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Training Liberian midwives in advanced obstetrics

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Training of midwives in advanced obstetrics in Liberia

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Abstract

\textbf{Problem} In Liberia, comprehensive emergency obstetric and neonatal care is limited by the small number of doctors.

\textbf{Approach} In a pilot project, two midwives were trained in advanced obstetric procedures and in the team approach to the in-hospital provision of advanced maternity care. The training took two years and was led by a Liberian consultant obstetrician with support from international experts.

\textbf{Local setting} The training took place in CB Dunbar Maternity Hospital. This rural hospital deals with approximately 2000 deliveries annually and many of these deliveries are complicated. In February 2015 there were just 117 doctors available in Liberia.

\textbf{Relevant changes} In the first 18 months of training, the trainees were involved with 236 caesarean sections, 35 manual evacuations of products of conception, 25 manual removals of placentas, 21 vaginal breech deliveries, 14 vacuum deliveries, four repairs of ruptured uteri, the management of four cases of shoulder dystocia, three hysterectomies, two laparotomies for ruptured ectopic pregnancies and numerous obstetric ultrasound examinations. The trainees also managed 41 cases of eclampsia or severe pre-eclampsia, 25 of major postpartum haemorrhage and 21 of shock. Although, initially they only assisted senior doctors, the trainees subsequently progressed from direct to indirect supervision and then to independent management.

\textbf{Lessons learnt} To compensate for a scarcity of doctors able to undertake comprehensive emergency obstetric and neonatal care, experienced midwives can be taught to undertake advanced obstetric care and procedures. Their team work with doctors can be particularly valuable in rural hospitals in resource-poor countries.

Introduction

In February 2012, Maternal and Child health Advocacy International approached the Liberian Ministry of Health and the World Health Organization (WHO), proposing a collaborative partnership to reduce rates of maternal and neonatal mortality in Liberia. One aim was to address the shortfall in doctors by training experienced midwives in advanced obstetrics. In October 2012, a formal partnership – including a pilot project training two experienced midwives – was established.
There are at least three reasons for the major shortage of doctors in Liberia. One is the armed conflict that ravaged the country between 1989 and 2003. Another is that more than three quarters of doctors trained in Liberia emigrate to practise elsewhere. Finally, 184 health workers in Liberia died from Ebola virus disease in the 2014–2016 outbreak. According to the ministry of health, only 117 doctors were available in the country in February 2015.

In 2012, the United Nations Children’s Fund reported that Liberia had 990 maternal deaths per 100,000 live births, 34 neonatal deaths per 1000 live births and a lifetime risk of maternal death of one in 20. The corresponding values reported in 2014 were similar: 990 maternal deaths per 100,000 live births, 27 neonatal deaths per 1000 live births and a lifetime risk of maternal death of 1 in 24.

In September 2013 – after a debate supported by the ministry of health – the Liberian Medical and Dental Council approved the provisional registration of the first two midwives to train as obstetric clinicians. The midwives’ selection for this pilot study was based on their five to six years’ experience in midwifery, the quality of their work in public health facilities and their performance on an internationally accredited three-day training course in emergency obstetric and neonatal care held in Liberia.

**Approach**

Apprenticeship-based training in advanced obstetric care was undertaken in CB Dunbar Maternity Hospital, which lies in Bong county – a rural area of almost 9000 km² with a population of about 330,000. This hospital is the county’s main provider of maternity care, caring for approximately 2000 deliveries per year – many seriously complicated by poverty and by delays in transfer from remote villages.

A curriculum was provided by Maternal and Child Health Advocacy International and education was led by a Liberian consultant obstetrician with support from two international obstetricians and a professor of paediatrics.

The education materials provided to the trainees and trainers included a practical manual and pocket book produced by Maternal and Child Health Advocacy International, a manual of basic practical skills in obstetrics and gynaecology, a manual on diagnostic ultrasound and a textbook on surgical care. Videos of maternal and neonatal care produced by the Advanced Life Support Group, Global Health Media, Maternal and Child Health Advocacy International, Medical Aid Films and WHO were also used.

