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"A child with severe pneumonia cannot feed, causing malnutrition": exploring health worker and caregiver perspectives and practices for mitigating malnutrition among children with severe pneumonia, a case of Uganda

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Abstract

Background Severe pneumonia remains the leading cause of morbidity and mortality among children worldwide. Severe pneumonia causes death during hospitalization, and survivors are prone to malnutrition after discharge from the hospital. The World Health Organization and United Nations International Children's Fund recommend 'continued' feeding following a severe pneumonia illness without specific recommendations on nutritional support. This recommendation could influence health workers' and caregivers' nutritional practices. This study aimed to explore the perspectives and practices of health workers and caregivers for mitigating malnutrition among children with severe pneumonia.

Methods We conducted a cross-sectional qualitative study between June and November 2021 among health workers and caregivers of children hospitalized with severe pneumonia at Mulago National Referral Hospital in Kampala, Uganda. The data were collected via focus group discussions involving 17 caregivers and key informant interviews with 12 health workers and were analyzed via the content-thematic analysis approach. Both manual coding and Atlas Ti software were used to support the analysis.

Results Health workers and some caregivers were aware that severe pneumonia predisposes children to malnutrition to various degrees, citing reduced appetite, difficulty breathing, persistent vomiting, and increased metabolic demands as pathways. Caregivers increased breastfeeding and utilized nutrient-rich foods to prevent malnutrition, while health workers applied caregiver education and tailored pneumonia management strategies, including following available guidelines and working with nutritionists.

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Conclusion Severe pneumonia is recognized among health workers and some caregivers as a risk factor for malnutrition. However, mitigating strategies are not uniformly practiced by caregivers and could be enhanced by effective health education and sensitization. More specific guidelines could further reinforce the beneficial practices of health workers managing children with severe pneumonia who are not severely malnourished, and improve treatment outcomes.

Keywords Pneumonia, Malnutrition, Caregivers, Health workers, Uganda, Qualitative

Background

Severe pneumonia is the leading cause of morbidity and mortality among children worldwide. In Africa, the incidence of severe pneumonia is estimated to be one episode per 3 child years, and the fatality rate is estimated to be 9.8% [1]. In 2013, Liu et al. estimated that 1 in 150 children under five years of age died of severe pneumonia [2]. Pneumonia is estimated to account for 14% of all-cause mortality in children under 5 years of age [3]. Children with pneumonia have a greater risk of dying, particularly when they develop severe acute malnutrition (SAM) [2, 4]. In addition to the concerning statistics on inpatient mortality from severe pneumonia, many children are reported to die following discharge [5]. A study by Ngari et al. conducted in Kenya among hospitalized children revealed that 364 (8.7%) children died in the hospital and following discharge. Post-discharge mortality was significantly greater among children previously admitted for severe pneumonia than among those with other diagnoses, with a hazard ratio of 2.5 (95% Cl 1.2, 5.3), and the majority (52%) of deaths were attributed to malnutrition [6]. Increased mortality from respiratory illnesses is linked to lower mid-upper arm circumference [6, 7].

Severe pneumonia is a catabolic illness resulting from the release of stress hormones to increase energy production and support the ability to breathe. Body stores are utilized for metabolism, resulting in rapid skeletal muscle breakdown and cachexia or 'wasting' [8]. Furthermore, children lose their appetite, resulting in reduced intake during pneumonia episodes and in the recovery period. These processes increase the risk of developing severe malnutrition through the loss of body fat and muscle. Severe malnutrition in turn increases the risk of severe infections such as severe pneumonia and death (a vicious cycle, as summarized in Fig. 1 below).

The World Health Organization (WHO) and United Nations Children's Fund (UNICEF), under the 'Treat' element of the Protect, Prevent and Treat Framework for Severe Pneumonia Treatment, recommend 'continued' feeding to try to mitigate the risks of developing severe acute malnutrition in children with severe pneumonia [9]. However, they do not give any specific recommendations or guidance on nutritional support for children hospitalized for severe pneumonia despite their higher nutritional demands during the illness and recovery. The lack of clear guidance could result in a varying understanding of the deadly interaction between pneumonia and malnutrition and influence health workers' and caregivers' practices when caring for children with severe pneumonia.

