



Project Report

Teaching course in Paediatric Anaesthesia & Care of the Critically Ill Child Muhimbili National Hospital, Dar es Salaam, Tanzania 11-14 January 2011

Background

Child mortality in Tanzania is unacceptably high. 12% of children die before their fifth birthday, thirty times more than in Sweden. One in every thirty babies dies in association with being born. A major determinant of newborn and child mortality is the care that a child receives in hospital. This emergency care involves resuscitation, critical care and anaesthesia. Poor quality anaesthesia and critical care are common in developing countries and result in complications being missed, acute treatments being delayed or omitted, suboptimal choice and practice of anaesthesia and, all too frequently, the death of the child. Improving paediatric anaesthesia and care of critically ill children could result in significant reductions in mortality.

Muhimbili National Hospital is the largest hospital in Tanzania and functions as the highest level referral hospital in the country. The hospital has 1500 beds, 1100 out-patients are seen each day and 55000 patients are admitted annually. 10,000 babies are delivered each year at Muhimbili, many of which are complex cases referred from other facilities. 50% are delivered by caesarean section necessitating anaesthetic input and frequently resuscitation. Anaesthesia is also required for life threatening conditions in children such as strangulated hernias, birth defects and fractures. 50 operations are carried out on children every week at Muhimbili.



Resources for paediatric anaesthesia are severely limited. The department of Anaesthesia and Intensive Care at Muhimbili has 6 specialist doctors to provide anaesthesia in all the hospital's 14 operating theatres plus supervising the Intensive Care Units (there are currently 9 ICU beds and 21 more will be opened soon). There are no specialists in Paediatric Anaesthesia. The large anaesthetic workload means that the few specialists are not able to provide round-the-clock supervision of the paediatric theatres. Anaesthesia for paediatric surgery is usually carried out by nurses or partially trained anaesthetic officers. The anaesthetic knowledge of these staff was gained during their initial vocational training, supplemented by "on-the-job" diffusion from colleagues, and informal teaching from the specialists. None of the staff have had formal in-service training in paediatric anaesthesia. The facilities in the paediatric theatres are basic, with only one ventilator, manual blood pressure monitoring and no pulse oximeters or syringe pumps. Resuscitation of newborn babies is conducted by nurses and midwives without adequate training and with equipment that is old and dysfunctional. There are no Paediatric ICU beds only a small "Acute Paediatric Care Unit – APCU" with no ventilators, poor monitoring and no oxygen masks or nasal cannulae. The consequences of poor anaesthetic and resuscitation resources are high child and newborn mortalities. In Muhimbili in 2009 10% of newborn babies died.

Karolinska University Hospital is a national referral hospital in Stockholm, Sweden. The hospital has 1600 beds, 4000 out-patients are seen each day and 100,000 patients are admitted annually. The department of Anaesthesia and Intensive Care employs 105 Anaesthesiologists and almost 100 anaesthetic nurses. There are many specialists in Paediatric Anaesthesia, providing a round-the-clock on-call service for sick children. Many of the staff have formal training in paediatric anaesthesia and care of critically ill children, the facilities are modern and advanced and the standard of the care given can be regarded as good as anywhere in the world. Newborn mortality at Karolinska is around 0.1%.



The Muhimbili-Karolinska Anaesthesia and Intensive Care Collaboration (MKAIC) was started in 2009. The initiative came from the doctors at Muhimbili who identified Anaesthesia as a priority area for improvement and an international partnership as the way to achieve this. A formal agreement has been signed with the aims of improving anaesthesia and intensive care provision in the two hospitals and increasing international and cross-cultural understanding. The first project within the collaboration was a teaching course in Obstetric Anaesthesia at Muhimbili Hospital in May 2010. This report is of the second course in Paediatric Anaesthesia and Care of the Critically Ill Child held in January 2011.

Aim of the teaching course

To improve the knowledge and skills of staff in Paediatric Anaesthesia and Care of the Critically Ill Child at Muhimbili thereby improving care for patients and to increase understanding and cooperation between Karolinska and Muhimbili.

Objectives of the course

By the end of the project:

1. Knowledge and skills about Paediatric Anaesthesia and Care of the Critically Ill Child among doctors and nurses at Muhimbili will have improved
2. Four staff from Karolinska will have spent a week at Muhimbili
3. There will be a greater mutual understanding between the staff at Muhimbili and Karolinska, and increased knowledge about the best ways to take MKAIC forwards
4. A plan for the next projects within MKAIC will have been discussed and decided upon
5. Paediatric Anaesthesia and Paediatric Critical Care at Muhimbili will have improved

Planning

During 2010 the course was planned. The teachers from Karolinska were Associate Professor Dr Peter Radell, Dr Tim Baker, Dr Henrik Jörnvall, Dr Ulf Lindsten and Nurse Anaesthetist Gunilla Lööf (who became unfortunately ill and was unable to travel). The local coordinators at Muhimbili were Dr Mpoki and Dr Mulungu and the teachers from Muhimbili were Dr Victor Ringo and Dr Karima Khalid. 75.000SEK were generously donated by the company Matkompaniet (www.matkompaniet.se). Dr Mulungu chose the course participants and organised all practicalities.



