said the chest congested] I thought of pneumonia since I take him to school every day on a motorbike and the motorbike rider always said he should not sit in front because he will get pneumonia and I tell him he is putting on a jacket and a sweater with gloves, but he tells me that it is not enough and cold can get through the mouth or nose and most of the time the child insisted on sitting in front and because I do not want morning arguments, I always let him sit in front. When I was told the chest congestion], what came to my mind was maybe pneumonia. Achieng', IDI

Atiela, a 26-year-old single mother with four levels of education, believes that a child can develop pneumonia when exposed to cold, especially during the cold season. She believed that the cold could enter through the feet of the child and cause pneumonia. During one of the informal interviews, she shared that she had learned about the cause of pneumonia from her grandmother and other people within the community. She explains her belief in the excerpt below.

- I know that it is brought about by the cold. If the child is not kept warm during the cold season, pneumonia can get through even the legs if the child has not worn socks or something like that. Atiela, IDI

Although Okumu, a 39-year-old father of two children, shares the same belief that cold causes pneumonia, he believes that after exposure to cold, the child becomes infected with, or attacked by, pneumonia.

- Yeah, cold. When the weather changes or when the weather is too cold, they say that "Ooh, dress the child well, it will be infected with pneumonia or athung'a [congestion or asthma], so you dress the child well to prevent it from being attacked by pneumonia. Therefore, it is always associated with cold weather and is believed to cause pneumonia. Okumu, IDI

Caregivers shared an understanding that exposure to cold causes pneumonia. The perspective of the mechanism of cold entry to cause pneumonia is conceptualized as something that physically *'enters'* the body through exposed parts and settles in the chest to cause pneumonia. Additionally, some caregivers such as Okumu, viewed cold exposure as triggering an "attack" or infection, aligning their cultural understanding with a mix of lay beliefs and biomedical explanations.

These explanations reflect caregivers' habitus, durable dispositions shaped through everyday experience and intergenerational knowledge, which orient them toward cold exposure as a common sense and morally appropriate explanation for pneumonia, even in the presence of biomedical alternatives.

Hereditary causes

Only a few caregivers mentioned hereditary causes of pneumonia, and this aspect did not emerge in focus group discussions.

Atieno, a 34-year-old caregiver who did not complete secondary school, explained that during the cold season, her son was ill due to a condition that affected his breathing, but she believed that dust had a worse effect on him. Pneumonia recurs frequently in her child, especially under cold and dusty conditions. She had made several visits to the hospital for breathing problems, which doctors told her of as pneumonia, and each time her child was nebulized. Atieno explains that she and her other son have the same condition.

During the IDIs, Atieno explained that the pneumonia ran on her side of the family. She reiterates that what they have is inherent pneumonia, which recurs occasionally. In the excerpt below, Atieno explains that what her child had was strong pneumonia, meaning that he had severe pneumonia.

- I: What has the doctor explained to you is happening to him?
- R: They just told me that he has that pneumonia...strong
- I: Every time you go...
- R: Very much
- I: They tell you that he has pneumonia?
- R: Exactly that. Because it is something I have, my oldest son has it, and he also has it
- Atieno, IDI

During an IDI, Florence, a 33-year-old college-educated mother of four, stated that pneumonia was caused by cold. She thus explains,

- '… .and then again it usually comes during the rainy seasons, the cold...so they told me that when evening reaches the child should wear a sweater, that I should not expose him to the cold. Florence, IDI

On probing further during the same interview, Florence explained that she believed that her son's pneumonia was caused by asthma, which she believed runs in the family. She believed that her child's pneumonia was directly attributable to his father's asthmatic condition. She further explained that when she took her child to the hospital with breathing difficulties, the doctor made a diagnosis of pneumonia/asthma. She averred that she did not know if pneumonia and asthma were the same thing. Florence explains her beliefs as follows:

- R: But, now, for me, what I was thinking is that maybe it is something that someone inherits from their parents.
- I: Ooh in the family?
- R: Yes, in the family
- I: Have you ever heard a story like that or were you just...
- R: No, I heard it from someone. As such, his father had asthma. So, I just knew that it was that... like maybe, it was something that he inherited from his father. So, I do not know if pneumonia and asthma are the same thing. I do not know. Florence, IDI

The attribution of pneumonia to hereditary factors illustrates how caregivers draw on experiential cultural capital, derived from family illness histories, to interpret recurrent respiratory symptoms in children.