As part of the integrated management of childhood illnesses (IMCI), health workers offer general feeding advice to caregivers of sick children. However, the majority of health workers in Uganda do not assess current feeding before providing advice to caregivers of children with severe illnesses such as severe pneumonia [10]. This could reveal a lack of understanding of the increased risk of developing malnutrition associated with severe illness. As a result, health workers may not emphasize improved nutritional practices sufficiently. Even though caregivers do not always practice everything advised by health workers, it is clear that their practices are shaped in some ways by health workers' opinions.

Appreciating the understanding and nutritional practices of caregivers and health workers when caring for children with severe pneumonia is crucial for designing educational materials to interrupt the vicious cycle between pneumonia and malnutrition. This study aimed to explore the perspectives and practices of health workers and caregivers for mitigating malnutrition among children with severe pneumonia.

Methods

Study design and setting

We conducted an exploratory qualitative study at the pediatric department of the Mulago National Referral Hospital in Kampala, Uganda. Mulago Hospital is the largest public hospital in Uganda and serves as a teaching facility for Makerere University College of Health Sciences. Healthcare for the urban and peri-urban catchment population attending the hospital is provided by nurses, medical officers, senior house officers (residents in pediatric specialist training), and pediatricians.

Study participants

We invited nurses, medical interns, medical officers, pediatric residents, and pediatricians actively involved in the daily management of pediatric patients with severe pneumonia admitted to both the emergency unit and the pulmonology ward during the study period to participate in the study. These health workers play integral roles in