Schedule

The first day (Monday 10th January) was for the introduction of the staff of Karolinska and Muhimbili to each other and orientation to the hospital.

Days 2-4 (Tuesday, Thursday, Friday) were the teaching course (Wednesday was a public holiday in Tanzania). The teaching consisted of formal lectures interspersed with interactive sessions. These included role play scenarios, group discussions, questions and recap sessions. A test was conducted at the start and end of the course, and feedback from the participants was sought both written/anonymous and open.

Time was also taken during days 2-4 to re-visit the main theatres and paediatric wards. A detailed course schedule is in Appendix A.

Impressions of Paediatric Anaesthesia and Critical Care at Muhimbili

The theatres at Muhimbili have been renovated in the last year and include central gas supply and an anaesthesia machine in each theatre. Monitoring equipment is somewhat lacking in several theatres and no pulse oximetry was available. Two theatres are reserved for paediatric anaesthesia and in



most cases they are manned by two anaesthesia nurses or technicians. There are not enough specialist Anaesthetists or physician anaesthetists to be able to attend the majority of routine operations. Access to anaesthesia drugs is limited and most inhalational anaesthesia is done with halothane, with isoflurane reserved for special situations due to cost. The recovery room is cramped and lacking also in monitoring equipment – there are no pulse oximeters. Hygiene rules are followed conscientiously and the general atmosphere among both surgical and anaesthesia staff is very positive and friendly.

The “Acute Paediatric Care Unit – APCU” is a small room with four beds for treating the sickest patients. There are no ventilators, no capacity for intubating children, and little involvement from the department of Anaesthesia and Intensive Care. The oxygen supply is reliable, but there are no oxygen masks or nasal cannulae – the oxygen is given through single nasal catheters. The staff are not trained in paediatric critical care. According to staff at Muhimbili, many critically ill children are cared for on the general paediatric wards, where a lack of staff, equipment and oxygen make the care rather basic.

Course Participants

31 participants took part in the course:

2	Specialist Anaesthesiologists
2	Anaesthesiologist trainees
7	Anaesthetic Nurses
2	Specialist Paediatricians
8	Paediatrics trainees
10	Nurses

Knowledge Test

Each participant received a test at the beginning of the course, and again at the end. (Appendix B) In the pre-course test the participants scored an average of 12 questions answered correctly out of 20 (60%). After the course the average score was 16 (80%) giving a relative improvement of 33%.

Course Feedback

A feedback form was distributed at the end of the course for the participants to fill in. The feedback was overwhelmingly positive. Over 80% of the participants felt the course was “very useful” for their work.

Some comments:

“We highly appreciated your teachings – to some of us it was for the first time!”

“We need to have classes at least twice per year”

“Lectures were excellent and easy to understand”

“Scenarios were good to help us remember what to do”

“The course was good because now I know how to resuscitate”

“The facilitators were so good; they wanted people to understand well”

“It was enjoyable exchanging ideas with other staff”

“Facilitators were good at listening to people’s questions”

“The facilitators are very charming and helpful. Congratulations!”

“Special thank you to MKAIC!”

Monitoring & Evaluation

Discussions were held about how to monitor and evaluate the effects of MKAIC and to set up a system of Quality Control into Anaesthesia and Intensive Care at Muhimbili. A Quality Control Officer was chosen at both hospitals – Dr Mulungu at Muhimbili and Dr Jörnvall at Karolinska. Dr Mulungu will



gather monthly data from Muhimbili and send to Dr Jörnvall. Initially the data will be simple data on Paediatric and Maternal mortalities, and once the system is fully functional further quality indicators such as peri-operative mortalities and morbidities will be added.

Budget

The total cost of the course was 58,200 Swedish Kronor.

	Return Flights Stockholm - DAR	40000
	Visas	2500
	Transfers in Stockholm	1000
	Transfers in Dar	700
	Insurance	0
	Medical expenses	700
	Accommodation Dar	11000
	Evening meals Dar	2000
	Stationary	300
	TOTAL SEK	58200
	(dollars)	(8953)

Future plans

Following previous discussions with Dr Mpoki and the other doctors at Muhimbili it was decided that the next course should be in Intensive Care. This is a priority area for improvement at Muhimbili. The course is planned for September 2011. Following this the three courses will be re-run during 2012-2013 to consolidate knowledge and reach staff that missed the first courses. The initiation of study visits and exchanges is seen as a priority. Dr Mpoki will visit Karolinska in June 2011 to facilitate logistics of the exchanges, and Dr Mulungu, Dr Ringo and Dr Lugazia will travel to Sweden during 2011/2012.

