

## PRELIMINARY REPORT

# Establishing standards for obstructed labour in a low-income country

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*Submitted: 2 June 2008; Resubmitted: 26 June 2008; Published: 8 August 2008*

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*Rural and Remote Health 8: 1022. (Online), 2008*

Available from: <http://www.rrh.org.au>

## ABSTRACT

**Introduction:** Conventionally standards for maternity care are developed by a panel of experts (usually obstetricians) and then implemented by a multidisciplinary team. The present study concerns the feasibility of involving health professionals of all grades in the establishment standards for obstructed labour in Malawi.

**Methods:** Standards for obstructed labour were developed by a multidisciplinary team involving all cadres of health professionals working in maternity units, as well as hospital managers and policy makers, using evidence from Malawi national guidelines, World Health Organisation manuals and peer-reviewed journals. Each standard consisted of a clear objective with structure, process and outcome criteria.

**Results:** Seven objectives were agreed, and structure, process and outcome criteria were developed for each objective. The standards addressed different aspects of the management of obstructed labour, namely early recognition of prolonged labour by labouring women and traditional birth attendants, early arrival of women to health facilities during labour, proper use of partograph by healthcare providers, proper management of prolonged labour, proper management of obstructed labour, appropriate management of uterine rupture and early delivery of the baby.



**Conclusion:** It is feasible to develop standards of emergency obstetric care in low-income countries using a multidisciplinary team that involves health professionals of all grades. The involvement of all health professionals might promote successful implementation, ownership and sustainability. The involvement of hospital managers and policy makers in the early stages of criteria-based audit might promote support from the hierarchy with regards to the allocation of resources.

**Key words:** Malawi, obstructed labour, standards of care.

## Introduction

Obstructed labour is a disorder of foeto-pelvic relationships characterised by failure to progress despite strong uterine contractions. Obstructed labour affects 3-6% of labouring women globally, and is a major cause of both maternal and newborn morbidity and mortality<sup>1</sup>. Obstructed labour is associated to high perinatal mortality rate (150 to 650 per 1000 births) and contributes to 8% of maternal mortality<sup>2-5</sup>. More than 80% of these maternal deaths can be prevented by improving the availability and quality of Emergency Obstetric Care (EmOC)<sup>5</sup>.

Malawi is a sub-Saharan African country in which approximately 80% of the population live in rural areas and only 57% of deliveries take place in health facilities, with the remainder taking place at home or with a Traditional Birth Attendant (TBA)<sup>6</sup>. The referral system is weak due to poor roads, lack of transport and an absence of communication between health centres and hospitals. In addition, suboptimal quality of care is a common problem in health facilities<sup>7</sup>. This implies that emergency obstetric care services are difficult to access and, where accessible, are of sub-optimal quality.

Criteria-based audit can improve the quality of professional practice<sup>8</sup>. Criteria-based audit is strongly supported by expert opinion as well as national and international organisations including the World Health Organisation (WHO) and the National Institute of Clinical Excellence (NICE) in the United Kingdom<sup>9,10</sup>. NICE defines audit as:

*A quality improvement process that seeks to improve patient care and outcomes through systematic review of care against explicit criteria and implementation of change. Aspects of structure, processes, and outcomes of care are selected and systematically evaluated against explicit criteria. Where indicated, changes are implemented at individual, team, or service level and further monitoring is used to confirm improvement in healthcare delivery<sup>10</sup>.*

The criteria-based audit consists of five steps which constitute the classic audit cycle (Fig1). The first step is the development of standards. Once standards have been developed, current practice is measured and compared with standards (optimal practice). Gaps in current practice are identified, recommendations made and implemented, and progress is evaluated.

Traditionally standards have been developed by a panel of experts and then implemented by a multidisciplinary team. As part of a collaborative program to reduce maternal and neonatal mortality in Malawi, the authors sought to introduce criteria-based audit for emergency obstetric care. The feasibility of involving all cadres of health professionals in the establishment of standards for obstructed labour in Malawi was studied. This article describes the process and presents the standards for obstructed labour developed in Malawi.



**Figure 1: Criteria-based audit cycle.** This figure presents the classic criterion-based audit cycle, which has five steps: (i) establishing standards of best practice; (ii) measuring the current practice; (iii) comparing the current practice with standards of best practice; (iv) making and implementing recommendations to fill the gaps between current practice and best practice; and (v) involving a re-evaluation of the recommendations implemented and where necessary refining practice.