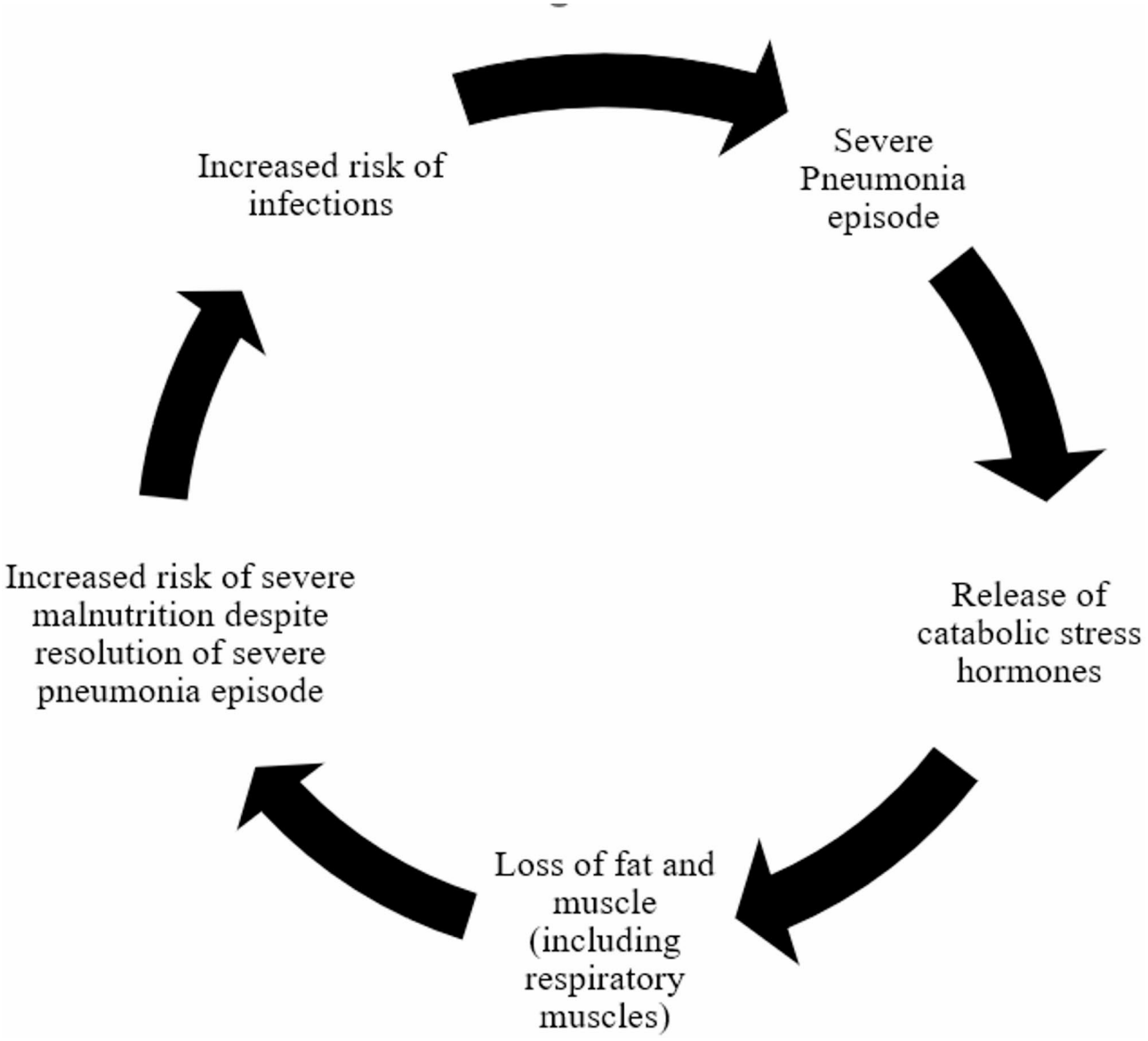

Fig. 1 Cyclical relationship between severe pneumonia and severe malnutrition

the comprehensive care of children, including initial assessment for admission, emergency interventions, and ongoing monitoring and treatment throughout their hospitalization until discharge. Additionally, caregivers (parents or guardians) responsible for the day-to-day care of children hospitalized with severe pneumonia during the study period were also approached to participate in the study.

Data collection

After providing informed consent, we conducted three focus group discussions (FGDs), 1 for males (comprising 4 caregivers) and 2 for females (comprising 6–7 caregivers). The study team established a rapport with the study participants before commencing each FGD, fostering an environment conducive to open dialog. The FGDs were conducted in English and/or Luganda (the common local language) as preferred by the participants by an experienced moderator and note taker using pretested discussion guides with open-ended questions (Supplementary file 1). All FGDs were audio-recorded using a digital recorder. Additionally, we conducted 12 key informant interviews (KIIs) with health workers using pretested interview guides with open-ended questions. The interviews were audio-recorded using a digital recorder and conducted in English. All FGDs and KIIs occurred in a private room at the hospital. Preliminary data analysis was conducted as the data collection process was ongoing until a point of saturation where no new information was generated by further data collection.

Table 1 Participant characteristics

Characteristic	Number (Female)
Caregivers	17 (12)
Health workers	
Nurses	3 (3)
Medical officers	4 (2)
Senior House Officers	5 (3)

Data analysis

Audio recordings from the KIIs and FGDs were transcribed verbatim by three members of the research team, and those that were obtained in Luganda were translated. The transcripts and audio recordings were reviewed to ensure accuracy. We reviewed the transcripts alongside the field notes, capturing the points of interest and relevant information. The data were analyzed using the content-thematic analysis approach [11]. Upon initial coding of the transcripts, a codebook was developed and refined during data collection as recommended by Braun et al. [12]. The codebook was used to deduce information from the transcripts to answer research questions. All disagreements were discussed, and a consensus was reached on the overall analysis. Both manual coding and Atlas Ti software were used to support the analysis [12].

Results

We interviewed 12 health workers and 17 caregivers, the majority of whom were female (Table 1). We found that caregivers and health workers had different perspectives and practices related to nutrition among children with severe pneumonia.

