INTRAPARTUM CARE IN SOUTH AFRICA

Review and Guidelines
Foreword

It is tragic that the most common primary cause of death of fetuses and neonates over 1000g in South Africa is intrapartum hypoxia and it is our duty as professionals entrusted with caring for women and their babies to reverse this trend. For this reason the MRC Maternal and Infant Health Care Strategies Research unit hosted a meeting of health workers involved in research into intrapartum care together with administrators from the Maternal Health Directorate of the National Department of Health and the Maternal, Child and Women’s Health units in the provincial Departments of Health.

The aim of the meeting was to review the current relevant research on intrapartum care and define:
- What is known?
- Where is the knowledge lacking?
- How should labour be managed in maternity units in South Africa?

The MRC unit reviewed all the articles related to intrapartum care in the Priorities in Perinatal Care Conference Proceedings and extracted information from those studies to try and answer the above questions. Since 1981 there have been over 120 studies performed and presented at the conferences. We believe we have captured most of the intrapartum care research that has been performed in South Africa in the last 25 years. Further, the seminal studies performed by Hugh Philpott and others in the 1960s and 1970s were also reviewed and scientific basis for the partogram reviewed. The Effective Care Research Unit of Justus Hofmeyr detailed what interventions in labour are effective or otherwise. By combining the information with the input of the members of the workgroup a clear set of guidelines on how to manage labour in South Africa has been developed.

Information related to health systems, training and methods of implementation of perinatal care strategies (like the Perinatal Education Programme and the Better Births Initiative) were reviewed to determine what was effective in improving practice. The aim was to identify effective strategies that improve intrapartum care and promote their use by the health administrators in South Africa.
This report presents the review of the past and current status of intrapartum care in South Africa, a review of the normal labour in African women and how it differs from other races, a comprehensive intrapartum care guideline which contains the motivation for each step and a review of the current strategies being used to improve intrapartum care. Appendices at the end contain short summaries of research.

We hope this report will stimulate further research into appropriate intrapartum care for the women of South Africa and serve as a platform to develop national guidelines on intrapartum care.

None of this would have been possible without the support of all the delegates at the workshop and their contribution towards producing this report. We are most indebted to them all. A special word of thanks to Peter Macdonald, who kindly edited the final version linguistically. We also wish to thank the MRC for sponsoring the meeting, without which nothing would have happened.

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Executive Summary

Intrapartum hypoxia is the most common cause of perinatal death in South Africa. A review of the South African literature on the problems of intrapartum care revealed the following:

1. Poor overall clinical skills
2. Poor recording of clinical findings, which leads to substandard (or no) management decisions
3. Inadequate transport for women requiring referral in labour
4. Inferior quality of care experienced by women in labour

To improve this, the following guideline for managing labour in a pregnant woman is presented.

When a pregnant woman presents to labour ward, she must be assessed to confirm labour and be risk classified. Women with high risk factors must be referred to the appropriate level of care.

**DIAGNOSIS OF LABOUR**

**Criteria:** Regular, painful contractions and one of the following:
- cervical changes;
- or ruptured membranes;
- or show.

**Latent phase**
Labour confirmed with the patient’s cervix less than 4cm dilated. This will usually be a retrospective diagnosis.

**Active phase**
The diagnosis of the active phase of labour is made when the woman’s cervix is 4cm dilated and less than 1cm long and regular uterine contractions are present.

**MANAGEMENT OF LABOUR:**

Where diagnosis of labour is uncertain, patient must be observed for 4 hours.

**Observations:** (same as those in the latent phase).
- Abdominal palpation – 4 hourly
- Vaginal examination – 4 hourly
- Maternal observations. – 4 hourly
- Fetal heart rate – 2 hourly

Any change in maternal condition would indicate more frequent observations

After 4 hours a diagnosis of false labour or latent labour should be made. If she is in latent labour, she should be observed for 8 hours.

**Latent phase**
**Observations:**
- Abdominal palpation – 4 hourly
- Vaginal examination – 4 hourly
- BP, pulse, temperature – 4 hourly
- Fetal heart rate – 2 hourly (doptone) – after a contraction
Patients need not be observed in a labour ward but should be in an area managed by a registered midwife.

**After 8 hours** in the latent phase a patient still at a level 1 institution should be referred for further assessment by an advanced midwife or experienced doctor at an institution that can perform caesarean sections.