## Methods

Standards for obstructed labour were developed in three districts (Salima, Kasungu, Lilongwe) in the Central region of Malawi. The three districts have a population of 2 812 183 people with 73 health facilities (9 hospitals and 64 health centres). Before the establishment of these standards a baseline survey was conducted in the three districts. All hospitals and health centres in the three districts were visited and data collected on maternal and newborn health services and outcomes for a period of 3 months (1 May to 31 July 2006). These data helped identify areas in which standards should be established.

The standards for obstructed labour were established during three workshops that brought together participants from the three districts and from the Ministry of Health.

### *Workshop 1: Establish standards for obstructed labour*

The standards were developed using evidence from Malawi national guidelines and WHO manuals<sup>11,12</sup>. Where necessary, this was supplemented by evidence from the Cochrane database and articles from peer-reviewed journals. Local standards were established during a workshop that brought together 61 participants who included representatives from all hospitals, some health centres and the Ministry of Health. Health professionals of all grades working in maternity units (nurses, midwives, laboratory technicians, anaesthetic technicians, doctors and obstetricians) were represented. The



workshop was led by healthcare providers in the three districts. Participants were divided into four groups and each group was made up of a multidisciplinary team. There was one facilitator per group and the facilitator encouraged active participation of all members in the group. The seven objectives were established during a joint session in which all groups were present. The groups established the structure, process and outcome during break-out sessions. During plenary sessions that followed the break-out sessions, the groups came together and each group presented its work. The participants discussed how standards are derived and how they are stated with clear objectives and structure, process and outcome criteria for each objective. The participants had lively discussion and debated openly on subjects such as: What is feasible in our districts? What is the reproductive policy and strategic plan? What is current evidence/best practice? Agreement on standards were reached by simple consensus. At the end of this two-day workshop, the participants agreed on seven objectives and developed the structure, process and outcome criteria for each objective.

## ***Workshop 2: Review and finalise the standards initially developed***

The second workshop brought together 55 participants from the Ministry of Health, health centres and hospitals of the three target districts. The participants reviewed the standards developed during the first workshop and agreed on a final list of criteria. During this review process, the participants considered evidence from the WHO manuals and national guidelines<sup>11,12</sup> and their relevance to the three districts.

## ***Workshop 3: Select criteria to audit during the next 6 months***

The third workshop brought together 58 participants from health centres and hospitals (healthcare providers and administrators). From the initial list of 137 criteria, 6 criteria were selected to be audited within the next 6 months, in

order to assess and improve the management of obstructed labour in maternity units in the three districts. Current practice will be measured by a retrospective review of case notes. Gaps between current practice and standards will be identified and recommendations made for change. A re-audit will be conducted later to evaluate the recommendations and practice.

## **Results**

### ***Prolonged/obstructed labour in the three districts prior to the establishment of standards***

During a period of three months (1 May to 31 July 2006) there were 269 cases of prolonged labour and/or obstructed labour in the three districts. Before the establishment of standards the healthcare providers did not routinely distinguish between prolonged labour and obstructed labour. Approximately half (49.4%) the cases of obstructed labour were referred from another health facility (65.0%) or by a TBA (35.0%). However some of the cases referred by health centres had been referred to the health centre by a TBA. Approximately three-quarters (74.7%) of the cases of obstructed labour had Caesarean section. All hospitals and health centres declared that routinely monitor all cases of labour with a partograph. Table 1 presents statistics on prolonged labour/obstructed in the three districts before the establishment of standards.

### ***Agreed standards for obstructed labour***

Table 2 presents the definition of obstructed labour as agreed by participants. Prolonged labour was defined as labour lasting more than 12 hours<sup>12</sup>. Prolonged labour precedes the development of obstructed labour which is a syndrome characterised by signs of failure to progress despite adequate uterine contractions.



**Table 1: Obstructed labour in three districts in Malawi (1 May to 31 July 2006)**

Variable	District			Total
	Kasungu	Lilongwe	Salima	
Population	608 917	1 871 958	333 308	2 812 183
Expected deliveries*	7612	33 400	1414	42 426
Facility deliveries (%)	27.6	30.0	43.6	31.1
Prolonged/obstructed labour	77	154	38	269
Prolonged/obstructed labour referred <sup>†</sup> (%)	51.9	55.2	47.4	49.4
Prolonged/obstructed labour in which Caesarean section was performed (%)	70.1	75.3	81.6	74.7

\*The expected number of deliveries was calculated as 5% of population based on Malawi crude birth rate of 50 per 1000.

