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Evaluation of the preparedness of the children's emergency rooms (CHER) in Southern Nigeria for service delivery

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Abstract: *Background:* The Children Emergency Room (CHER) is the first point of call for many sick children. A significant proportion of childhood and under five deaths in tertiary institutions takes place in the CHER. There is thus need for a high level skilled manpower and infrastructure in the CHER in readiness for service delivery.

Objective: To assess the preparedness of the children emergency room in tertiary institutions in southern Nigeria to successful management of children presenting to the emergency rooms.

Methods: This study was a cross sectional, descriptive multicentre study carried out among nine Tertiary Hospitals in Southern Nigeria. Three tertiary hospitals were randomly selected from each of the three Geo political zones (South-South, South-East and South-West) in Southern Nigeria. A structured questionnaire was used to collect data about the Children Emergency Rooms in these hospitals. The obtained data was entered and analysed using SPSS version 21 and is presented as table.

Results: All the centres have an emergency room. The number of doctors in CHER ranged from 7 to 22 while the number of nurses ranged from 10 to 24 persons with a nurse: bed ratio of 1:3-15.

In all the centres, the CHER had a side laboratory, well stocked emergency drug shelf, pulse oximeters, oxygen cylinders, electri-

cal and manual suction machines, ambu bags and nebulizers. However, none of the centres has functional manual defibrillator or an Automated External Defibrillator (AED). In 5 (55.6%) of the studied centres, the doctors and nurses have training on emergency triage. Also 5 (55.6%) centres have doctors with certification in emergency care, but none of the nurses in all the centres have any certification in emergency care. Three (33.3%) centres had staff trained with skills on the use of AED while in 4(44.4%) centres they were skilled on the use of manual defibrillators.

All the centres have a waiting area for patients' relatives but only one (11.1%) has a television installed. All the CHERs have toilet facilities for patients relatives but only 5 (55.6%) have bathrooms. Running water is regularly available in the toilets of only 4 (44.4%) of the centres.

Conclusion/Recommendation: We conclude that limitation abounds with regards to personnel, high technology infrastructure, personnel skill and patient friendly infrastructure. It is recommended that concerted efforts should be made by the government and all key players to make available the necessary equipment and facilities and ensure that health personnel acquire the necessary skills so that the standard of practice in our tertiary hospitals will be comparable to international best practices.

Introduction

Children, unlike adults are more unlikely to withstand the effect of certain diseases for prolonged periods. Thus, they deserve more immediate attention to enable

them have better chance of survival. This is especially true when the child is presenting with life-threatening features such as severe respiratory distress or apnoea, shock, coma, seizures, severe anaemia or severe dehydration.¹ Studies have shown that many children dying in

the emergency room die from preventable infectious diseases. Most deaths in children presenting to the emergency room occur within the first 24 hours of presentation² and many can be prevented by immediate and effective intervention.² Thus, anticipation and adequate preparation are key elements to increasing the survival rate of these children presenting to the emergency room.

Apart from the requirement of adequate number of highly skilled personnel, the physical structure and equipments like suction machines, nebulizers, oxygen cylinders, cardiac monitors etc play very vital roles in optimizing the outcome of children presenting to the emergency room. Every emergency room that hopes to achieve substantial success in managing children who present as emergencies must have basic equipment necessary for resuscitation, stabilization and diagnosis of the common disorders that present in their environment. Staff motivations as well as good co-operation from sister departments like the blood bank, radiology and laboratory are very essential to the successful management of children in the emergency situations. This study thus assesses the preparedness of tertiary institutions in southern Nigeria for successful management of children presenting to the emergency room.

Methodology

This study was a cross sectional, descriptive multicentre study carried out among nine Tertiary Hospitals in Southern Nigeria. Ethical approval for the study was obtained from the University of Port Harcourt Teaching Hospital (UPTH) ethical committee. Three tertiary hospitals were randomly selected from each of the three Geo political zones (South-South, South East and South West) in Southern Nigeria. University of Port Harcourt Teaching Hospital (UPTH) Port Harcourt, Niger Delta University Teaching Hospital (NDUTH) Okolobiri, Bayelsa State and Federal Medical Centre (FMC) Irrua in South-South, University of Nigeria Teaching (UNTH) Enugu, FMC Umuahia and FMC Owerri in South-East, Lagos University Teaching Hospital (LUTH), Obafemi Awolowo University Teaching Hospital (OAUTH), Ife, and Ladoke Akintola University of Technology Teaching Hospital (LTH), Osogbo, Osun state in South-West.