Pathogens

During FGDs, caregivers have reported that bacteria can cause pneumonia. Most of them were not sure of this fact and requested further information. Okumu, a 39-year-old father of two and a form four leaver, was the only caregiver who participated in participant observation and attempted biomedical explanation of pneumonia. Okumu explained that pneumonia can be caused by a virus:

- Whatever I know...pneumonia is a what...I think it is a virus...it is an infection. I think this is a viral infection. When it attacks somebody, I know is always dealing with breathing and it is always brought about by cold weather. Okumu, IDI

He explained that viruses hibernate in cold water, and under the same conditions, the environment allows for the growth of viruses. So, when his child got sick with pneumonia, he immediately knew that his child had taken cold water.

- Like taking cold things, like after drinking sugary things you know...you know these cold things like water, any cold water they...it makes some virus...some viruses hibernate in cold things. So, I knew maybe this child has been taking maybe a lot of a cold thing or the...the drinks, you know some of the drinks during fermentation they give room for the viruses to grow because some...most of like drinks they are fermented and you know when something is fermented it is like there is poison inside it. Yeah, you know that fermentation brings about poisoning. So, I knew may be through this cold thing a virus...some viruses mutate...mutate through the cold. Okumu, IDI.

Okumu explained that his child had a persistent wet, rapid, and irritating cough, especially at night, which kept him up. He immediately knew that the cough was caused by the infection, and the infections were always treated with antibiotics. Okumu further narrates that he believes that cough is caused by a virus, which led him to conclude that his child had viral pneumonia. Acting on his own understanding, he gave his child leftover azithromycin, which he explained was meant for an adult, believing it was stronger and more effective.

Okumu has prior experience working in a research organization and maintaining friendships with medical professionals, which has contributed to his relatively advanced knowledge about pneumonia compared to other caregivers. However, Okumu's knowledge of pneumonia causation in the biomedical sense is mostly inaccurate. Okumu accurately referred to pneumonia as a viral infection, which he treated with an antibiotic. Okumu's actions highlight the idea that pneumonia remains a foreign and poorly understood concept.

Focus group discussions revealed that pneumonia can be caused by germs, although the majority of them did not have any knowledge about germs that cause pneumonia.

- I know it is caused by cold, but there is a time I heard from the radio that it is caused by bacteria, but I am not so sure that you will give me a response to that. FGD, Female group

Attempts to invoke biomedical explanations, such as viral or bacterial causation, reflect partial acquisition of biomedical cultural capital that is selectively incorporated into existing explanatory frameworks rather than replacing them.

Terms and phrases used to describe pneumonia

Caregivers who participated in IDIs, informal interviews, and FGDs used diverse terminology and phrases to describe the signs and symptoms of pneumonia. The varying terminologies were 'athung'a' (meaning "congestion"), kore thung'/ ridore (chest congestion) , ang'ieu' (a word used to refer to measles) or 'kahera' (tuberculosis), tuo koyo or midekre mag koyo (illness of the cold), and homa mar kor (illness of the chest).

Of the 14 caregivers who participated in the in-depth interviews, nine were unaware of any name for pneumonia other than the English term 'pneumonia.' Similarly, the majority of participants in the focus group discussions (FGDs) shared the same lack of knowledge.

Atiela, a young single mother, expressed unfamiliarity with any other term for pneumonia. The excerpt below expresses her unfamiliarity with pneumonia terminology:

- I: In this community, what do you call pneumonia commonly?
- R: I just know it as pneumonia
- I: There is no other that you have heard people saying?
- R: No

Okumu, on the other hand, is familiar with other terms describing pneumonia in Dholuo. He believes that different people have various ways of using terms that refer to their symptoms. For instance, he mentions the term *athung'a* which means congestion. He says that they call this measles or *ang'ieu* in Dholuo. Upon further probing, Okumu explains that the community uses the term *ang'ieu* to refer to both measles and pneumonia. Dual naming arises because measles presents with symptoms similar to those of *athung'a*, such as runny nose, chest congestion, or difficulty in breathing and coughing, which are similar to those of pneumonia.

