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April 2010

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Recommended Citation

Haque, A., Haider, R., Salat, M. (2010). Teaching paediatric critical care medicine to paediatric residents. *Journal of the Pakistan Medical Association*, 60(4), 319-21.

Available at: http://ecommons.aku.edu/pakistan_fhs_mc_women_childhealth_paediatr/30

Short Report

Teaching paediatric critical care medicine to paediatric residents

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Abstract

Critical care training during paediatric residency provides an ideal opportunity to learn and refine the skills needed in the early recognition and prompt treatment of the acutely ill paediatric patients. Paediatric critical care medicine is a relatively young sub-specialty in Pakistan. The aim of this study is to describe our experience of teaching paediatric residents in paediatric critical care medicine during paediatric intensive care unit rotation. Our paediatric critical care teaching curriculum for residents is based on the spectrum of our common critical care problems along with basic principal of critical care. The clinical rotation in our paediatric intensive care unit is very dynamic, thrilling, enjoyable and provides a lot of learning opportunities. During the rotation, the residents were exposed to all major critical care illnesses in infants and children. We use four traditional models of learning in our Paediatric Intensive Care Unit (PICU): bedside rounds, direct patient care, didactic learning and self-study. Our curriculum enhances the resident's educational and clinical experience of paediatric intensive care medicine.

Introduction

Critical care training during paediatric residency provides an ideal opportunity to learn and refine the skills needed in the early recognition, timely intervention and prompt treatment of the acutely ill paediatric patients.¹ Paediatrician's confidence in stabilizing an acutely ill child depends on the setting in which they work and train. The recent advancement in Paediatric critical care medicine has dramatically changed the outcome of critically ill children in the last two decades.^{2,3} Paediatric Intensive Care Unit (PICU) is unique because of work load, high acuity environment and caters to a wide range of diverse pathology of various ages. Teaching residents in PICU is quite challenging. After completing their PICU rotation, paediatric residents are expected to have acquired enough fund of knowledge of this discipline to be able to recognize and provide initial management of acutely ill or injured children. Paediatric trainees are less experienced in the management of critically ill children. Several studies, have reported that paediatric residents are hesitant in managing critically ill children, life threatening situations and are also deficient in resuscitation skills.^{4,5} Cullen et al found that the implementation of a paediatric intensivist initiated teaching curriculum was beneficial to residents in the early 1990s.⁶

Academic medicine has changed enormously.⁷ No previous report is found in the literature regarding teaching of paediatric critical care medicine to post-graduate trainees in Pakistan. The aim of this study is to describe our experience of teaching paediatric residents in paediatric critical care medicine during PICU rotation.

Methods

Our PICU is a 5-bed unit (3-multipdisciplinary and 2-cardiac surgical) at the Aga Khan University Hospital (AKUH) Karachi, Pakistan, staffed by two full-time dedicated attending Paediatric intensivists, with about 500 admissions annually. Our PICU provides full range of services including postoperative care of cardiac surgical patients. The paediatric residency training programme has been fully accredited by the College of Physicians and Surgeons (CPSP) since 1986. At present, the programme has thirty-nine residents. Residents rotate for one month during second-year of residency (R2) and again for a further period of three-months during either third-year (R3) or fourth-year of residency (R4). A resident database was compiled from the division of paediatric critical care medicine which contained resident characteristics. Each resident was given a code number for confidentiality. The residents were divided into two groups based on the level of training. The senior residents were third and fourth-year residents (R3 and R4) and the junior residents were second-year residents (R2). We used a structured PICU teaching curriculum whose components are mentioned in Table-1. Our residents' responsibilities included direct patient

Table-1: Structure of PICU Rotation.

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1. Daily patient care round and problem-based learning
 2. Lecture series from PICU course
 3. Assigned reading materials
 4. PICU resident's handbook
 5. PICU test at the end of rotation
-

care, bedside problem-based learning during the daily-morning rounds, and performance of procedures like endotracheal intubation, placement of central venous catheter and arterial line as well as chest tube insertion under the supervision of the attending physician. Residents were given assigned reading material from recent systemic review articles or book chapter on common paediatric critical care problem and a "PICU Handbook" in the beginning of rotation content of which are mentioned in Table-2. There was also a series of didactic

Table-2: Core Topics of PICU Rotation.