†Referred from another health facility or a traditional birth attendant.

**Table 2: Working definition of obstructed labour, as agreed by participants**

Essential	Feature	
	Additional*	
<ul style="list-style-type: none"> <li>◆ Labour with failure to progress requiring surgical delivery or assisted vaginal delivery</li> </ul>	<ul style="list-style-type: none"> <li>◆ Labour &gt;12 hours</li> <li>◆ Hypertonic uterine contractions</li> <li>◆ Bandl's ring</li> <li>◆ Uterine rupture</li> <li>◆ Blood-stained urine</li> <li>◆ Caput or moulding</li> <li>◆ Clinical signs of shock (systolic blood pressure &lt;90mmHg and pulse &gt;110/min)</li> </ul>	

\*At least one of the listed features

The standards developed for obstructed labour consisted of seven objectives, each with structure, process and outcome criteria. The standards addressed different aspects of the management of obstructed labour, namely: early recognition of prolonged labour by labouring women and TBAs; early arrival of women during labour at health facilities; proper use of partograph by healthcare providers; proper management of prolonged and/or obstructed labour; and proper management of uterine rupture (a common complication of obstructed labour). Table 3 presents the agreed standards for obstructed labour (each bullet point in this table represents to one criterion).

The seven objectives were:

1. Prolonged labour is correctly identified by TBAs, women and their families, and referred to the health facility.
2. Pregnant women are encouraged to report to a health facility when labour commences.
3. All women in labour in the health facility are adequately monitored with a partograph and proper action taken.
4. Health providers correctly recognize and manage all cases of prolonged labour in a health facility.
5. Health providers correctly recognize and manage obstructed labour.
6. All women suspected to have uterine rupture are given initial treatment and preparation to have a laparotomy within 1 hour of diagnosis.



7. All women with obstructed labour (and a live foetus) have Caesarean section commenced within 1 hour of diagnosis.

## *Criteria selected to audit in the first six months*

Six criteria were selected to be audited in the next 6 months, namely: (i) an intravenous (IV) line is set up and the patient hydrated by giving IV fluids; (ii) typing and cross-matching should be performed; (iii) the urinary bladder should be drained; (iv) broad spectrum antibiotics should be administered; (v) Caesarean section is commenced within 1 hour or the foetus delivered within 2 hours of diagnosis; and (vi) an observation chart (pulse, temperature, blood pressure, and urine output) is set up and maintained.

The selection was based on perceived deficiencies in the management of obstructed labour in maternity units in the three districts. The criteria addressed different aspects of care, such as treatment of dehydration, typing and cross-matching of blood, draining of the urinary bladder, administration of antibiotics, monitoring and prompt delivery by Caesarean section or vaginal delivery, as indicated.

## Discussion

This article describes the development of standards for obstructed labour in a resource-limited setting by a multidisciplinary team involving all cadres of health professionals working in maternity units, as well as hospital managers and policy makers in Malawi. Criteria to be audited in the next 6 months were identified by the participants based on perceived deficiencies, level of priority and availability of resources. It was noted that important but simple principles of care for women with obstructed labour (such as hydration; typing and cross-matching; draining of the urinary bladder; and administration of broad spectrum antibiotics) were not routinely carried out for all patients with obstructed labour.

Some authors have reported the introduction of criteria-based audit in developing countries<sup>13-15</sup>. All these studies used the conventional method of establishing standards where standards are developed by a panel of experts (usually obstetricians) and then implemented by a multidisciplinary team, usually made up of nurses, midwives, doctors and specialists, including obstetricians. Following this conventional approach, the lower cadres of staff are excluded from the early stages of the audit cycle, namely the development of the standard. We involved all grades of staff in this criteria-based audit from the beginning, so they all participated in the establishment of standards. The early involvement of all staff is aimed to promote successful implementation, ownership and sustainability of the standards. We also involved hospital managers and policy-makers; their involvement was also important in promoting changes in the organisation of services. It was also hoped their involvement would encourage support from the hierarchy with regard to the provision of resources required for the implementation of the standards.