The training began in October 2013 – i.e. a few weeks after preregistration on 3 September 2013. The first three months consisted of a mixture of theory and practice, as
outlined in the curriculum. This foundation training covered knowledge of the anatomy of the female pelvis, basic surgical skills such as suturing, sterilization of instruments, hand washing and the proper use of gowns and gloves, maintenance of the operating theatre, postoperative care, the obstetric use of ultrasound and a basic understanding of obstetric anaesthesia. With the ultrasound, trainees were expected to learn to recognize malpresentations, placenta praevia and other possible problems that may make surgery difficult. At the end of the foundation period, the Liberian and international trainers used an objective structured clinical examination in obstetric anatomy and basic surgical skills to determine the trainees’ progress.

The trainees’ practical skills were increased in the apprenticeship-based training that ran for two years – initially in parallel with classroom-based foundation training. Apprenticeship-based training consisted of a mixture of work experience – when the trainees undertook essential obstetric procedures and treated major complications of pregnancy and delivery – and training in systems of care and team working.

The trainees were given increasing levels of responsibility and involvement over time. At first, the trainees just assisted a senior doctor but, as time passed, they became the primary people undertaking the procedures, albeit always with a senior doctor in the hospital who could give advice or assistance. At this stage, a trainee would often be working with – and supervising – a junior doctor, a peri-operative nurse or at least one other midwife. As time passed, the trainees were given more independence. For example, they were allowed to perform caesarean sections either with someone who had not been trained to do the procedure or with someone who had been trained but played no active role in the surgery. At this stage, a senior doctor was always available to give advice but that doctor could be off-site – e.g. asleep at home – or working elsewhere in the hospital. Records of each procedure involving a trainee were kept in a paper logbook and on a tablet computer.

For quality control, there was continuous clinical assessment of the trainees and examination of the procedural logbook, case-based discussion, supervisor-observed experience and reflective practice forms.

At the end of two years, the trainees were given internships during which they are to continue their apprenticeship-based training for at least one year in Liberian hospitals, supervised by senior doctors. During internships, each trainee will undergo a period of observation – as she undertakes advanced procedures – by Liberian Medical and Dental Council officers, the main Liberian trainer and an international obstetrician. If these observers see evidence of adequate skills and knowledge, and if the trainees pass a final, written examination,
trainees will receive a five-year license to practise as obstetric clinicians in public hospitals chosen by the Liberian Ministry of Health.

Both trainees received their basic hospital salary throughout the project. They also received incentives of 150 United States dollars (US$) per month from Maternal and Child Health Advocacy International during their apprenticeship, which increased to US$ 300 when they became interns.

Results
Both trainees successfully completed the objective structured clinical examination and scored high marks in surgical equipment and practice (17/20 and 17/20), opening and closing the abdomen (21/27 and 22/27), uterine anatomy (25/33 and 23/33), bony pelvis anatomy (17/20 and 13/20) and vulval and vaginal anatomy (34/40 and 31/40). Overall scores for the two trainees were 114/140 (81%) and 106/140 (76%).

During their apprenticeship-based training, the two trainees were closely involved with hundreds of advanced obstetric procedures and the management of many serious complications of pregnancy or delivery (Table 1). The trainees participated – often in a leadership role – in the management of all activities within the maternity unit and helped to ensure that the labour and delivery wards and operating theatres were well organized, effective and safe (Box 1). They worked as part of the medical team on shifts of 48–72 hours, supported the senior doctors and helped to train junior doctors. Although there was considerable personal risk, the trainees and their Liberian trainers worked through the outbreak of Ebola virus disease. Support from the trainees – especially at night – helped to provide better sleep patterns for the hospital’s doctors. Although many of the women treated by the trainees were seriously ill, none of them died. The trainees were involved in the successful resuscitation of 73 neonates who did not breathe at birth. At the time of writing, both trainees are awaiting final licensing by the Liberian Medical and Dental Council.

Rates of maternal and neonatal mortality in Bong county were documented. However, the potential impact of the training programme on these rates was difficult to evaluate because of the outbreak of Ebola virus disease. As the programme continues, its impact on mortality and morbidity should be easier to document.