Benta, a 24-year-old mother, shared that she did not know the local name of pneumonia. She explained that in her native community, pneumonia is referred to as *Kwashiorkor.* She reiterates that this is the term that her community uses to describe pneumonia. Similar to Okumu, she says that another terminology used for pneumonia is measles, using English to describe both terms.

In a mixed-gender FGD, one caregiver mentioned that pneumonia is referred to as *athung'a*- a term that is also used to describe asthma. The caregiver shares that she is not sure if *athung'a* refers specifically to asthma or if it includes pneumonia. She says, "I've heard some people calling it *athung'a* but I'm not sure if *athunga* is asthma."

Siri, a 22-year-old mother of three, was not familiar with the term for pneumonia in her local language. Additionally, she is not sure of the illness itself, as she refers to pneumonia as the disease that causes blood to run low. She says that she is unfamiliar with the terminology because she is not conversant with the Luo language.

The absence of a distinct local term for pneumonia and reliance on symptom-based descriptors demonstrate limitations in linguistic cultural capital, constraining caregivers' ability to classify and recognize pneumonia as a discrete biomedical condition.

Terms and phrases used to describe difficulty in breathing

Difficulty in breathing was not mentioned spontaneously by the caregivers as a symptom of pneumonia. Instead, caregivers often conflated it with terms used to describe chest congestion, such as *athung'a, kore thung'*, or *ridore.* These local terms generally refer to congestion or tightness in the chest rather than breathlessness. The study observed that caregivers indicated that they perceived difficulty in breathing as a problem in the chest but struggled to articulate the symptoms clearly. For instance, Okumu had difficulty describing the symptoms; therefore, he described breathing difficulties using sounds as illustrations, despite being multilingual (speaking English, Dholuo, and Swahili). He thus explained:

- The child...when the child breathes, you get that... she loses air. This is not normal. Yeah, there is a sound that it produces like... [Imitates breathing] like someone siphoning something or a trumpet or like..., which is very abnormal. There was no smooth breathing. Okumu, IDI

Similarly, Atiela, another caregiver, expressed uncertainty over whether her child had pneumonia based on how she breathed while sleeping.

- In the past, I used to suspect, because she (daughter) used to have...but I do not think she had it. She used to breathe as if she wanted to...like when she was inhaling [imitates heavy breathing] while she was sleeping. So I wondered if my child had pneumonia or if she was okay. Atiela, IDI

The absence of breathing difficulty terminology demonstrates limitation of the linguistic cultural capital. Although caregivers recognized abnormal breathing through embodied observation, difficulties in naming and classifying the symptom constrained their ability to interpret its clinical significance.

Discussion

Drawing on Bourdieu's Theory of Practice, caregivers' perceptions of pneumonia are best understood as socially structured practices rather than informational deficits. The persistence of cold exposure as a dominant causal explanation reflects habitus, embodied dispositions shaped by environmental experience, caregiving practices, and intergenerational transmission of knowledge. Caregivers' selective incorporation of biomedical explanations illustrates how new forms of cultural capital are negotiated within existing frameworks rather than fully displacing them. These dynamics unfold within a health field characterized by unequal access to biomedical authority, fragmented communication, and overlapping illness categories, shaping how pneumonia is interpreted and acted upon in everyday life. Consistently, caregivers had a shared perception of pneumonia, indicating a common understanding derived from their cultural and social capital, which reflects the environment in which they live. Similarly, past literature has detailed a range of culturally specific beliefs about pneumonia in various contexts.[10,27,37] These findings highlight the diversity in community-level perceptions of pneumonia causation across different regions influenced by social and cultural beliefs in their given social environment.