A questionnaire was used to collect data about the Children Emergency unit in these hospitals. The questionnaire was divided into 3 sections: Section A contained information on the number of Personnel (doctors, nurses, and administration staff), section B had information on the skill (ability to use cardiac monitors, defibrillators) and certification of the Personnel (certifications in Emergency Paediatrics, BLS, PALS). section C contained information on available infrastructure (as shown in the results). The obtained data was entered and analysed using SPSS version 21 and is presented as prose and table.

Result

Personnel

All the institutions studied have an emergency room and operate a three-shift (morning, afternoon and night) system. The number of doctors in CHER ranged from 7 to 22 comprising of consultants, senior and junior residents, medical officers as well as intern doctors. However, only 4 (44.4%) centres have dedicated consultants in charge of the emergency room. In all the centres, there are junior residents covering night shift, while in 7 (77.8%) of the centres senior residents also sleep in. (See Table 1)

The nine centres have nurses ranging from 10 to 24 persons working in the emergency rooms. The number of nurses covering each shift range from 1-6 nurses. In relation to the number of beds, the average number of beds per nurse ranges from 3-15, giving a nurse: patient ratio of 1:3-15. (Table 1)

Personnel skills/certification

In 5 (55.6%) of the studied centres, the doctors and nurses have training on emergency triage. Also 5 (55.6%) centres have doctors with certification in Emergency Paediatrics. but none of the nurses in all the centres have any certification in Emergency Paediatrics, though, in 3 (33.3%) of the centres, the nurses have training on basic life support (BLS). In 4(44.4%) centres there were staff skilled on the use of manual defibrillators while 3(33.3%) centres had staff trained with skills on the use of AED. (See Table 1)

Infrastructure

The number of beds in the emergency rooms ranged from 8 to 30 beds with 3(33.3%) centres having twenty five or more beds. In 9(100.0%) of the centres, the CHER had a side laboratory, well stocked emergency drug shelf, pulse oxymeters, oxygen cylinders, electrical and manual suction machines, nebulizers and ambu bags. However, all (100.0%) the centres had no functional manual defibrillator or an Automated External Defibrillator (AED). One (10.1%) Centre has a portable mobile X-ray machine and portable ultrasonography scan machine. Getting an X-ray or ultrasound done for a child takes over 2hrs in 4 (44.4%) of the nine institutions, less than 2 hours in 2(22.2%) and within an hour in the remaining 3(33.3%) institutions. (See Table 1)

Only 2(22.2%) centres have a triage room and piped oxygen in their CHER. There are no cardiac monitors and endotracheal tubes in 3(33.3%) of the centres. Also, 3(33.3%) centres have a pharmacy that is dedicated to their children emergency room, while 4 (44.4%) centres have a resuscitation room. (See Table 1)

All the centres have a waiting area for patients' relatives but only one (11.1%) has a television installed. All the CHERs have toilet facilities for patients relatives but only 5 (55.6%) have bathrooms. Running water is regularly available in the toilets of only 4 (44.4%) of the centres. (see Table 1)