Caregivers' and health workers' perspectives

While caregivers had some understanding of pneumonia as a risk factor for malnutrition, health workers had a more comprehensive understanding of the significant risk of developing malnutrition among children with severe pneumonia.

Pneumonia symptoms cause problems with feeding

Many caregivers noted that the symptoms of pneumonia, such as difficulty breathing, coughing, and vomiting, significantly hindered the child's ability to feed adequately. They emphasized that a child's inability to consume sufficient nutrients due to these symptoms could lead to weight loss and subsequent malnutrition. For instance, one caregiver stated,

> *"Pneumonia comes with a lot of fever, and I noticed he was vomiting and not eating anything, had no appetite. I noticed changes in his physical appearance; then, I knew something was wrong. By the time I came to the hospital, it was already malnourished." (Female, parent)*

Another caregiver reported,

> *"If a child doesn't feed well, doesn't want whatever you give them, how will they get the energy? When you put him on the breast to suckle, they cannot because they are not breathing well." (Female, guardian)*

Feeding problems increase the risk of malnutrition

Additionally, caregivers discussed the challenges associated with breastfeeding and nutrient intake in children with pneumonia. They described situations where children were unable to breastfeed properly due to respiratory distress, further exacerbating the risk of malnutrition. As some caregivers explained,

> *"With pneumonia, because the child takes a long time without eating, they lose a lot of weight in just one week. The difficulties in breathing and sneezing all the time quicken the child to become malnourished." (Male, parent)*

> *"... I noticed changes in his physical appearance, then I knew something was wrong. By the time I came to the hospital, it was already malnourished." (Female, parent)*

This sentiment was echoed by others who observed changes in their child's feeding patterns and physical appearance, prompting concerns about malnutrition.

Inadequate feeding and increased metabolic needs

Health workers recognize that children with severe pneumonia often have increased metabolic demands, yet they experience challenges in feeding adequately due to respiratory symptoms. Health workers emphasized the importance of addressing these challenges promptly to prevent malnutrition. For example, one health worker explained,

> *"If a child has pneumonia, they will have increased metabolism because they are using a lot of energy to breathe, they have fever, all of which take up the energy and the glucose from their bodies. They need to feed more than a normal child, and if they don't, then they become malnourished." (Senior House Officer, male)*

Delays in seeking medical care

Health workers observed that delays in seeking medical care for children with pneumonia could exacerbate the risk of malnutrition. They noted instances where caregivers underestimated the severity of pneumonia symptoms or relied on alternative medicines instead of seeking timely medical attention. Consequently, the

patient presented to the hospital with advanced pneumonia and coexisting malnutrition. One health worker highlighted,

> *"... sometimes mothers stay at home even when the baby has pneumonia, and they still treat with other alternative medicines at home. Therefore, the child will lose appetite and weight, and by the time they come to the hospital, they are already malnourished." (Nurse, female)*

Recurrence of pneumonia

The health workers also highlighted the recurrence of pneumonia episodes as a significant risk factor for developing malnutrition in children. Pneumonia weakens children's immunity and increases the likelihood of developing pneumonia or other infections, increasing the risk of malnutrition. Some health workers expressed this concern in the excerpts below:

> *"Pneumonia increases the risk of getting malnourished more if a child keeps on getting recurrent pneumonia. With recurring infection, the body demands a lot, and if not provided, it also leads to malnutrition." (Medical officer, male)*

> *"Most times, this is not a single pneumonia episode. Pneumonia that leads to malnutrition follows recurring symptoms causing recurrent admission." (Senior House Officer, female)*

Caregivers' and health workers' practices

Caregivers demonstrated diverse nutritional practices for children with severe pneumonia. Several key themes emerged from the data, illustrating caregivers' efforts to provide balanced diets and their reliance on alternative medicines. On the other hand, health workers demonstrated a multifaceted approach to managing children with severe pneumonia, integrating nutritional support strategies and working with nutrition specialists to optimize patient outcomes and prevent malnutrition complications.