Our study revealed that caregivers had to navigate competing explanations of pneumonia, balancing traditional cultural knowledge with an emerging, though limited, biomedical understanding. While traditional beliefs about the causes of pneumonia are prominent, biomedical explanations are gaining traction- supplementing rather than replacing traditional beliefs. The study findings indicate the dynamic nature of caregivers' knowledge as they integrate new information, such as acknowledging infections into their existing frameworks and how cold causes pneumonia. However, the predominance of cold exposure in caregivers' explanations demonstrates the resilience of culturally ingrained beliefs (habitus) even when exposed to alternative explanations. For example, generational knowledge of the effects of cold weather on pneumonia reinforces the idea of protecting children with warm clothing. Their disposition is embedded in their collective worldview and everyday practices and explains why this belief persists across caregivers of varied educational levels and social statuses.

Pneumonia causation through cold exposure has been documented in various studies across sub-Saharan Africa and South Asia. These studies consistently revealed that caregivers strongly believed that pneumonia was caused by cold weather, a belief that was carried from one generation to the next.[9,10,27,34,38,39] However, in the current study, consumption of cold foods and drinks as a cause of pneumonia was not established. In Lagos, Nigeria, most caregivers noted the dangers of exposing children to cold, specifically mentioning bathing practices, either at the wrong time of the day or with cold water.[33] In contrast, in Mozambique, the cause of an episode of probable pneumonia was sometimes unknown to caregivers for various reasons that were attributed to probable pneumonia. In this context, pneumonia was caused by disregarding prescribed sexual practices, asthma, and cold weather.[11] Despite these past studies' failure to use a theoretical framework, their findings align with Bourdieu's concept of cultural capital, particularly in how caregivers' knowledge and beliefs are shaped by their social and cultural context. This helps to explain the predominance of exposure to cold as a cause of pneumonia across different communities.

Exposure to cold as a cause of pneumonia was constructed and negotiated within the cultural context of the study's community.[10] This aligns with Bakare *et al.*, who posited that illness knowledge is socially constructed.[37] Within this context, pneumonia is attributed to natural causes that are shaped by cultural beliefs. These natural causes of ill health were constructed from the effects of the physical environment, such as exposure to cold and infections.[9,10,27,34,38,39] Although infection is recognized to some extent as a cause of pneumonia, this aspect has not been fully explored in studies conducted with community members. Past literature like the present study does not fully reconcile biomedical explanations of pneumonia with deeply ingrained cultural beliefs about the cold as a primary cause.

According to Colvin *et al.*, there are different theories of causation, such as humoral models, which describe illnesses resulting from an imbalance in natural forces, such as excessive heat or cold.[10] Other theories of illness causation are

extramarital affairs and pollution, which are believed to cause diarrhea in children, while convulsions are believed to be caused by supernatural forces. Biomedical theories of health coexist and operate in complex and dynamic relationships with other local theories of health.[10] For example, caregivers recognized the co-occurrence of a sunken fontanelle and diarrhea but interpreted causality through local illness categories, attributing these signs to a condition known as *nhoua* or *chipande* rather than understanding the sunken fontanelle as a consequence of diarrhea-related dehydration. In the present study, caregivers predominantly attributed pneumonia to natural causes, particularly environmental exposure and infections, which were understood as complementary rather than contradictory explanations. From a theory of practice perspective, this reflects caregivers' habitus, in which socially embedded understandings of the natural environment shape illness interpretation and everyday caregiving practices. These causal logics are produced and reproduced within a social field where biomedical knowledge is unevenly accessible and selectively incorporated, resulting in hybrid explanatory models that guide health-seeking practice.

This study revealed an interplay between asthma as a cause of pneumonia and hereditary pneumonia. Caregivers navigated two coexisting explanatory logic: that pneumonia is caused by cold weather, an embodied, socially constructed disposition reinforced through everyday practices, and pneumonia as linked to asthma, learned through personal and familial illness experiences. Within this framework, the distinction between asthma and pneumonia was unclear, as. overlapping in symptoms between the two conditions, particularly breathing problems, may contribute to this confusion. Without clear guidance from healthcare professionals, caregivers may struggle to differentiate between asthma (a chronic condition often influenced by genetic factors) and pneumonia. This confusion can lead to misrecognition, where symptoms of one condition are mistaken for those of the other, potentially impacting the child's care and treatment.