If the reason for poor progress is inadequate contractions and the maternal and fetal conditions are satisfactory, the patient may be managed expectantly at the higher level institution.

**Active phase**

**Maternal monitoring**

**Essential observations:**
- Blood pressure
- Pulse rate
- Temperature
- Urine output
- Urine dipstix
- Respiratory rate – high risk only

**Frequency of observations**

**Low-risk patient**
- Blood pressure – hourly
- Pulse rate – hourly
- Temperature – 4 hourly
- Urine output – when urine is passed
- Urine dipstix – on admission and when urine is passed

**High-risk patient**
- Blood pressure – hourly (more often if abnormal)
- Pulse rate – hourly (more often if abnormal)
- Respiratory rate – hourly
- Temperature – 4 hourly
- Urine output – hourly if catheterised, otherwise when urine passed
- Urine dipstix – 4 hourly if catheterised, otherwise when urine passed
- Chart fluid intake/output

**Fetal monitoring**

**Low-risk patient**
All monitoring should be performed immediately after a contraction.

**Method used for fetal monitoring:**
- Doptone (preferred)
- Auscultation should still be actively taught
- Pinard/clinical stethoscopes must be available in labour wards.

**Frequency of fetal monitoring which is considered safe**
- Fetal heart rate monitoring every 30 min (doptone) – before, during and after a contraction
- If individual observations are missed, then the reason should be noted on the partogram.
High-risk patient
A cardiotocograph (CTG) should be used to monitor the fetal heart rate pattern. If not available, fetal heart rate should be monitored every 30 min, before, during and after contractions. The tocograph should also routinely be used to monitor frequency and duration of contractions in high risk patients.

Managing the active phase of labour - Low Risk patient
1. Progress to the left of the alert line: Continue routine monitoring of mother and fetus
2. Progress crosses the alert line: Make a diagnosis of why progress is poor using the 4P’s (patient, powers, passenger and passage) to exclude fetal distress and disproportion. If poor progress is due to:
   a. Malposition (e.g. occipito-posterior), maternal distress, pain or dehydration: improve maternal status and reassess in two hours.
      i. If remains to the left of the transfer line; reassess 2 hourly until delivery.
      ii. If crosses the transfer line transfer to a hospital that can perform caesarean sections
   b. Poor contractions and the institution has the facilities to give oxytocin safely: start oxytocin to augment contractions.
   c. Disproportion: refer to a hospital that can perform caesarean sections for review and further management

MONITORING OF PROGRESS OF LABOUR
Latent Phase
The partogram should only be started on diagnosing latent phase and not if the diagnosis of labour is uncertain. Recording of the uncertain latent phase can be entered on the table provided for the latent phase in the labour record booklet but not on the partogram.
Active Phase
Documentation of the progress of labour is by use of the partogram. It should be filled in when each observation performed and problems identified should be noted and a management plan stated. The following observations plus those of the mother and fetus are required:

**Abdominal palpation**
- Length and frequency of contractions
- Head above brim

**Vaginal examination**
- State of the membranes (intact/clear liquor/meconium stained)
- Cervical position and length
- Cervical dilation
- Identification of the presentation
- Application of the presenting part
- Position and attitude of the presenting part
- Caput
- Moulding
- Station of presenting part
- Bimanual assessment of head above brim

**Frequency of the actions:**

**Abdominal palpation**
- Length and frequency of contractions – hourly
Other Aspects of managing the active phase of labour

**Doula/Support person in labour**
All patients should be encouraged to have a support person of their choice in labour.

**Use of analgesia**
All women in labour should be routinely offered analgesia during labour. What to use: Pethidine, morphine, nitrous oxide, epidural service.

**Nutrition in labour**
All patients should be allowed to take food when in labour. Ensure adequate oral fluids are taken to prevent dehydration.

**Mobilisation in labour**
Women in labour should be encouraged to mobilise during labour, or at least assume an upright position.

**Rupturing the membranes**
Indications: poor progress in labour where it is documented that patient is HIV negative, otherwise use oxytocin (with intact membranes). If patient is on antiretroviral therapy, treat as HIV negative. Contra-indications: HIV positive or unknown status, then membranes should be ruptured as late as possible.