Table 1: Summary of the findings in the 9 tertiary hospitals evaluated

Hospital	A	B	C	D	E	F	G	H	I
Total number of Doctors that work in CHER	14	15	12	11	7	8	22	15	10
Total number of nurses working in CHER	21	20	14	24	10	10	24	18	12
Number of nurses per shift	2-4	4-6	2-4	2-6	1-3	2	2-4	2-4	2-3
Have consultants heading the emergency unit	Y	N	N	N	N	Y	Y	N	Y
Staff trained on emergency triage	Y	Y	Y	N	N	N	Y	Y	N
Availability of a triage room	N	Y	N	N	N	N	Y	N	N
Availability of resuscitation room	Y	Y	N	Y	N	N	Y	N	N
Total number of beds	26	25	15	18	15	10	30	8	14
Availability of a side laboratory	Y	Y	Y	Y	Y	Y	Y	Y	Y
A dedicated pharmacy	N	Y	N	N	Y	N	Y	N	N
Stocked emergency drug shelf	Y	Y	Y	Y	Y	Y	Y	Y	Y
Availability of cardiac monitors	Y	Y	Y	Y	Y	Y	N	N	N
Availability of pulse oxymeters	Y	Y	Y	Y	Y	Y	Y	Y	Y
Availability of functional AED	N	N	N	N	N	N	N	N	N
Staff trained on use of AED	Y	Y	N	N	N	N	Y	N	N
Availability of functional defibrillator	N	N	N	N	N	N	N	N	N
Staff trained on use of defibrillator	Y	Y	N	Y	N	N	Y	N	N
Availability of functional ECG machine	N	N	N	N	Y	N	N	Y	N
Emergency ward piped with oxygen	N	N	Y	N	N	Y	N	N	N
Regular supply of oxygen in cylinders	Y	Y	Y	Y	Y	Y	Y	Y	Y
Availability of oxygen concentrators	Y	N	N	Y	Y	Y	Y	Y	Y
Availability of suction machines	Y	Y	Y	Y	Y	Y	Y	Y	Y
Ambu bag	Y	Y	Y	Y	Y	Y	Y	Y	Y
Endotracheal tubes	Y	Y	Y	Y	Y	Y	N	N	N
Availability of nebulizer units	Y	Y	Y	Y	Y	Y	Y	Y	Y
Portable X-ray and ultrasound machines	N	N	N	Y	N	N	N	N	N
Time to availability of screened blood *	<2	<1	<2	<2	<2	<2	>2	<1	<2
Dedicated phone for communication	Y	Y	N	N	Y	N	N	N	Y

Y – Yes, N – No , * - In hours

environment where many actions are time dependent and therefore requires better experience.⁴⁻⁶

Discussion

This study has shown that there are available Children Emergency Rooms (CHER) in the tertiary health institutions in southern Nigeria to cater for the needs of children who present with emergencies in this region. The three shift system operated by the CHER and the availability of twenty hour service in a day is recognized internationally and is in tandem with other Emergency Departments.³ It ensures that services are provided round the clock and limits care giver burn out since CHER is a very busy area especially at peak periods which is usually not predictable.

The study also shows that in many centres paediatricians of senior cadre are available to render services round the clock, this is however not the case in 2(22.2%) of the centres where senior residents are not available at nights. Junior resident paediatricians, especially those who are inexperienced may sometimes be overwhelmed and this may lead to poor case management. Although, with modern communication tool, such as smart phones and tablets this could be minimized, the importance of the availability of senior doctors in the children emergency room on a 24 hour basis need not be overemphasized. This must be addressed especially in these days where patients expect and demand quality service. Due to the acute and sudden nature of the problems patients present with to the CHER, stress and anxiety levels are usually high. Managing the expectations of these patients and their families becomes even more challenging in an en-

Only 44.4% of the centres have dedicated consultants in charge of the CHER and 55.6% of the centres have consultants with certification in emergency Paediatrics. The 2009 American Academy of Paediatrics (AAP) guidelines for preparedness to treat children in the Emergency Department identified the designation of a coordinator for Paediatric emergency care as an important first step in ensuring readiness for children.⁹ Though no such guideline exists in our setting, it is pertinent that each centre should have at least one consultant in charge of the CHER, considering the significant role of the CHER in Paediatric practice.

This nurse: patient ratio of 1: 3-15 in these hospitals fall below the internationally recommended standard in the emergency rooms.conclusion¹⁰ The Children Emergency Room requires a high intensity of service for many conditions, especially during the first hour of treatment; emergency nursing involves patient evaluation, interval assessments, medication administration, procedure assistance, point-of-care testing, chart documentation, and aftercare education.^{10,11} Also, the emergency room is a high risk area and trained emergency nurses play a vital role in medical error reduction in this area. The American Academy of Emergency Medicine (AAEM) therefore asserts that, as a guideline for comprehensive, moderate acuity emergency departments, the maximum emergency nurse-to-patient staffing ratio should be 1:3 or based on the rate of patient influx such that the rate of 1.25 patients per nurse per hour is not exceeded.¹⁰ However, this recommendation is still far-

fetches in our setting but striving towards it is a step in the right direction.