Previous studies have identified asthma as a perceived cause of pneumonia.[11,27] However, the findings from this study suggest a more nuanced relationship, which highlights parental asthma as a hereditary condition that may directly contribute to the causation of pneumonia in children. While caregivers in Abbey *et al.*'s.[27] study viewed the cause of pneumonia as straightforward, the present study revealed a more complex causal interaction that confuses caregivers. Caregivers who mentioned parental asthma as a cause of pneumonia were uncertain whether pneumonia was the same as asthma or whether asthma directly caused it, reflecting a lack of clarity regarding the connection between the two conditions. Similar overlaps between pneumonia and asthma were reported by King *et al.* (2022).[40] In a study conducted in Malawi, caregivers often mentioned that their children were '*born with asthma'*. Additionally, there was frequent uncertainty regarding whether their children were suffering from asthma or pneumonia. This ambiguity, also evident in the current study, reflects gaps in caregivers' habitus, embodied and experiential knowledge shaped by prior illness encounters and social learning. Although asthma and pneumonia are clinically distinct, their overlapping respiratory symptoms are interpreted through symptom-based classifications grounded in everyday practice. In the absence of clear and consistent biomedical communications, caregivers draw on available cultural and social capital to make sense of recurrent breathing problems, resulting in blurred diagnostic boundaries that may influence care-seeking and treatment decisions.

Explanations of pneumonia, such as its association with viral infections, reflect an attempt to apply biomedical reasoning. However, this understanding is incomplete and interwoven with local beliefs about illness causation, such as the idea that viruses hibernate in cold water or mutate through cold drinks. These beliefs demonstrate how caregivers' understanding is influenced by a combination of biomedical knowledge and sociocultural perceptions mediated by their social environment. However, caregivers sociocultural knowledge has taken a predominance in their explanation of pneumonia. Caregivers narratives reflect the influence of ingrained dispositions, shaped by limited formal education and cultural beliefs, along with access to social capital through interactions with medical professionals. Consistent with previous studies,[28,34,37,41] most caregivers demonstrated limited understanding of biomedical causes of pneumonia. Inaccurate biomedical knowledge of the causes of pneumonia can have implications for prevention and actions taken by caregivers when a child becomes ill with pneumonia.[27] While some studies have identified poor biomedical knowledge of pneumonia, the underlying issue appears to be the disconnect between symptom recognition and recognition of its link to pneumonia. As a result, caregivers may struggle to translate fragmented biomedical knowledge into timely and appropriate preventive or care-seeking actions when a child becomes ill.

Caregivers provided terms based on the perceived causation of illness. For instance, a few caregivers referred to pneumonia as *tuo koyo* (illness of the cold). The findings of this study are consistent with those of Kilimanjaro, Tanzania, Ghana, and Central Kenya,[27,42,43] where caregivers described pneumonia symptoms literally but did not have a local name for the illness. For instance, *kore thung'/ridore* refers to a congested chest that reflects a symptom-based understanding of the illness. These terminologies reflect caregivers' habitus, in which illness is recognized and named through everyday sensory experience and culturally shared explanatory frameworks. Hildenwell highlighted the complexity of respiratory symptom terminology, noting that some terminologies were literal translations that did not

necessarily focus on the visible symptoms. For instance *'enhonhi'* which literally means *'bird'* was used because a sick child's hand and foot positioning resembled a bird-reflecting the belief that the illness is caused by birds.[41]

A study conducted in Mozambique has revealed a similar understanding of respiratory illnesses. In their context, *Xifuva* and *tosse* most closely resonated with respiratory illnesses: tosse, an illness itself, or a symptom of another illness such as *xifuva* (chest).[11] An overlap was also observed in this study, whereby one term was used to describe an illness as well as a symptom of an illness. For instance, *athung'a* is an illness as well as a symptom of measles. These terminological overlaps point to a complex cultural and linguistic framework for understanding illness. Past literature[11,27,41–43] and the current findings align with Bourdieu's concept of cultural capital, which shapes current knowledge and practice. The lack of distinct pneumonia terminologies indicates a limitation in the cultural practices surrounding pneumonia disease classification and recognition.