Increasing breastfeeding

Many caregivers prioritized breastfeeding, particularly for young children, to provide the necessary energy given its nutritional benefits. They continued to offer breast milk despite the challenges related to the children's respiratory symptoms. For instance, one caregiver stated,

> *"To prevent my child from becoming malnourished, I breastfeed him. He breastfeeds well, but I haven't started him on solids because he is still young. However, when he is breastfeeding, you see that he is breathing heavily." (Female, parent)*

Utilization of nutrient-rich foods

Caregivers described their efforts to provide nutrient-rich foods to ensure that their children received adequate nutrition. They emphasized the importance of cooking diverse foods and incorporating nutritious ingredients into their children's diets to boost immunity and prevent malnutrition. For example, one caregiver mentioned,

> *"You need to feed them well (balanced diet) to avoid malnutrition like cooking for him different foods so that his immunity can be boosted." (Male, parent)*

Another caregiver mentioned:

> *"I managed to give him porridge with different types of flour that I mix, then I also give him milk. Sometimes I give him soup of fish, beef or beans with matooke or posho. You need to feed them (children) well so that their immunity can be boosted to avoid malnutrition." (Female, parent)*

Beliefs in alternative medicines and traditional practices

Some caregivers attributed their children's illnesses to cultural or traditional causes and preferred seeking care from traditional healers or using herbal remedies instead of seeking timely medical attention at hospitals. Some caregivers explained:

> *"In some villages people who have their traditional norms, even when a child is visibly having pneumonia with a terrible fever and coughing, they will relate it to some cultural traditional things." (Female guardian)*

> *"Actually, when you meet these people, they will tell you that it is not malnutrition or pneumonia. They call the disease "KIDUGAVU" [traditional], which they believe is a demonic thing, and they never bring these children to the hospital." (Male, parent)*

This reluctance to seek timely medical care often results in children with severe pneumonia presenting with malnutrition. Despite experiencing negative outcomes associated with alternative medicines, some caregivers continued to seek alternative care, as expressed in the excerpt below:

> *"Most caregivers believe in seeking care from traditional healers rather than coming to the hospital. This places the children with severe pneumonia at risk of becoming malnourished." (Female, parent)*

Education and guidance for caregivers

Health workers actively engaged in educating caregivers about proper feeding practices, hygiene, and food safety

measures to promote optimal nutrition and prevent malnutrition recurrence. Despite their efforts, they noted challenges in caregiver adherence to recommendations, particularly regarding breastfeeding and dietary diversity. This discrepancy underscores the need for ongoing education and support for caregivers to ensure the effective implementation of nutritional interventions.

> *"We educate the mothers on how to feed the children, but sometimes the mothers do not comprehend when you tell them to breastfeed the child or feed the child on a specific meal; they are reluctant. They are only after getting the treatment for pneumonia and the child becomes better, but in the end, the child becomes malnourished." (Nursing Officer, female)*

Managing pneumonia in ways that mitigate malnutrition risk

Health workers demonstrated adherence to established clinical guidelines and protocols for managing children with severe pneumonia, aiming to address the risk of malnutrition effectively. They emphasized the importance of following both local and global guidelines, such as those provided by the World Health Organization (WHO) and Uganda clinical guidelines, in guiding their clinical decision-making and treatment approaches even though they are not specific to children with severe pneumonia.