Discussion
It appears that, before this pilot project, there was no formal training for midwives to undertake advanced surgical obstetric care. The arguments as to why such training is needed in many
rural areas of sub-Saharan Africa where there are few doctors and under special circumstances have been summarized elsewhere.\textsuperscript{12}

A year of negotiations was necessary before the Liberian Medical and Dental Council were willing – provisionally – to register the first two trainees. The delay reflected doubts from some doctors about the likely benefits. A senior doctor who began working with the two trainees halfway through their training was initially worried about whether midwives could ever safely undertake procedures such as caesarean sections. After a few weeks working alongside the two trainees, however, this doctor became convinced that this approach represents a necessary and effective way forward for rural hospitals in Liberia.

The Ministry of Health have now agreed to increase the number of obstetric clinicians in Liberia, via a second round of training. Another seven experienced midwives started training in October 2015 – together with two physician assistants with extensive experience in midwifery. Four of the new trainees come from a hospital in a remote county of Liberia where there is only one doctor undertaking advanced obstetric surgery. Once trained, some of these four trainees will return to work long-term in this hospital.

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**Competing interests:**
None declared.
References


Box 1. Summary of main lessons learnt

- Experienced midwives can become obstetric clinicians by being taught the skills needed to undertake advanced obstetric procedures such as caesarean sections.
- Obstetric clinicians can work well within a maternity team, assisting doctors and providing improvements in comprehensive emergency obstetric and neonatal care.
- Obstetric clinicians are likely to be particularly valuable in rural hospitals in resource-poor countries where there are few doctors trained in advanced obstetrics.

Table 1. Actions of the two trainees during the first 18 months of their preregistration training, Liberia, 17 October 2013–31 March 2015

<table>
<thead>
<tr>
<th>Trainee action</th>
<th>No. undertaken</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Procedure</strong></td>
<td></td>
</tr>
<tr>
<td>Caesarean section</td>
<td>236</td>
</tr>
<tr>
<td>Trainee as assistant</td>
<td>77</td>
</tr>
<tr>
<td>Trainee under direct supervision</td>
<td>52</td>
</tr>
<tr>
<td>Trainee under indirect supervision</td>
<td>69</td>
</tr>
<tr>
<td>Trainee managing procedure independently</td>
<td>38</td>
</tr>
<tr>
<td>Manual vacuum aspiration for miscarriage</td>
<td>42</td>
</tr>
<tr>
<td>Manual removal of placenta</td>
<td>25</td>
</tr>
<tr>
<td>Vaginal breech delivery</td>
<td>21</td>
</tr>
<tr>
<td>Vacuum delivery</td>
<td>14</td>
</tr>
<tr>
<td>Repair of ruptured uterus&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4</td>
</tr>
<tr>
<td>Shoulder dystocia</td>
<td>4</td>
</tr>
<tr>
<td>Hysterectomy&lt;sup&gt;c&lt;/sup&gt;</td>
<td>3</td>
</tr>
<tr>
<td>Destructive procedure&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2</td>
</tr>
<tr>
<td>Laparotomy for ruptured ectopic pregnancy&lt;sup&gt;c&lt;/sup&gt;</td>
<td>2</td>
</tr>
<tr>
<td><strong>Management of serious complication</strong></td>
<td></td>
</tr>
<tr>
<td>Eclampsia or severe pre-eclampsia</td>
<td>41</td>
</tr>
<tr>
<td>Postpartum haemorrhage</td>
<td>25</td>
</tr>
<tr>
<td>Shock</td>
<td>21</td>
</tr>
</tbody>
</table>

<sup>a</sup> Training took place at the CB Dunbar Maternity Hospital in Gbanga, Bong county. In this hospital, during the period covered by this table, there were 3017 births and 648 caesarean sections and the two trainees successfully resuscitated 73 neonates, failed to resuscitate 12 neonates, recorded 39 cases of intrauterine fetal death and treated 386 women – none of whom died.

<sup>b</sup> Some of the patients treated by the trainees required both a procedure and the management of a serious complication.

<sup>c</sup> Trainee(s) only assisted with this procedure.