The use of *ang'ieu* to refer to pneumonia has significant implications for health-seeking behaviors. As *ang'ieu* is traditionally associated with measles, caregivers may conflate the two illnesses and potentially misinterpret the severity and appropriate treatment pathways. In a previous study in Western Kenya, measles was perceived as an illness that should not be treated with hospital medications, particularly injections, because of the cultural belief that such treatments may result in death.[44] When pneumonia is framed within this illness category, caregivers' habitus, shaped by inherited cultural classifications, prior collective experiences and economic capital, may orient them toward traditional remedies and away from biomedical care. This misclassification can delay timely treatment and complicate clinical management.

Caregivers' understanding of breathing difficulties reveals a significant limitation in their recognition and interpretation of symptoms. Key clinical concepts such as fast breathing and chest wall in-drawing, which are essential indicators of difficulty in breathing, remain largely unknown or poorly understood. Our findings are similar to those of previous studies, which also found that there was no specific word to describe breathing difficulty.[27,43] However, Hildenwall *et al.* reports a literal translation '*tawera bulundji'* to mean *'difficult breathing'* that was used to refer to difficulty in breathing. They acknowledged difficulties for caregivers in establishing the term that refers to fast breathing and chest-wall in-drawing as caregivers were only able to provide terminology after viewing a video of a child with difficulty in breathing.[41] These findings point to a limitation of linguistic cultural capital, which constrains the present linguistic knowledge about critical pneumonia symptoms.

Study limitations

This study has a few limitations. There was a possibility of biased or skewed findings due to the subjective nature of the responses and partly because of participants' desire to give socially acceptable answers. However, the presence of the researcher within the community for six months influenced the trusting relationship between caregivers and the researcher. This enabled the researcher to verify the information obtained from study participants. Furthermore, owing to the interactive nature and observations made during the study, the researcher was able to validate earlier responses provided by the study participants. The study conducted sufficient training for the research assistants. These strategies were sufficient to reduce potential biases in the data collection, analysis, and interpretation. The study used qualitative research methods; therefore, the findings from this research cannot be used to make inferences and causality about relationships in observed variables. The study applied Bourdieu's Theory of Practice to strengthen analytical depth. However, theoretical interpretation is inherently shaped by the researcher's positionality. Despite reflexive engagement throughout data collection and analysis, alternative theoretical lenses may have yielded different interpretations of caregivers' narratives and practices.

Conclusion

This study demonstrates that caregivers' understandings and management of childhood pneumonia are shaped by socially embedded practices rather than individual knowledge deficits. Applying Bourdieu's Theory of Practice shows how habitus, different forms of capital and social environment structure how symptoms are interpreted, named, and acted upon within everyday caregiving. Caregivers do not reject biomedical explanations; instead, they selectively incorporate them into existing sociocultural frameworks, producing hybrid explanatory models that influence care-seeking pathways. These findings highlight the need for pneumonia interventions and health communication strategies that engage with local illness categories and strengthen provider–caregiver communication, rather than relying solely on information dissemination. Embedding such approaches within health systems may improve early recognition, timely care-seeking, and treatment outcomes for childhood pneumonia.

Disclaimer

The views and opinions expressed in this article are those of the authors and do not necessarily reflect the official policy or position of any affiliated agency of the authors or funder. The authors are responsible for the results, findings, and content of this article.

Ethics and consent

Ethical approval was obtained from the Maseno University Scientific and Ethics Review Committee (MUSERC) ref number MSU/MUSERC/01330/24 and the National Commission of Science, Technology and Innovation (NACOSTI) ref number NACOSTI/P/24/34015. Written informed consent was obtained from all participants enrolled in this study.

Data availability

The data provided cannot be made publicly available due to concerns regarding participant confidentiality and the potential for identification of individuals due to the small sample size. Maseno University Scientific and Ethics Review Committee (MUSERC) state that anonymized data can be shared upon requests via the corresponding author SHN on email sarangere@gmail.com.