The development of standards is the first step in an audit cycle. This crucial step lays the foundation for the clinical audit cycle. If the first step is falsified, then the whole process is invalidated. However, the success of a criteria-based audit in improving the quality of care depends on the ability of the audit team to overcome constraints encountered during the entire cycle.

## Conclusion

Ronsmans identified five potential constraints to the introduction of criteria-based audit in developing countries - (i) poor access to scientific literature; (ii) lack of resources to support audit activities; (iii) the hierarchical structure of the medical profession; (iv) poor quality of case notes; and (v) the scale of resource constraints<sup>16</sup>. However, our experience suggests it is feasible to develop standards of emergency obstetric care in a low-income country, using a multidisciplinary team that involves health professionals of all grades.



**Table 3: Standards for obstructed labour, as agreed by the participants**

Objectives	Structure	Process	Outcome
<p>1. Prolonged labour is correctly identified by TBAs, women and their families, and referred to the health facility</p>	<ul style="list-style-type: none"> <li>◆ TBAs, women, families and health providers</li> <li>◆ IEC materials: banners, drama groups, women's groups, flip charts, posters, leaflets, videos, radio etc.</li> <li>◆ Mode of transport such as ox cart, bicycle ambulance etc.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Training of TBAs (initial training and refresher courses) accompanied by effective supervision of the TBAs</li> <li>◆ Education of ANC mothers on the recognition of prolonged labour as well as obstructed labour</li> <li>◆ Show videos of prolonged labour and of obstructed labour to TBAs and ANC mothers</li> <li>◆ Women to discuss maternal health issues</li> <li>◆ Community education (i.e. women and their families) on signs and symptoms of prolonged labour and the dangers of home delivery</li> <li>◆ Early recognition of prolonged labour (labour lasting longer than 12 hours) by women, their families and TBAs.</li> </ul>	<ul style="list-style-type: none"> <li>◆ 95 % of all cases of prolonged labour in the community are correctly recognized by mothers, their families or TBAs and referred to health facility.</li> <li>◆ All women with prolonged labour should reach the health facility with 12 hours</li> </ul>
<p>2. Pregnant women are encouraged to report to health facility when labour commences</p>	<ul style="list-style-type: none"> <li>◆ Women and their families</li> <li>◆ Skilled health workers</li> <li>◆ Women groups</li> <li>◆ IEC materials: flip charts, leaflets etc.</li> <li>◆ Community transport, that is ox cart, bicycle ambulance etc.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Health education on signs and symptoms of labour and the importance of facility delivery during (1) ANC, (2) open days and (3) outreach clinics</li> <li>◆ Health education on the need to report to health facility when labour commences or membranes are ruptured</li> <li>◆ All women attended to within 15 min on arrival in the health facilities by the midwives or clinician</li> </ul>	<ul style="list-style-type: none"> <li>◆ 70% of women report to the health facility when labour commences</li> <li>◆ 100% of women are attended to within 15 min of arrival in the health facility</li> <li>◆ Increased number of deliveries at facility</li> <li>◆ Increased number of deliveries with skilled attendance</li> </ul>
<p>3. All women in labour in the health facility are adequately monitored with a partograph and proper action taken</p>	<ul style="list-style-type: none"> <li>◆ Partographs</li> <li>◆ Monitoring equipment, that is BP machine, stethoscope, foetoscope, thermometer etc.</li> <li>◆ Gloves and antiseptics</li> <li>◆ Health providers (midwives and clinicians) trained to fill and interpret the partograph</li> <li>◆ Midwives available 24 hours in the labour ward</li> <li>◆ Supervisor (who should be a senior person in maternity who knows how to fill and interpret the partograph)</li> <li>◆ BP machines</li> <li>◆ Foestoscope and stethoscope</li> <li>◆ Watch</li> </ul>	<ul style="list-style-type: none"> <li>◆ All skilled birth attendants working in the labour ward to be refreshed on the proper filling and interpretation of the partograph</li> <li>◆ Skilled birth attendants correctly identify women in labour or onset of labour</li> <li>◆ Skilled birth attendants in the labour ward correctly fill and interpret the partographs</li> <li>◆ Women in labour are monitored with partograph in the labour ward and correct action is taken</li> <li>◆ The supervisor ensures correct filling and interpretation of the partograph</li> </ul>	<ul style="list-style-type: none"> <li>◆ All women (100%) who deliver in the health facility are monitored with a partograph</li> <li>◆ All partographs are properly filled and interpreted</li> <li>◆ Appropriate action should be taken to all filled partographs</li> </ul>