> *"We follow clinical management guidelines like the WHO and the Uganda clinical guidelines. They have been helpful in planning the next course of action. Of course, you can also use your clinical judgment to determine what the patient needs." (Medical Officer, female)*

In cases where children were unable to feed orally due to severe respiratory distress, health workers employed alternative nutritional support strategies, such as nasogastric (NG) tube feeding. They highlighted the importance of ensuring adequate nutritional intake for children with severe pneumonia, even when oral feeding was not feasible, to prevent malnutrition and support recovery. One health worker described the following:

> *"In regard to nutrition support for children with severe pneumonia and respiratory distress, we feed them using the nasogastric tube. This way we ensure the child is fed while reducing the risk of aspirating." (Senior House Officer, male)*

Working with nutritionists and referrals

Health workers worked closely with nutritionists and specialized nutrition units to manage malnourished patients comprehensively. They referred complicated cases to these units for further assessment and management, ensuring that children received appropriate nutritional support tailored to their individual needs, as expressed by one health worker in the excerpt below:

> *"For children who appear severely malnourished, we assess them. If they need additional support, we send them to the nutrition center." (Nursing officer, female)*

Health workers acknowledged challenges in routinely screening and assessing children with severe pneumonia for malnutrition during hospitalization. They typically rely on clinical signs of malnutrition, which leaves many malnourished children undiagnosed.

Discussion

This study explored caregivers' and health workers' perspectives and practices for mitigating malnutrition among children with severe pneumonia. We found that caregivers perceived severe pneumonia as a risk factor for malnutrition among children through the effect of symptoms on feeding and how these symptoms translated into malnutrition. Caregivers tried to increase breastfeeding and utilize nutrient-rich food to reduce the risk of their children developing malnutrition. However, the allure of alternative medicine and traditional remedies, while well-intentioned, often inadvertently increased the risk of malnutrition. Health workers expressed that pneumonia increases the risk of malnutrition via its effects on feeding as well as increasing the body's metabolic needs. Caregivers and health workers reported that delays in seeking medical care and recurrent pneumonia episodes further increased this risk. Health workers mentioned that they educate and guide caregivers on feeding their children and managing pneumonia in ways that mitigate the risk of malnutrition. Working with nutritionists and appropriate referrals were highlighted as essential components in addressing this multifaceted challenge.

The finding that some caregivers not only expressed a good understanding of the risk of malnutrition in children with severe pneumonia but also took deliberate steps to mitigate it by improving diet and breastfeeding more frequently was interesting. Unfortunately, this might not necessarily reflect what caregivers do to support their children after discharge, while away from the watchful eyes of health workers. Parents and guardians often quickly return to work to provide for their families. The fact that some caregivers used alternative medicine and traditional practices instead of taking their sick children to the hospital is not surprising. This is because of findings from other sub-Saharan African countries where even when adequate knowledge of severe pneumonia symptoms was displayed, appropriate health-seeking behavior was as low as 30% [13]. The health workers felt that some caregivers did not fully understand the

increased risk of developing severe malnutrition among children with severe pneumonia. As a result, they delay seeking medical attention, or even worse, seek alternative forms of care altogether, which is common in developing countries [14]. Inadequate knowledge and understanding of pneumonia and associated risks by caregivers significantly contribute to childhood mortality [15]. Furthermore, caregivers who seek care elsewhere miss the opportunity to interact with health workers to obtain valuable information on severe pneumonia and malnutrition that could help break the cycle. Gaps in caregiver knowledge on the general principles of infant and young child feeding increase the likelihood of harmful nutritional practices in sick children [16]. This could significantly increase the risk of malnutrition among children with pneumonia and subsequently increase childhood mortality [17, 18]. Infant and young child feeding education at all interaction points with health workers could fill gaps in caregiver knowledge and practices.

Health workers across all levels of expertise demonstrated a comprehensive understanding of the detrimental link between severe pneumonia and malnutrition, recognizing the intricate mechanisms and pathways at play. However, this did not seem to specifically affect the way they managed patients with severe pneumonia, focusing on reducing the risk of progression to severe malnutrition. Although health workers have expressed a clear understanding of the pathways to malnutrition among children with pneumonia, they often rely on visual cues rather than standardized anthropometric measurements to identify at-risk individuals. This missed opportunity underscores the need for proactive screening measures, including anthropometric assessments at both admission and discharge, as well as targeted nutritional counseling tailored to caregivers of children exhibiting pneumonia symptoms.