Availability of the right mix of physicians, nurses and other support staff in the emergency room help to ensure patient satisfaction, emergency room efficiency, cost-effective care and medical-legal safety.⁵⁻⁷ Emergency room staffing involves two key elements: strategic drivers and tactical drivers. Strategic drivers are the quality of care, the level of service you want to deliver and patient safety while the tactical drivers are patient volume, acuity, duration of patient stay, admits holds, physician capability and non-physician staffing. Appropriately configuring staffing patterns based on volume and acuity is the key to emergency department efficiency, as well as to overall patient satisfaction.^{6,7}

Each area in the emergency room plays a key part in the patients' journey, and the non-availability of a triage and resuscitation areas in many centres may portend some danger; this would mean resuscitating patients in areas not designated to do so and would lead to time wastage in gathering these equipment when the need arises. Functional areas in the emergency room includes but not limited to: waiting/reception area, a triage area, resuscitation area, acute treatment area, consultation area, adjunctive areas (x-ray, Short Stay Unit (SSU), allied health, investigations room (point of care testing), Staff/amenities areas, administrative areas, storage areas, clean preparation and drug preparation room(s), dirty utility and disposal areas, patient amenities areas e.g. a food storage fridge, toilet (staff and patient including for disabled patients) and bathroom/shower facilities and teaching and research areas.^{10,12,13} The triage, resuscitation and acute treatment areas may be either a re-allocation of existing treatment spaces, or are specifically purpose built to accommodate a multi-disciplinary team who are treating patients together. These areas should be staffed for a rapid turnover of patients with suitable appropriate outflow areas.

Availability of the necessary tool required for patient care varied in the studied centres. While all the centres had the basic tool for the care of many patients who present to the CHER, none had equipment like manual defibrillator and Automated External Defibrillator (AED). Cardiac monitor was present in 3(33.3%) of the centres, piped oxygen in 2 (22.2%) centres while a portable mobile x-ray and ultrasonography scan machine were found in only one centre. The unavailability of these equipment's in our emergency rooms is unacceptable because these are key to the resuscitation, prompt evaluation and monitoring of varied life threatening complications that present to the CHER on a nearly daily basis. Also, services offered in our tertiary centres must go beyond the mundane as many of these centres have existed for several years. This may be partly why there is increasing medical tourism abroad as most often any care beyond the basic is far reaching. Also, individuals who are trained or who have trained themselves on skills necessary to use these equipment lose them fast as the equipment are unavailable and so are unable to domesticate or pass on these skills. There is need for concerted efforts

by the government and all key players in Health to make available these equipment and to train health personnel on skills to use them so that our standard of practice will be comparable to international best practices.

All the centres had well-stocked emergency shelf/tray for emergency medications; this is quite encouraging and the practice must be encouraged and maintained. There is also the need for a pharmacy dedicated to the emergency room to reduce waiting time required to obtain emergency drugs. This was obtainable in only 33.3% of the centres. Alternatively, in centres where pharmacy is shared between CHER and other departments, there should be pharmacy staff dedicated to emergency room patients.

Having the necessary skill, competence and certification in Emergency Paediatrics among the health team in the CHER cannot be over emphasized. That acute care physicians and nurses in CHER are not trained in basic skill as triage as well as on the use of life saving equipment such as manual defibrillators and AED is worrisome. This is so because these skills are used by even paramedics at the community hospitals in developed countries let alone in tertiary referral centres. While our counterparts in the western world have gone beyond the three-level triage algorithm system to the five-level triage system called the emergency severity index,¹⁴ most emergency room staff are yet to acquire training on triage. The welfare of the staff of the CHER should also be taken seriously by the authorities and there should be incentives to help motivate the medical staff that work in CHER just as is done in many hospitals in developed countries where there is additional wage/ allowance for emergency room staff.

Conclusion

In conclusion, this study has shown that there is considerable availability of some equipment in the Children Emergency Room, however, limitation abounds with regards to personnel, high technology infrastructure, personnel skill and patient friendly infrastructure. This finding in Southern Nigeria may not be different from what obtains in other parts of Nigeria. There is need for managers of tertiary health institutions to train and re-train health care workers on necessary skills and to advocate for other sources of funding in the Health sector as Government alone can no longer sustain the burden of health cost.

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