**Table 3 continued**

Objectives	Structure	Process	Outcome
<p>4. Health providers correctly recognize and manage all cases of prolonged labour in the health facility</p>	<ul style="list-style-type: none"> <li>◆ Tutors, lecturers and trainers</li> <li>◆ Health providers (midwives and clinicians) trained on the diagnosis and treatment of prolonged labour</li> <li>◆ Learning materials e.g. books, videos.</li> <li>◆ Partographs</li> <li>◆ Urinary catheter and bag</li> <li>◆ Gloves</li> <li>◆ Suction tube for the baby</li> <li>◆ Foetoscope</li> <li>◆ Swabs and plaster</li> <li>◆ Giving set, cannula</li> <li>◆ IV fluid</li> <li>◆ Oxytocin</li> <li>◆ BP machines and stethoscope</li> <li>◆ Antibiotics</li> <li>◆ Vacuum extractor</li> <li>◆ Bag and mask for neonatal resuscitation</li> <li>◆ CS set</li> </ul>	<ul style="list-style-type: none"> <li>◆ Training of midwives and clinicians to recognize and manage prolonged latent and active phases, and prolonged second stage of labour.</li> <li>◆ Skilled birth attendants correctly diagnose prolonged labour by using the partograph.</li> <li>◆ Skilled birth attendants correctly manage prolonged labour</li> </ul>	<ul style="list-style-type: none"> <li>◆ 100% of clients with prolonged labour in health facility are diagnosed correctly</li> <li>◆ 100% of women with prolonged labour are managed correctly</li> <li>◆ Reduction in the proportion of women in labour who progress to obstructed labour in health facility</li> </ul>
<p>5. Health providers correctly recognize and manage obstructed labour</p>	<ul style="list-style-type: none"> <li>◆ Health workers equipped with life saving skills</li> <li>◆ Adequate supplies and equipment in labour ward: IV set, fluids, vacuum extractor, antibiotics, urinary catheter, etc.</li> <li>◆ CS set</li> <li>◆ Functional theatre</li> <li>◆ Surgeon and anaesthetist</li> <li>◆ Functional laboratory</li> <li>◆ Functional ambulance</li> <li>◆ Communication facilities (radio and phone)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Health provider training in life saving skills</li> <li>◆ Providers correctly diagnose obstructed labour: large caput, excessive moulding, Bandl's ring, ballooning of the lower uterine segment, foetal and maternal distress, bloody urine when catheterised, rising fundus</li> <li>◆ Providers correctly manage obstructed labour by CS or refer</li> </ul>	<ul style="list-style-type: none"> <li>◆ Case fatality for obstructed labour &lt;1%</li> <li>◆ 98% of women with obstructed labour who arrives in the health facility are correctly managed</li> </ul>





Table 3 continued

Objectives	Structure	Process	Outcome
6. All women suspected to have uterine rupture are given initial treatment and preparation to have laparotomy within one hour of diagnosis	<ul style="list-style-type: none"> <li>◆ Health providers (midwives and clinicians) trained to recognise and manage uterine rupture</li> <li>◆ Protocols for the management of uterine rupture</li> <li>◆ Health providers trained on the management of previous uterine scars</li> <li>◆ Transport facilities: functional ambulance and fuel</li> <li>◆ Communication facilities: functional radio communication and phones</li> <li>◆ IEC materials: banners, leaflets etc.</li> <li>◆ Functional theatre</li> <li>◆ Laparotomy set</li> <li>◆ Functional laboratory</li> <li>◆ Surgeon and theatre team</li> <li>◆ Screened blood</li> <li>◆ Suction tube</li> <li>◆ Oxygen cylinder</li> <li>◆ IV set and fluids available on emergency tray in labour ward</li> </ul>	<ul style="list-style-type: none"> <li>◆ Refresher courses to health providers on the diagnosis and management of uterine rupture</li> <li>◆ Training of health providers on signs and symptoms of uterine rupture: vaginal bleeding, absence of uterine contraction, irregular uterus, easily palpable foetal parts, absent FHS and shock</li> <li>◆ Training of providers on the management of uterine rupture</li> <li>◆ Health providers correctly diagnose uterine rupture based on sign and symptoms</li> <li>◆ Health providers rapidly prepare all patients suspected of uterine rupture for surgery: IV line with a wide bore cannula (16-18G), IV infusion, Trendelenburg's position and blood for cross-match and typing and blood transfusion</li> <li>◆ Patients with uterine rupture have laparotomy within the shortest time possible</li> <li>◆ Skilled birth attendants correctly manage all pregnant women with risk of uterine rupture such as grand multiparity and previous uterine scar</li> <li>◆ One previous scar: always hospital delivery with close monitoring</li> <li>◆ Two previous scars: caesarean section indicated</li> </ul>	<ul style="list-style-type: none"> <li>◆ Case fatality for uterine rupture is &lt;1%</li> <li>◆ 100% of women have laparotomy within 1 hour of diagnosis of uterine rupture</li> </ul>

