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Original article

Qualitative needs assessment for paediatric emergency care in Kampala, Uganda

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ABSTRACT

Introduction: Acute childhood illnesses, such as malaria, pneumonia, and diarrhoea, represent the leading causes of under-five mortality in Uganda. Given that most early child deaths are treatable with timely interventions, emergency units dedicated to paediatric populations have been established in the country. In light of recent developments, the department of paediatrics at Makerere University requested a needs assessment in the paediatric acute care unit (PACU) at Mulago National Referral Hospital, which could guide the development of a new training curriculum for medical providers.

Methods: We administered a survey for medical providers working in the PACU at Mulago Hospital, which assessed their self-rated comfort levels with paediatric assessment, treatment, and teamwork skills. We also conducted focus groups with a smaller subset of medical providers to understand barriers and facilitators to paediatric emergency and critical care.

Results: Of 35 paediatric assessment, treatment, and teamwork skills, 29 (83%) questions had the median comfort rating of 6 or 7 on a 7-point Likert scale. The remaining 6 (17%) skills had a median comfort rating of 5 or lower. Focus groups identified a number of major barriers to caring for critically ill children, including limited resources and staffing, training gaps, and challenges with interprofessional teamwork. In terms of training development, focus group participants suggested continuous training for all medical providers working in the PACU led by local leaders.

Discussion: This study identified the need and desirability of continuous trainings in the PACU. Key components include objective skills assessment, simulation-based scenarios, and interprofessional teamwork. Training development should be augmented by increases in resources, staffing, and training opportunities in collaboration with the Uganda Ministry of Health.

African relevance

- Paediatric emergency care is an emerging field in sub-Saharan Africa, including Uganda.
- Limited evidence shows that paediatric acute care facilities in Uganda face challenges in caring for critically ill children.
- This research study is a needs assessment that seeks to assess the barriers to clinical practice in a paediatric acute care facility from the perspective of Ugandan medical providers.
- The results from this needs assessment can inform the training development for paediatric medical providers in the country.

Introduction

Since 1990, the world has seen significant reductions in global childhood mortality. Under-five mortality declined from 93 deaths per 1000 live births in 1990 to 38 in 2019 [1]. Despite this progress, childhood mortality persists worldwide. In 2019, an estimated 5.2 million children died from causes including preterm birth

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complications, pneumonia, diarrhoea, and malaria. Large disparities in childhood mortality exist between regions, with the largest burden observed in sub-Saharan Africa.

In order to combat the persisting burden of early child deaths, paediatric emergency care has developed in sub-Saharan Africa. In 2005, the World Health Organization (WHO) introduced Emergency Triage Assessment and Treatment (ETAT) specific for the care of critically ill children in developing countries [2]. Developed in Malawi, these guidelines have been field tested in other sub-Saharan countries including Angola, Kenya, and Niger. In 2012, Kenya established a postgraduate training program in emergency medicine specifically dedicated to the paediatric population. Known as the Paediatric Emergency and Critical Care-Kenya (PECC-Kenya) Fellowship Training Program, this opportunity offers a 2-year paediatric emergency and critical care fellowship at the University of Nairobi for paediatricians from sub-Saharan Africa [3].

Uganda has also shown promising progress in paediatric emergency care. Research shows that paediatric triage has been introduced based on ETAT guidelines [4]. Furthermore, Uganda has developed acute care facilities specifically for children, including the Paediatric Acute Care Unit (PACU) at Mulago National Referral Hospital. Staffed by nurses, medical interns, paediatric residents, pharmacists, laboratory technicians, and paediatricians affiliated with Makerere University, Mulago PACU houses a 4-bed acute care unit and a 7-bed intensive care unit. Serving as the point of entry for all paediatric admissions to Mulago Hospital, the unit sees over hundred infants and children each day.