MANAGEMENT OF THE SECOND STAGE

**Two phases** are recognized:
- Full dilation until the head is on the perineum
- Head-on- perineum until delivery of the baby

**Diagnosis** of the true second stage: should be made at the time the patient has the urge to bear down.

**Duration of the second stage:**
- Primigravida: 45 min
- Multigravida: 30 min

Obtain help or refer the patient if these time limits are exceeded.

**Monitoring of the fetus in the second stage**
- Midwife constantly with patient in second stage.
- Fetal heart rate after every second contraction (doptone)
- Check descent and progress every 15 min.
- Document fetal heart rate and descent in delivery notes.
- Action must be taken immediately if fetal distress is diagnosed.
- Give hexoprenaline and turn on side for referral.

**When to push**
- If no desire to push after being diagnosed fully dilated, re-assess after 1 hour.
- If no progress/desire to push after one hour, call for help or refer.
- If head is on pelvic floor, the patient should be encouraged to push. If the head is higher, the process for referral should be set
in motion. The patients needs to be accompanied by a person who can assist with a vaginal delivery.

**Use of Episiotomy**
The use of episiotomy should be restricted to selected cases.

**MANAGEMENT OF THE THIRD STAGE**
Active management using oxytocin (10U) IMI as first choice.

**Implementation of these guidelines can be achieved by:**
1. Training of midwives and doctors using one or more of the following methods
   a. Perinatal Education Programme
   b. Better Births Initiative
   c. On-site face to face training
   d. The Decentralised Education Programme for Advance Midwives (DEPAM)
   e. The Peninsula Maternity and Neonatal Services model
   Training includes:
      1.1 Basic skills training which includes abdominal palpation, pelvimetry, vaginal examination of the birth canal and presenting part of the fetus, fetal wellbeing
      1.2 The use and interpretation of the partogram
      1.3 The interpretation of the cardiotocograph
2. Audit of Management of Labour
   2.1 The 25-point score of the partogram
   2.2 The Robson Classification of caesarean sections
   2.3 The Perinatal Problem Identification Programme (PPIP)
   2.4 A 20-point exit questionnaire completed by the patients on quality of care during labour.
3. Implementation
   3.1 An on-site Champion
   3.2. The Community Midwife practitioner/Obstetrician/ Paediatrician
Chapter 1. Defining the Challenge

Intrapartum Hypoxia

The following points are clear from a review of South African Data:
1. Intrapartum hypoxia is currently the most common cause of perinatal deaths in South Africa.¹
   This disturbing fact has been documented repeatedly since the start of Priorities, yet not much has changed in this regard over the past 10-15 years. (See Table 1)

Table 1. Rates of Deaths due to Intrapartum Hypoxia reported at The Priorities in Perinatal Care Congresses

<table>
<thead>
<tr>
<th>Institution</th>
<th>Year</th>
<th>IPA deaths</th>
<th>Total Births</th>
<th>IPA death Rate</th>
<th>Interventions</th>
</tr>
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<tbody>
<tr>
<td>Baragwanath Hospital²</td>
<td>1982</td>
<td>109</td>
<td>29 967</td>
<td>3.64</td>
<td></td>
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<tr>
<td>UCT (MOU's in Cape Town)³</td>
<td>1989</td>
<td>116</td>
<td>16 998</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>Livingstone Hospital⁴</td>
<td>1992-1994</td>
<td>115</td>
<td>30 614</td>
<td>3.76</td>
<td>PEP Training, Assisted delivery instruction, Improvement of referral system</td>
</tr>
<tr>
<td>Hlabisa District, KZN⁵</td>
<td>1996</td>
<td>21</td>
<td>4869</td>
<td>4.31</td>
<td></td>
</tr>
<tr>
<td>PMNS⁶</td>
<td>1993-2001</td>
<td>509</td>
<td>122</td>
<td>4.15</td>
<td></td>
</tr>
<tr>
<td>PMNS⁷ (&gt; 2500g)</td>
<td>1992</td>
<td>36</td>
<td>17 707</td>
<td>2.03</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2001-2002</td>
<td>23</td>
<td>19 192</td>
<td>1.12</td>
<td></td>
</tr>
<tr>
<td>PPIP Data⁸ Metropolitan Town &amp; City Rural</td>
<td>2000-2003</td>
<td>754</td>
<td>204</td>
<td>3.7</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td>821</td>
<td>193</td>
<td>5.47</td>
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<td></td>
<td></td>
<td>704</td>
<td>150</td>
<td>6.51</td>
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2. An audit system designed to identify avoidable factors is essential in order to make changes that may impact on future practices and eventually reduce perinatal mortality rates.\textsuperscript{9}