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Open Peer Review

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Version 1

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This is a **solid, well-executed qualitative study** with high relevance to child health, anthropology, and implementation research. With stronger theoretical integration and reflexive analysis, it has the potential to become a **high-impact contribution** to socio-cultural studies of childhood pneumonia. This ethnographic study offers rich insights into caregivers' pneumonia perceptions and is methodologically sound. However, scientific rigor requires clearer operationalization of Bourdieu's Theory of Practice, correction of "mixed methods" terminology, stronger reflexivity, and explicit linkage of findings to theory. Addressing these will substantially strengthen analytical depth and theoretical contribution.

Is the work clearly and accurately presented and does it engage with the current literature?
Yes

Is the study design appropriate and is the work technically sound?
Yes

Are sufficient details of methods and analysis provided to allow replication by others?
Partly

Are all the source data and materials underlying the results available?
Yes

If applicable, is the statistical analysis and its interpretation appropriate?
Not applicable

Are the conclusions drawn adequately supported by the results?
Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Anthropology, cultural undestanding Childhood pneumonia, Public health, sexuality, Reproductive Child Health, Infectious diseases

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Comments on this article

Version 1

Author Response 20 Jan 2026

Sarah Ngere

Response to reviewer *Thank you for the insightful comments and observations. We have reviewed the article based on the comments, see the detailed responses below and a revised article with changes.*

Reviewer concern : *Clearer operationalization of Bourdieu's Theory of Practice,*
The use of Bourdieu's Theory of Practice required clearer operationalization to demonstrate how theoretical concepts informed analysis rather than serving only as a framing device.
Response: *We agree with this observation and have revised the manuscript to explicitly operationalize Bourdieu's Theory of Practice within the data analysis process. Specifically, we added a new subsection under Data management and analysis titled* ***"Operationalization of Bourdieu's Theory of Practice."*** *In this section, we clearly define how key theoretical concepts, habitus, cultural capital, social capital, and field, were conceptualized and applied during analysis. Habitus is now operationalized as caregivers embodied, unapparent dispositions toward illness causation, symptom recognition, and care-seeking. Cultural capital is examined through caregivers' illness knowledge, symptom interpretations, and local terminology, while social capital is explored through access to advice and information from social networks and health system actors. The field is conceptualized as the social space in which household practices, community norms, and biomedical health systems intersect. In addition, we revised the Results and Discussion sections to explicitly link major empirical findings to these theoretical concepts, demonstrating how caregivers' perceptions and practices reflect the interaction between habitus, capital, and field rather than individual knowledge deficits. These revisions strengthen the analytical depth and clarify the study's theoretical contribution. The authors have strengthened the reflexive process by moving beyond surface level descriptions to a deeper level analysis.*

Reviewer concern
The manuscript used the term "mixed methods" inaccurately.
Response: *We appreciate this clarification and have corrected the terminology in the manuscript. The study is now consistently described as an ethnographic qualitative study drawing on multiple qualitative methods, rather than a mixed-methods study. Specifically, we revised the Abstract and the Study Design section to accurately reflect the use of in-depth interviews, focus group discussions, and participant*

observation as complementary qualitative methods.

Reviewer concern
Explicit linkage of findings to theory Reviewer concern
Findings required more explicit linkage to Bourdieu's Theory of Practice to strengthen theoretical contribution.
Response: *In response, we revised the Results and Discussion sections to make the theory–data linkage explicit. Brief analytic statements have been added at the end of each major thematic subsection in the Results to demonstrate how empirical findings illustrate habitus, cultural capital, social capital, and field dynamics. The Discussion section was also strengthened by explicitly interpreting caregivers' pneumonia perceptions as socially structured practices shaped by durable dispositions and unequal access to biomedical cultural capital, rather than as isolated beliefs or misconceptions. These revisions clarify how the findings extend the application of Bourdieu's Theory of Practice to understanding childhood pneumonia perceptions and care-seeking behavior in this context.*
Conclusion *We are grateful for the reviewer's insightful feedback. Addressing these points has significantly improved the manuscript's theoretical clarity, methodological precision, and analytical depth. We believe the revised manuscript now more clearly demonstrates its contribution to anthropological understandings of childhood pneumonia and health-seeking behavior.*

Competing Interests: No competing interests were disclosed.