In light of recent development, the Department of Paediatrics at Makerere University requested external expertise in conducting a needs assessment in the PACU at Mulago Hospital. The proposed needs assessment is a qualitative study of barriers to paediatric emergency care from the perspective of medical providers working in the PACU at Mulago Hospital. Given that these medical providers have the most direct encounters with the paediatric patients, understanding their experiences through surveys and focus groups could help identify the major barriers and facilitators to their clinical practice. The results from this needs assessment will inform the development of a training program for paediatric medical providers in the country.

Methods

Study design and population

The survey questionnaire was developed in collaboration between the Makerere University Department of Paediatrics and UCSF. The survey, composed of three sections, assessed provider comfort levels in 9 paediatric assessment, 20 treatment, and 7 teamwork skills on a 7-point Likert scale, respectively (Appendix A). Each of the three sections also contained 1 open-ended question where participants could raise any issues not previously identified. At the end of the survey, participants were asked to indicate their demographic information. The survey was finalized after piloting with a small group of medical providers working in the PACU. Focus group interview guide, also developed in collaboration between the Makerere University and UCSF, was focused on understanding experiences and challenges in working in the paediatric ACU (Appendix B).

Two investigators (NG, BA) from UCSF worked with the Department of Paediatrics at Makerere University to identify potential participants for the study, which included current paediatricians, nurses, paediatric residents, General doctors, Junior House Officers (medical interns), laboratory technicians, pharmacists, and nutritionists. Participants were asked to volunteer and consent to participation in the survey and focus groups. Medical providers without current affiliation with Mulago Hospital PACU were excluded from participation.

Data collection

Faculty and staff working in the PACU were asked for voluntary participation in the survey. Clinical staff, including paediatricians, nurses, residents, General doctors, and Junior House Officers, completed all three sections of the survey in paediatric assessment, treatment, and teamwork skills. Support services staff, including laboratory technicians, pharmacists, and nutritionists, only completed the section on teamwork skills.

A subset of survey participants participated in focus groups based on their availability to meet. We stratified each focus group by professional roles in order to prevent hierarchies from influencing responses. Focus groups were moderated by the two researchers from UCSF (NG, BA). All contents were audio-recorded, and the interviews were conducted until theme saturation was achieved [5].

Data analysis

All paper survey responses were entered and stored in REDCap software (TN, USA). Demographic information, including current professional roles, years of experience, and ETAT training backgrounds, were calculated as percentage distribution. Descriptive statistics, such as median, were computed for each skill item.

Audio-recorded focus groups were transcribed using the Rev software (CA, USA). Any participant information was de-identified. Inductive content analysis was used to identify themes from the content of the focus groups. From the initial debriefing of a small subset of focus group transcripts, two investigators (BA, NG) agreed upon a preliminary set of major themes. Investigators then coded the remainder of the transcripts. Major themes, sub-themes, and quotations were reviewed in the end to ensure that all data were represented and valid.

Results

A total of 72 medical providers in the Mulago Hospital PACU completed the survey (Table 1). Participants were represented by clinical staff, including paediatricians, nurses, paediatric residents, General doctors, and Junior House Officers. Participants also included support services staff, such as laboratory technicians, pharmacists, and nutritionists. Clinical staff ($n = 62$) completed all three sections of the survey in paediatric assessment, treatment, and teamwork skills. Support services staff ($n = 10$), who do not provide any direct medical care for children, only completed the last section on teamwork skills.

Out of 29 assessment and treatment skills, 7 skills had the median

Table 1
Characteristics of survey participants ($n = 72$).

	N	%
Professional role		
Nurse	19	26.4
Nursing intern	2	2.8
Junior house officer	12	16.7
General doctor	2	2.8
Paediatric resident	15	20.8
Paediatrician	12	16.7
Laboratory technician	6	8.3
Pharmacist	3	4.2
Nutritionist	1	1.4
Years of experience		
<1 years	35	48.6
2–5 years	18	25.0
6–10 years	7	9.7
>10 years	11	15.3
Unanswered	1	1.4
Completion of ETAT		
Yes	38	52.8
No	34	47.2

comfort rating of 7 on the 7-point Likert scale, equivalent to 'extremely comfortable'. 15 skills had the median comfort rating of 6, equivalent to 'very comfortable'. 7 skills had the median comfort ratings 5, equivalent to 'slightly comfortable', or lower. All 7 teamwork skills had the median comfort rating of 6 on a 7-point scale. Overall, out of the total 36 skills in the survey, 29 (81%) questions had the median comfort rating of 7 or 6, indicating high overall comfort with paediatric assessment, treatment, and teamwork among medical providers (Figs. 1 to 3).