3. In the vast majority of cases of perinatal mortality one can identify at least one avoidable factor, and these are often related to medical personnel. The most common avoidable factor relating to personnel is that of poor intrapartum monitoring, as found throughout the above-mentioned studies, as well as others.\textsuperscript{10,11,12}

4. In a recent study, 19 hospitals completed “confidential enquiry” forms relating to deaths from intrapartum hypoxia (IPH). This study, once again, clearly showed that the majority of patients losing babies to IPH are low risk patients, with apparently normal labours. In 80\% of cases there were signs of probable fetal distress (late decelerations and/or thick meconium stained liquor), yet only 25\% had an operative delivery due to fetal distress. This clearly shows that, even when patients are being monitored, there is often no response to abnormal signs in labour.\textsuperscript{App 1} This fact is not a new finding, and has previously been emphasized by others.

5. A study aimed at identifying antepartum and intrapartum risk factors for neonatal encephalopathy found that substandard care was much more common in cases of neonatal encephalopathy than that of labours ending in births of healthy babies (RR 2.5).\textsuperscript{13}

6. Intrapartum hypoxia leads to severe morbidity in survivors. Many studies have shown a clear association between prolonged labour and neonatal and even childhood neurological problems.\textsuperscript{13,14,15,16,17}

Intrapartum care

1. The women using the maternity services of the South African public sector are very dissatisfied with the availability of services and with the treatment they receive.\textsuperscript{18,19}
2. According to a study performed by the MRC Maternal and Infant Health Care Strategies Research unit patients were least satisfied with the following care:

- MOUs at primary level hospitals without C/S facilities
- Midwives not empowered to refer patients to a higher level of care
- Doctors in the hospital but not dedicated to maternity care

The most acceptable care was delivered at MOU’s run by midwives, with the authority to refer if they felt it was indicated. App 2

3. Practices at most of the MOU’s in the country are appalling, with little or no adherence to standard protocols. 20

4. Patients are being abused emotionally, verbally, and physically by the medical personnel who are supposed to care for them during labour. 18,19,20,21,22,23

5. Harmful practices has become routine practice in most of the public health institutions. 21

Staffing and Health Systems

1. There seems to be an association between staff shortages and the occurrence of perinatal deaths. 24

A postal survey conducted amongst users of the PPIP programme was conducted to try and establish whether there was a relationship between the number of deliveries conducted by a unit, the staffing of the unit and its rate of deaths due to intrapartum hypoxia (IPH). App 3 Forty nine of the centres that replied to the survey also submitted data electronically to the PPIP database and could therefore be included in this study. This survey found that in the smaller hospitals the rate of IPH deaths was significantly higher than larger hospitals (i.e. doing more than 5000 deliveries per year). In fact, in smaller hospitals (doing
less than 5000 deliveries per year), it appeared that the more the staff, the higher the rate of deaths due to IPH. This rather bizarre anomaly is explained by the finding that in smaller hospitals the midwives doing deliveries were responsible for many other duties, such as casualty, the antenatal and postpartum wards and the nursery, while also being responsible for patients in labour. It seems clear that the management of labour should be regarded as a high care activity and that the midwives should be able to give their undivided attention to women in labour. For this to occur there would have to be enough deliveries per unit to warrant the deployment of midwives only to manage patients in labour (economy of scale). There should be grave concern for the safety of women delivering in units doing less than 5000 deliveries per year.

2. The design and functioning of labour wards in the public sector has recently been studied, and it appears that the manner in which labour wards are being managed contributes to their inefficiency. In many labour wards there are no dedicated management areas (admission, first stage) and patients are housed elsewhere, where they are infrequently monitored or totally neglected until second stage when they return to the labour ward. There is often a lack of both supervision and supervisor.

Many studies have reported that staff numbers and staff morale is low, and this is quoted as a reason for poor rendering of services.

