EDITORIAL

Paediatric Critical Care

Beyond the Walls

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Critical illness is defined as an alteration in physiologic mechanisms with the potential to result in the failure of one or more organ systems, incomplete recovery or death, without prompt and appropriate intervention (1, 2). Recognition and management are particularly challenging in infants and children, because of the age-specific differences in types of illness and range of physiologic values, the skill required to perform procedures on small children, and the unanticipated sudden deterioration especially in infants who have limited compensatory capacity. The old adage that *'children are not little adults'* is applicable, and the value of specific knowledge and training in paediatric critical care management by pertinent personnel cannot be understated (3).

Critically ill children present in diverse settings, including the prehospital (primary care physician's office, public health centres and unexpected emergent circumstances) and hospital environments (emergency department, ward and intensive care facility). The spectrum of clinical problems presenting as critical illness include infections and sepsis, respiratory, cardiovascular and neurological emergencies, trauma and post-surgical supportive care.

Outcome of critical illness in children hinges on early recognition, expeditious anticipatory supportive intervention and prompt definitive treatment. When one considers the diversity of possible settings in which critically ill children may present, common sense would dictate that basic intensive care for such children begins whenever resuscitation occurs or coincides with the anticipated need for advanced care. It is incumbent on caregivers and healthcare providers to be able to deliver appropriate care whenever the need arises. Optimum care, however, depends on the level of training and experience of the individual, the available resources in the facility, quality of transport service, the existence of appropriate tertiary-level care with required expertise and use of evidence-based management protocols.

In Jamaica, children (0–17 years old) comprise 37.6% (986 713) of the total population. This figure increases to 41.4% (1 087 649) when 18- and 19-year-olds are included (4). Respiratory conditions, gastrointestinal infections and diarrhoea, septicaemia and inflammatory conditions of the central nervous system rank as the commonest discharge diagnoses in infants and children less than four years. Burns, corrosions and poisonings are commonest in the one to four year band; intentional accidents and intracranial injuries are increasingly common discharge diagnoses in older children and adolescents (5). Most deaths occur as a result of respiratory infections, diarrhoea and gastrointestinal infections, and septicaemia, particularly in the less than four-year age group (5). These common conditions represent potential risk opportunities for intensive care interventions in the paediatric population. A number of these problems are preventable and thus underscores the value of public health preventive strategies to improve the current epidemiologic profile.

There are currently 22 available intensive care beds distributed among the four major hospitals in Jamaica: The University Hospital of the West Indies (UHWI), Kingston Public Hospital (KPH), Bustamante Hospital for Children (BHC) and Cornwall Regional Hospital (CRH). Only the unit at BHC and the neonatal intensive care unit at UHWI are dedicated to paediatric intensive care, and have a functional bed capacity of eight beds; UHWI, KPH and CRH have general intensive care units. The estimated intensive care need for the paediatric population (birth to 18 years) in Jamaica is approximately 26 beds (bed requirement = $m + 1.64\sqrt{m}$ where $m = p$ x 20/1 000 000; p is the at risk population) (6).

The disparity between available resources and burden of need suggests that many children in Jamaica will be denied access to optimized paediatric intensive care. In fact, critically ill children are often managed on the wards where conditions are constrained and access to the intensive care unit (ICU) is based on reactionary rather than anticipatory criteria (7, 8). Research has shown that optimal paediatric ICU care is best provided in centralized tertiary care units, with the relevant expertise (9, 10). But can we really afford to provide this kind of care, given the competing health needs and limited economic and infrastructural resources within the health sector?

An assessment of the intensive care needs at the general intensive care unit, UHWI, during the period June 2001 to May 2002, confirmed that the demand outstripped the supply and that mortality was high among those non-admitted patients who were considered suitable candidates for ICU care (7, 8). Among 56 ICU admission requests (in the

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age range 0–18 years), there was 20% refusal rate and 50% mortality among those not admitted. In more than 50% of cases, refusal was due to inadequate number of trained nurses. Trauma, sepsis, cardiac abnormalities and brain tumours accounted for the morbidity among paediatric patients admitted to the UHWI intensive care unit during this period (7, 8). Data for other intensive care facilities is unavailable but the demand-supply gap is reportedly the same.

The Ministry of Health, Jamaica, in association with the Heart Foundation of Jamaica and the Office of Disaster Preparedness and Emergency Management have conducted several training courses including basic and advanced paediatric life support, since 2001 (5). An internal audit of training in paediatric life support skills among residents in the Doctor of Medicine (Paediatric) postgraduate programme in September 2003 revealed that 95% had Basic Life Support training and certification but just 38% were trained in Paediatric Advanced Life Support. The impact of training on outcome of critical illness management however has not been explored.

There have been numerous anecdotal reports of the inadequacy of transport services (personnel and infrastructural resources) for critically ill patients in Jamaica. Crandon and colleagues highlighted this problem in a recent paper regarding the inappropriate inter-hospital transfer of injured patients to the UHWI (11).

Against this background, one must consider cost-effective interventions to meet the potential paediatric critical care needs of the country. We propose that optimizing and expanding critical care paediatrics in Jamaica requires a paradigm shift – to look beyond the 'walls' of intensive care units, while strengthening the capacity of existing units. Public health prevention strategies need to be expanded and reinforced to include legislation for child seatbelt use, infant car seat use and protective headgear for cyclists and protection of recreational water environments.

Jamaica boasts of an expanded programme for immunization with average coverage of 90% (5), although some strengthening is needed in the light of recent decline in coverage. The recent universal access of infants and young children to *Haemophilus influenzae type b* vaccine (HIB) will have a significant impact on the morbidity and mortality resulting from sepsis by this common age-specific organism (12, 13). Consideration should be given for increased access to the conjugated pneumoccocal vaccine at least for at-risk groups, and for the much anticipated rota virus vaccine when this is licensed for use.

Optimal care and treatment of common, potentially life-threatening problems, for example, dehydration, acute asthma and sepsis can be achieved through ongoing training and use of evidence-based protocols. An outstanding achievement in public health policy has been the implementation of oral rehydration therapy in reducing morbidity and mortality associated with dehydration and diarrhoeal illnesses in infants and children. Training and recertification of pertinent personnel (for example, residents, medical practitioners, paediatric and ICU nurses and even parents and child caregivers) in basic and advanced paediatric life support are critical for effective delivery of appropriate management of critically ill children (14, 15). The annual medical undergraduate and postgraduate cohorts provide excellent opportunities for curricular infusion of relevant paediatric life support skills.

Development and implementation of standardized protocols for care in non-ICU settings particularly emergency departments, wards, and during inter- and intra-hospital patient transfer will further enhance patient care and reduce ICU-dependent morbidities. In conclusion, the delivery of optimal paediatric critical care in Jamaica requires healthcare providers to think outside the confines of the ICU (16, 17). Although improving the efficiency and operational capacity of existing units is important, one cannot underscore the value of strengthening public health strategies, training and recertification of relevant personnel in basic and advanced paediatric life support and implementing protocols for care and effective transfer of patients.

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