Focus groups were conducted with a subset of survey participants (n = 42). Focus group participants included seven groups of clinical staff, stratified by the professional roles. This included one group of paediatricians, two groups of nurses, three groups of paediatric residents, and one group of Junior House Officers. Participants also included two groups of support service staff. This includes one group of laboratory technicians and one group of pharmacists.

Participants identified three major barriers to caring for critically ill children at Mulago Hospital. These barriers are limited resources and staffing, training gaps, and challenges with interprofessional teamwork.

Limited resources and staffing

Limited resources were identified as a major barrier in nearly all focus groups. Most participants noted the critical shortages in essential drugs, medical supplies, and equipment, which directly contributes to poor health outcomes.

> *We lack ventilation…these support life machines. You find that we have even the PICU, [Paediatric Intensive Care Unit] but equipments are not there. If you like to intubate, a life supporting machine…they are not there. Another thing is just lack of other facilities. You find that you have a lot of children at night who will need oxygen - they have severe respiratory distress - then they need to share.*
>
> (*Paediatric Resident FG1*)

Participants also noted the understaffing of medical providers, especially during night shifts, which directly compromises the promptness and quality of care. Such inadequate staffing levels were identified among all levels of medical providers, including supporting services.

> *When it comes to evening and night shifts, you find a child is gasping. Another one has come. He needs suction. Another one has come in. He is convulsing… You are participating. You are resuscitating. Another one has brought a dead body. You have to participate. The other one is crying. What can I do? The work here is too much. Yes…The work is too much.*
>
> (*Nurse FG1*)

Training gaps

When asked about their training backgrounds, participants noted that their ETAT training was largely theoretical with lack of hands-on practice. Furthermore, their trainings were largely geared toward adult patient populations and did not teach paediatric applications.

> *I was taught some emergency paediatrics but right now, I don't even have a whole protocol in my mind. He [The doctor] didn't give it to me, and if he gives it to me, it'd be theoretical because they don't do [it] with us in the wards. The teaching about ETAT is just mostly theoretical.*
>
> (*Junior House Officer*)

> *In my final year, they developed a simulation program. So I got hands on a mannequin…it was a good experience. Only problem is that it was only being done for adult emergency situations. So that was the only problem. We didn't get a chance to do it for paediatrics.*
>
> (*Junior House Officer*)