The beneficial practices included screening children with severe pneumonia for malnutrition at admission and discharge and providing clear feeding/nutritional counseling specific for caregivers of children with pneumonia symptoms. However, as with all sick children, health workers barely assess children or specifically counsel caregivers on feeding according to the Integrated Management of Childhood Illnesses (IMCI) guidelines [10]. Chaturvedi et al. also reported that knowledge of malnutrition among health workers did not necessarily translate into practice [19]. The knowledge and understanding among some cadres of health workers may be insufficient, causing them to omit otherwise crucial procedures, including screening of children with severe pneumonia for malnutrition and targeted counseling. Research among nurses in Ghana showed that even if they knew when and how to perform nutritional assessments, nurses felt that it was not their responsibility [20]. On the other hand, even health workers who counsel caregivers about feeding practices might not be precise on special feeding requirements for children with severe pneumonia, as the guidelines themselves are not specific enough for children with severe pneumonia [9].

To our knowledge, this is one of the first studies to explore the perspectives and nutritional practices of caregivers and health workers among children with severe pneumonia, but it is not without limitations. First, we were unable to access all the cadres of health workers involved in the management of the children given that staffing at the national referral level excludes some cadres. However, we included key cadres, including nurses, medical officers, and pediatric residents. Researcher bias could have influenced the findings of the study. We tried to reduce the risk of bias by using pretested guides for the FGDs and KIIs and by having a note-taker present. The interviews were conducted in a teaching hospital setting, where the caregivers' children were being managed, and the lead investigator teaches. This may have introduced a social desirability bias. We tried to mitigate this bias by working with experienced interviewers who were not themselves health workers at the hospital. Focus group discussions also presented a challenge with obtaining the recommended number of 6–8 participants [21]. However, findings from groups that had few participants (FGD for male participants) and those that had adequate numbers were similar implying the effect could have been minimal. Additionally, males are traditionally not the primary caregivers of children during hospitalization. This made obtaining the recommended number for the FGD for male caregivers more challenging. We took the necessary precautions, including the use of face masks and social distancing, to solicit as much information as possible while keeping the participants and research assistants safe. We also missed an opportunity to find out the training needs of the health workers.

Conclusion

Both caregivers and health workers were aware that severe pneumonia increases the risk of malnutrition to varying degrees. Significant gaps in the understanding of the deadly relationship between severe pneumonia and malnutrition still exist among caregivers, resulting in unsafe practices. While health workers managing children with severe pneumonia prioritize the diagnosis and management of severe acute malnutrition using established malnutrition guidelines, this often overlooks preventive approaches such as routine nutritional screening and proactive counseling for caregivers of children with severe pneumonia who are not severely malnourished.

Addressing this gap is crucial to enhance the overall health outcomes for these children and reduce the risk of future complications. Therefore, there is a need for

specific guidance and recommendations on nutritional support for children hospitalized for severe pneumonia and future research should explore the feasibility and impact of incorporating nutritional counseling and regular screening in the management protocol for severe pneumonia on outcomes.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-13014-y.

Supplementary Material 1.

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Authors' contributions
All the authors contributed to the design of the study, interpretation of the results, and review of the manuscript. A.S.S. performed the data analysis. L.K. oversaw the recruitment of study participants. D.N., A.S.S. and A.K. wrote the first draft of the manuscript. All authors reviewed and approved the manuscript.

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Data availability
The data analyzed during the current study are provided within the manuscript. The transcripts and codebook are not publicly available due to the potential for identifying individual participants.

Declarations

Ethics approval and consent to participate
The study was approved by the Mulago Research Ethics Committee (MREC 1933) and the Uganda National Council for Science and Technology (UNCST: SS803ES). Before the data collection, the respondents provided verbal and written consent. They were informed about the study procedures and were informed that participation was voluntary and that refusal to participate would not cause any penalties or adversely impact their work. To ensure confidentiality, we did not use personal identifiers.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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