## Acknowledgement

The authors acknowledge the Health Foundation for providing financial support for this study.

## References

1. Dolea C, Abouzahr C. *Global burden of obstructed labour in the year 2000*. Geneva: Evidence and Information for Policy, World Health Organisation, 2003.



2. van Beekhuizen HJ, Unkels R, Mmuni NS, Kaiser M. Complications of obstructed labour: pressure necrosis of neonatal scalp and vesicovaginal fistula. *Lancet* 2006; **368(9542)**: 1210.
3. Chhabra S, Gandhi D, Jaiswal M. Obstructed labour - a preventable entity. *Journal of Obstetrics and Gynaecology* 2000; **20(2)**: 151-153.
4. Weiner R, Ronsmans C, Dorman E, Jilo H, Muhoro A, Shulman C. Labour complications remain the most important risk factors for perinatal mortality in rural Kenya. *Bulletin of the World Health Organ* 2003; **81(8)**: 561-566.
5. Melah GS, El-Nafaty AU, Massa AA, Audu BM. Obstructed labour: a public health problem in Gombe, Gombe State, Nigeria. *Journal of Obstetrics and Gynaecology* 2003; **23(4)**: 369-373.
6. National Statistical Office (Malawi), ORC Macro. *2004 Malawi Demographic and Health Survey*. Calverton: ORC Macro, Maryland, 2005.
7. Seljeskog L, Sundby J, Chimango J. Factors influencing women's choice of place of delivery in rural Malawi – an explorative study. *African Journal of Reproductive Health* 2006; **10**: 66-75.
8. Jamtvedt G, Young JM, Kristoffersen DT, O'Brien MA, Oxman AD. Audit and feedback: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews* 2006, issue 1. Art. no.: CD000259. DOI: 10.1002/14651858.CD000259.pub2.
9. World Health Organisation. *Beyond the numbers: reviewing maternal deaths and complications to make pregnancy safer*. Geneva: WHO, 2004.
10. National Institute for Clinical Excellence. *Principles for best practice in clinical audit*. Abingdon: Radcliffe Medical Press, 2002.
11. Ministry of Health and Population (Malawi), JHPIEGO. *Malawi National Reproductive Health Services Delivery Guidelines*. Lilongwe: Ministry of Health and Population, Malawi, 2001.
12. World Health Organisation. *Integrated management of pregnancy and childbirth series (IMPAC)*. Geneva: WHO, 2005. Available: [http://www.euro.who.int/pregnancy/esscare/20051103\\_3?language=german](http://www.euro.who.int/pregnancy/esscare/20051103_3?language=german) (Accessed 20 April 2007).
13. Weeks AD, Alia G, Ononge S, Mutungi A, Otolorin EO et al. Introducing criteria based audit into Ugandan maternity units. *BMJ* 2003; **327**: 1329-1331.
14. Graham W, Wagaarachchi P, Penney G, McCaw-Binns A, Antwi KY, Hall MH. Criteria for clinical audit of the quality of hospital-based obstetric care in developing countries. *Bulletin of the World Health Organisation* 2000; **78(5)**: 614-620.
15. Wagaarachchi PT, Graham WJ, Penney GC, McCaw-Binns A, Yeboah Antwi K, Hall MH. Holding up a mirror: changing obstetric practice through criterion-based clinical audit in developing countries. *International Journal of Gynecology and Obstetrics* 2001; **74**: 119-130.
16. Ronsmans C. What is the evidence for the role of audits to improve the quality of obstetric care? *Studies in Health Services Organisation and Policy* 2001; **17**: 207-228.