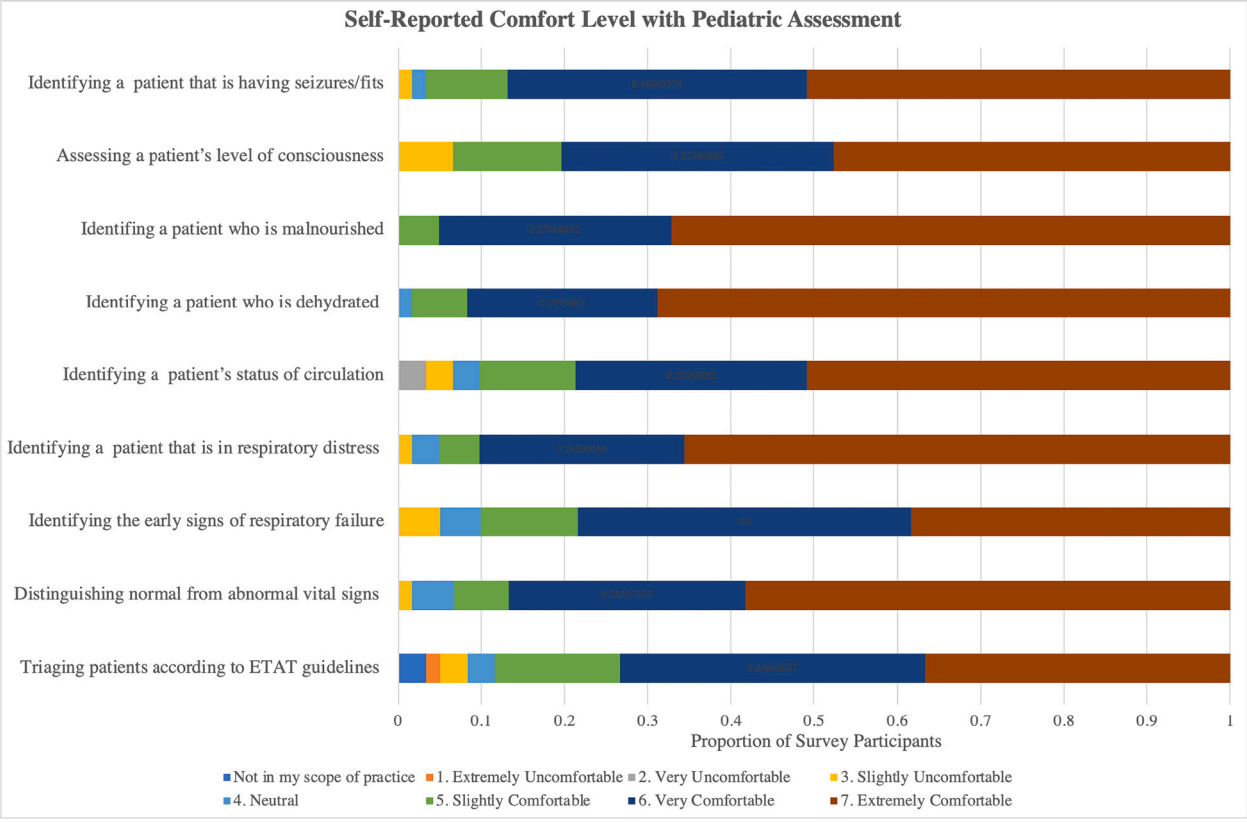

Fig. 1. Self-reported comfort level with paediatric assessment (n = 62).