Cardiopulmonary Resuscitation
Paediatric Airway
Acute Respiratory Failure
Mechanical Ventilation
Acute Respiratory Distress Syndrome
Status asthma
Paediatric Septic Shock
Cardiogenic Shock
Post-op Cardiac Care
Status Epilepticus
Non- Traumatic Coma
Traumatic Brain Injury
Sedative, Analgesics and NMB Drugs
Acute Renal Failure
Peritoneal Dialysis
Electrolytes & Acid-Base Disorders
Acute Hepatic Failure
Nutrition
Diabetic Ketoacidosis
Poisoning

lectures on core topic of paediatric critical care medicine. The course is authorized and managed by the resident education committee of paediatric section of Society of Critical Care Medicine (SCCM).⁸ There were on-line multiple choice questions based on case-scenario for residents upon completion of their PICU rotation. Our resident's knowledge acquisition was tested by standardized multiple-choice question based on case-based scenarios.⁸ Statistical analysis was performed by using student t-test to compare the two group of residents with a p-value of <0.05 considered as significant.

Results

A cohort of twenty-four paediatric residents was educated through our PICU curriculum from September 2006 to October 2008 during their PICU rotations. Ten of them

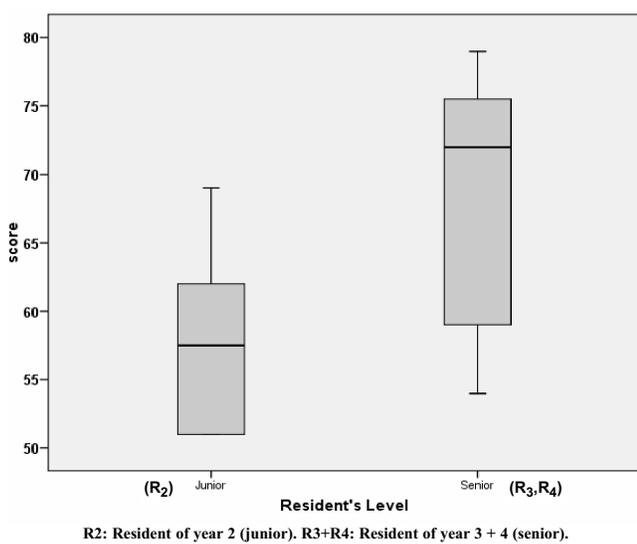


Figure: Test score (%) versus resident's level.

were senior (R3 and R4) and fourteen residents were junior (R2). Residents performed very well in the case-based scenarios multiple-choice questions.⁸ The median senior residents score was 72% (range 54-79%) while the median junior residents score was 58% (range 51-69%). As expected, residents at a higher level of training performed significantly better than junior residents ($p < 0.05$) (Figure).

Discussions

Residency Review Committee (RRC) of Accreditation Council Graduate Medical Education (ACGME) published PICU educational goals for paediatric residents. Paediatric residents must be assured of excellent training in the stabilization of critically ill or injured children to manage their problems appropriately in acute care setting.⁹ This is the first report from Pakistan, to our knowledge, describing the paediatric residents experience in PICU rotation. Our paediatric critical care curriculum is based on the spectrum of our common critical care problems along with basic principal of critical care. The clinical rotation in our PICU is very dynamic, thrilling enjoyable and provides a lot of learning opportunities. During the PICU-stay, the residents were exposed to all major critical care illnesses in infants and children. We use four traditional models of learning in our PICU: bedside rounds, direct patient care, didactic learning and self-study. Recent reports found that bedside rounds are a superior teaching strategy than conference room case presentation.^{10,11} When our residents rotate in the paediatric ward after this rotation, they were more confident in recognizing and managing the acutely ill children and hence, were able to avoid potential cardiac arrest which has a poor outcome. Evaluation of rotation by trainees was done and PICU rotation was rated as the most beneficial experiences from which they learned the most about critically ill children. We believe that implementation of our teaching curriculum in other PICUs would enhance the resident's ability to recognize and stabilize the critically ill children. Our teaching curriculum provides an excellent educational PICU experience. It can be used effectively to teach paediatric residents at other teaching institutions. This will ultimately improve overall care of paediatric population in the country and eventually bring down the paediatric mortality especially in children under the age of 5 years.

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