Conclusions

The initial project objectives 1, 2, 3 and 4 have all been successfully met. Objective 5 is a longer term goal and is yet to be evaluated – it will be assessed at the subsequent MKAIC visits to Muhimbili.

Overall the course has been a great success. The reception at Muhimbili was extremely positive, the staff from Karolinska found it rewarding and interesting, the participants gave the course very positive feedback and the test showed a dramatic improvement in knowledge levels. Most of all it was clear that there is a huge need for an initiative in Anaesthesia and Intensive Care. MKAIC has both a well defined role and the capacity to fulfil that role. Improvements are important and achievable, and if MKAIC can continue to achieve its objectives there is potential to save a significant number of lives.



Appendix A Course schedule

Tues: 11/1	08.00:	Arrival of participants and introduction
	09.00:	Pre-course test
	09.30:	The Healthy Child
	10.30:	Coffee
	11.00:	The Acutely Ill Child & ABC Part I
	12.00:	Scenarios
	12.30:	Lunch
	13:15:	The Acutely Ill Child & ABC Part II
	14.15:	Scenarios
	15.00:	End
Thurs: 13/1	08.00:	Recap
	08.30:	Neonatal Resuscitation
	09.30:	Scenarios
	10.30:	Coffee
	11.00:	Paediatric Resuscitation
	12:00:	Scenarios
	13.00:	Lunch
	14.00:	Pre-op assessment
	15.00:	End
Fri: 14/1	08.00:	Recap
	08.30:	General Anaesthesia for children
	09.30:	Ketamine
	10:00	Seminars
	11.00:	Coffee
	11.30:	Recovery room care
	12.00:	Post-op care & Pain management
	12.30:	Post-course test
	13.00:	Lunch
	13.45:	Feedback
	14.15:	Test discussion & certificates
14.45:	Closing address	
15.00:	End	

**Appendix B Pre & Post course Test**

Put a cross in the box that is the correct answer to the following questions:

- Small children have a high risk of becoming hypoxic because:
 - They breathe slowly
 - They have small oxygen reserves
 - They have fetal hemoglobin
- An important treatment for a newborn with a pulse of 50 is:
 - CPR (Cardiopulmonary Resuscitation)
 - Nothing, this is normal
 - Hydrocortisone
- Which of the following is NOT a sign of respiratory distress in a child?
 - Chest indrawing
 - Fast respiratory rate
 - Delayed capillary refill
- The correct size of Endotracheal Tube for a normal weight newborn baby is most likely:
 - 2
 - 3.5
 - 5
- What is most important during CPR in a child?
 - Ventilation
 - Chest compressions
 - Medication
- The optimal position to maintain a free airway when doing ventilation in an unconscious 1 year old is:
 - Sniffing position
 - Bend the head back
 - Place a towel under the shoulders
- A reasonable approximation of a 2year old's weight is:
 - 12kg
 - 10kg
 - 14kg
- The ideal location for an intraosseous cannula is:
 - The tibia
 - The hip
 - The forearm
- How much IV fluid should be given to a 12kg child in shock?
 - 100ml then reassess
 - 240ml then reassess
 - 24ml then reassess
- What is the correct ratio of chest compressions to breaths in neonatal resuscitation?
 - 15:2
 - 3:1
 - 6:1
- The correct dose of adrenaline for neonatal resuscitation is 10mcg/kg. If your adrenaline is 0.1mg/ml how many millilitres should you give to a 3kg baby?
 - 0.3ml
 - 3ml
 - 0.1ml
- What is the correct dose of glucose in an unconscious 10kg child with suspected hypoglycaemia?
 - 50ml 10% glucose
 - 50ml 50% glucose
 - 5ml 5% glucose
- When evaluating conscious level, the scale "AVPU" can be used. What does the "V" stand for?
 - Volume
 - Ventilation
 - Voice
- What is the first course of action for a newborn baby who is not breathing?
 - chest compressions
 - tactile stimulation
 - IV adrenaline
- How much maintenance fluid does a 13kg child need per 24hrs?
 - 1150ml
 - 2000ml
 - 650ml
- Reduced urine output postoperatively should usually be treated first with:
 - Frusemide
 - Fluids
 - Dopamine
- Do newborn babies require pain relief for surgery?
 - No, they can't feel pain
 - Yes, in the same way as other patients
- Which of the following is an indication for oxygen?
 - Newborn baby with respiratory rate 50/min
 - 11 month old with respiratory rate of 45/min
 - 3 year old with respiratory rate of 45/min
- The standard intubating dose of Thiopentone is:
 - 1-3 mg/kg
 - 12-20 mg/kg
 - 5-10 mg/kg
- Which of the following is a contraindication to Succinylcholine?
 - 50% burn injury 2 days ago
 - Liver failure
 - Premature baby



Appendix C Photos from the Course



Muhimbili



Participants



Lecture



Meeting the Executive Director



Course packs



Studying



Seminars



Dr Karima's lecture



Heimlich



Resuscitation Mannikin