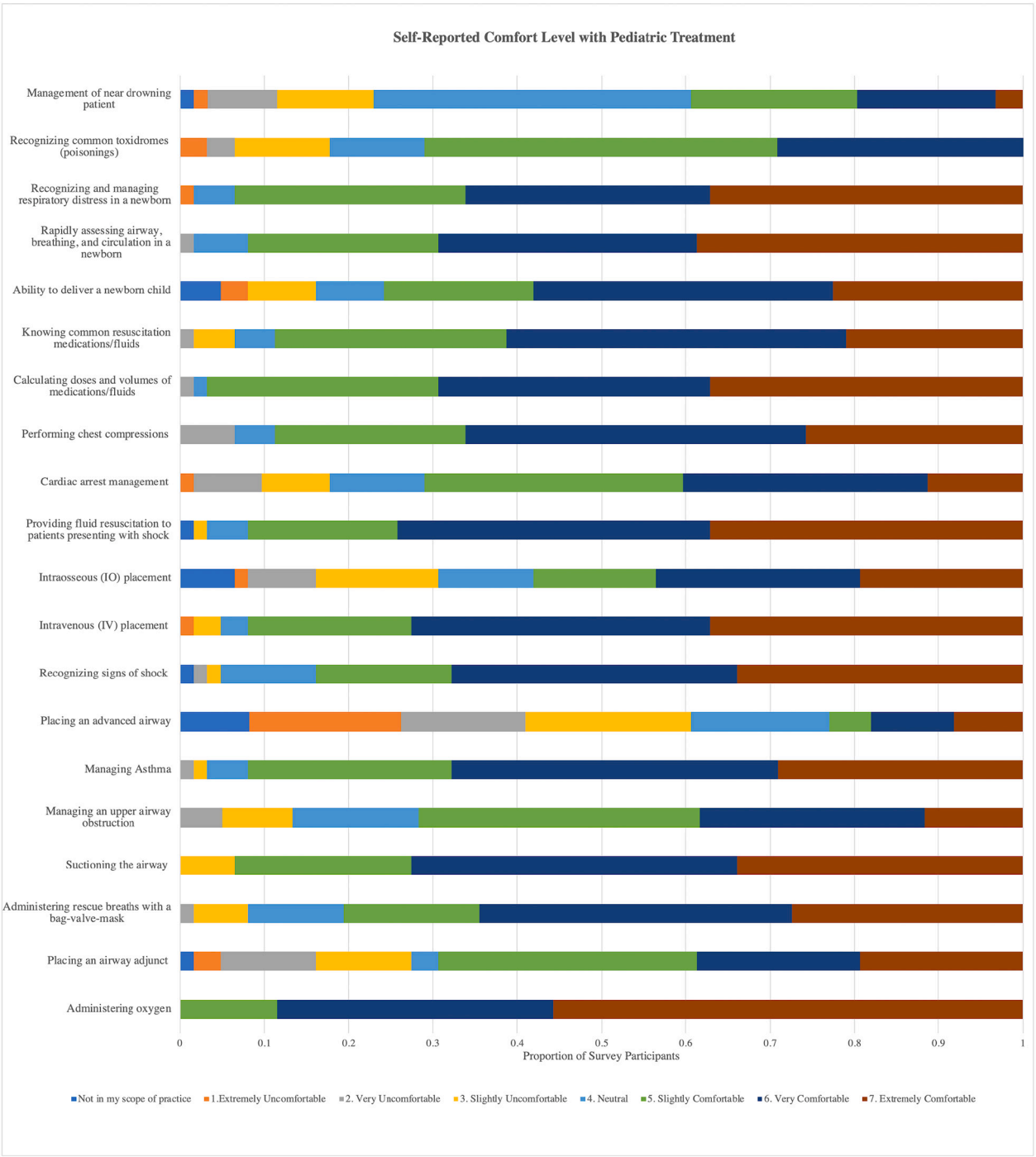

Fig. 2. Self-reported comfort level with paediatric treatment (n = 62).

Challenges with interprofessional teamwork

Participants described the challenges with teamwork between providers that may stem from the lack of common emergency knowledge and skills shared by all medical providers. Others noted perceived tension and divisions between different professions.

> *Training the other will surely help a lot - pharmacists, lab technicians - so that we all know what the idea of emergency in paediatrics is. So that when I'm… asking them, 'I need this the soonest'… then they will know… So, if we have them [support services] trained as well, it will add a great deal in emergency care.*
>
> (*Paediatric Resident FG2*)

> *Sometimes if we don't have supplies, we want to go and share with the nurses because they also have their own supply… You hear something like this, 'Get your own.' You see that… they don't want to share. It's like they're independent, but we're all here for the same cause. We want to help children.*
>
> (*Laboratory Technician*)

Perspectives on training development

There was a consensus on the urgent and timely need to develop a

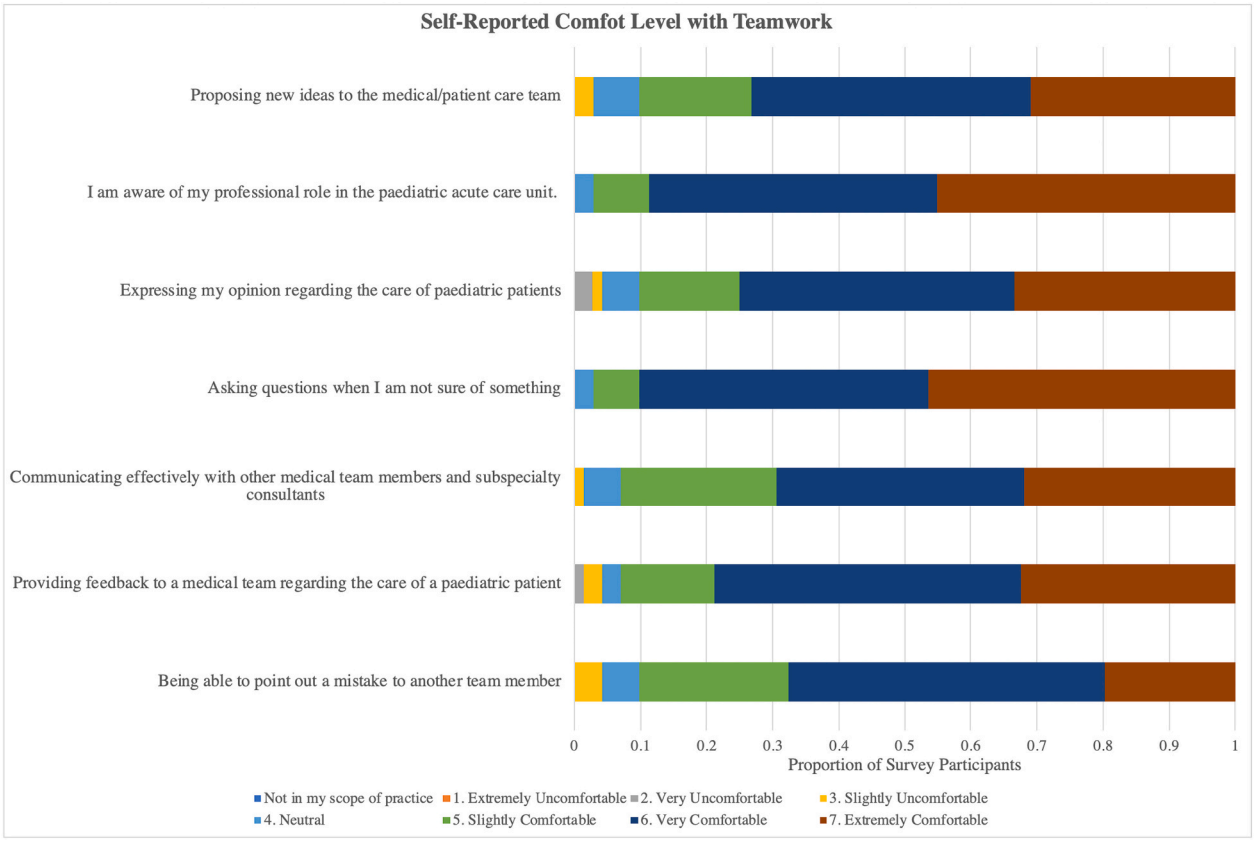

Fig. 3. Self-reported comfort level with teamwork skills ($n = 72$).

training in the paediatric ACU. Many participants noted that the training should be interdisciplinary across all cadres of medical providers – ranging from physicians and nurses to laboratory technicians and pharmacists.

> *Have the nurses around in the same room with the consultants, in the same room with the intern doctors. So [we] get a feeling that, what A knows, I know, B knows, so they get that kind of feeling that we are at the same level. I think that's what I would do.*
>
> (*Junior House Officer*)

Participants also identified the need for local leadership with expertise in paediatric emergency care. Such leadership on the ground can lead the training on the ground and improve the overall scope and quality of care in the paediatric ACU.

> *If, for example, you had two emergency paediatric care specialists…that would be great. So, in the end, these people who are specialized in that emergency care…as they practice the emergency care they pass on that knowledge to the residents. So in a way they teach others even without knowing it.*
>
> (*Junior House Officer*)

Discussion

Existing research suggests that paediatric acute care facilities in Uganda face challenges in adequately caring for critically ill children. In 2016, a mortality audit in the Mulago PACU estimated the mortality rate at 4.7 deaths per 100 patient admissions from causes including respiratory infection (32.5%), neonatal sepsis (10.7%), and malaria (10.7%) [6]. This needs assessment is the first published study that sought to characterize challenges faced by these facilities through first-hand perspectives of medical providers.

This needs assessment observed significant discrepancies between surveys and focus group results. While survey results on self-perceived skill levels were overall positive, focus groups identified significant skill gaps both at the individual and team levels. Such discrepancies may be due to the social desirability bias often observed in self-report surveys, whereas focus groups allowed for deeper and more honest conversations. This highlighted the need to develop an objective assessment tool as the next step. This can better assess clinical knowledge and skills for a more accurate understanding of the deficits that can be targeted for the curriculum development.

For curriculum development, a combination of didactics with hands-on, case-based simulations holds promise. Providers admitted that their one-time ETAT training was lacking in hands-on practice and pediatric applications. Research shows that monthly refresher training based on knowledge reviews, simulation-based scenarios, and debriefing significantly increased providers' knowledge and self-efficacy in the management of neonatal emergencies in Ghana [7]. Similar trainings can be developed in Uganda based on the ETAT course modules and scenarios specific for the care of critically ill children [2]. These guidelines can be adapted to the Mulago PACU, based on locally specific factors such as resources and patient populations.

Another key component for the training curriculum is interprofessional teamwork. While survey results on self-perceived teamwork were overall positive, focus groups exposed significant division between departments that hinder collaboration during emergencies and contribute to poor health outcomes. Previous research in Malawi noted teamwork challenges as a significant barrier to the management of children [8]. A growing body of research shows a positive association between teamwork and clinical performance [9]. Hence, in addition to technical skills, PACU training should also incorporate case scenarios that target communication and collaboration between all cadres of medical

providers. This has positive implications for the efficiency and efficacy of care in the PACU.

Furthermore, this needs assessment identified resource shortages as a significant contributor to preventable child deaths. Similar studies in resource-limited settings describe the lack of essential medical supplies and medications as major barriers to paediatric emergency care [10]. Providers also called attention to staffing shortages during night shifts, which may explain the higher mortality observed at night compared to the day [6]. Hence, successful implementation of this training curriculum warrants quality improvement at the structural level. We recommend a performance assessment of resources and staffing allocations at Mulago PACU. Addressing the resource gaps through increased governmental funding will be pivotal in improving the care at the PACU.

Lastly, this needs assessment calls for more training opportunities in paediatric emergency care at the national level. Surveys showed that nearly half of the providers had not received the ETAT training. This suggests that despite ETAT course guidelines in place, institutions may be facing challenges in implementing the training as part of the education of future healthcare trainees. It is timely and critical to work with the Ministry of Health to evaluate and address the potential barriers to ETAT implementation. Another area of consideration is opportunities for specialized training in paediatric emergency care; currently under discussion is sending the recent paediatric emergency medicine residency graduates to the aforementioned PECC-Kenya Fellowship Training Program. Having local leaders specialized in paediatric emergency care will be pivotal for ensuring a sustainable training development.

Conclusion

This needs assessment identified the need and desirability of continuous trainings in the PACU at Mulago Hospital composed of objective skills assessment, ETAT-based case simulations, and interprofessional teamwork. As the next step, we plan to develop an objective assessment tool that can assess the knowledge and skills gaps that can be targeted for the training. Furthermore, we will be communicating with the Ministry of Health regarding the performance assessment to address the resources and staffing in the PACU. The development of a locally relevant training in the PACU will be critical to improving paediatric emergency care in Uganda.

Dissemination of results

Results from this needs assessment were shared with the Makerere University Department of Paediatrics and the Ministry of Health through an informal presentation in November 2019. Results were also presented at the African Conference on Emergency Medicine (AfCEM) 2020 held in Nairobi, Kenya. Makerere University Department of Paediatrics and UCSF are currently collaborating for curriculum development.

CRediT authorship contribution statement

Authors contributed as follow to the conception or design of the work; the collection, analysis, or interpretation of data for the work; and drafting the work or revising it critically for important intellectual content: BA, EM, and NG contributed 25% each; BI, RO, HA, CB, and DG contributed 5% each. All authors approved the version to be published and agreed to be accountable for all aspects of the work.

Declaration of competing interest

The authors declared no conflict of interest.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.afjem.2021.03.001.

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