3. Transport is a major problem in the public sector. This has been quoted in almost all of the studies looking at intrapartum hypoxia deaths, but has not been audited as a separate entity until recently. In a recent Eastern Cape survey (including 4 MOU’s and their referral hospitals) 48 midwives, the ambulance services manager of the region and the manager of the referral hospital were interviewed or submitted written reports. The maternity records of 114 referred patients were also reviewed.
The midwives reported the following problems:

- Ambulance delays of as much as 4-6 hours (and even longer in some instances)
- Ill-equipped ambulances
- Difficulty with communication such as making repeated calls to have one patient referred, needing to convince the ambulance call centre that the patient needs referral and sometimes even challenged with obtaining authorization from the doctor at the referral hospital, which is in conflict with referral protocols.
- Patients frequently have to make use of private transport because of ambulance delays or unavailability
- No midwife/health care professional available to accompany high risk patients

The ambulance services manager responded as follows:

- There are too few vehicles available
- The available vehicles are in a very poor state
- There is an urgent need for training amongst paramedic staff
- The private sector attracts most of their experienced personnel
- The lack of incentives for staff contributes to the failure to retain competent personnel

The Midwifery services manager echoed these responses from both the midwives and the ambulance services manager.

**Clinical Skills**

**Fetal Monitoring**

1. Inadequate fetal monitoring has been identified in many studies as being the most common avoidable factor relating to perinatal deaths and intrapartum hypoxia in South Africa.

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2. Even when the fetus is monitored, the signs of fetal distress are often not recognized or misinterpreted.3,8,12,16,28, App 1

Clinical skill of health workers

The lack of clinical skills needed to evaluate patients in labour are not restricted to fetal monitoring. A study was conducted at Chris Hani Baragwanath Hospital to evaluate the correlation of clinical findings between two observers examining 508 patients in the active phase of labour. The two observers were always a registrar or someone more senior and they were blinded to each other’s findings.

It was found that, even at this level of clinical experience, there was poor correlation regarding the evaluation of descent of the fetal head, moulding of the head and position of the fetus with patients in active labour. Only in the evaluation of cervical dilatation was the correlation of an acceptable standard. App 6

Use of the Partogram

1. The partogram is used in a very small proportion of patients to monitor the progress of labour.29,30,31

2. Even when in use, the partogram is often incomplete.29,32,33

3. The findings recorded on the partogram are often misinterpreted.32,33

4. In some instances, the partogram is filled in retrospectively, i.e when the patient has already delivered.21

5. Training in the use of the partogram has some effect, but still does not lead to the use of the partogram in >60% of patients in some institutions.29,30
6. There are severe obstructions to the proper use of the partogram in labour.

One study analyzing the labour records of 583 consecutive patients presenting in labour showed that 24% of patients that present in early labour are not monitored at all during the labour process. Of the patients that were monitored, a median score of 40% was obtained for filling in of the labour graph. The highest score (59%) was obtained for plotting cervical dilatation on the graph, but other aspects received very poor scores, i.e. recording of the fetal heart rate ½ hourly (34%), degree of moulding on vaginal examination (39%), strength and duration of contractions ½ hourly (47%), maternal blood pressure and pulse hourly (21%), maternal intake and output 4 hourly (23%) and recording of intake of drugs and fluids (18%).

The median scores for the 3 aspects of the partogram were as follows:

- Fetal condition 40%
- Labour progress 51%
- Maternal condition 22%

In only 24% of patients was any decision on further action recorded.

Another study from the Western Cape, evaluating the effect of a training programme on the clinical skills and decision making of midwives, identified major deficiencies in basic skills. Eighty eight midwives were tested on their use of the partogram, including knowledge and ability to analyse the clinical information. After initial testing, a training programme was introduced and the test then repeated by the participants.

The initial pre-training test results showed that the partogram was completely filled in 71% of cases, but in only 21% of cases was this done correctly. The mean score for knowledge was 56% and for analysis 38%.

Results combining knowledge and analysis of clinical facts yielded the following mean scores:

- Fetal assessment 39%
At the second test (post-training programme), scores were as follows:

- Fetal assessment: 42.4%
- Progress of labour: 45.0%
- Maternal assessment: 52.6%

This shows that, despite the fact that there was a statistically significant improvement in various aspects of partogram use, this did not impact dramatically on the final product, i.e., managing patients in labour. This is where the core problem lies – not only in completing the graph, but in the interpretation of the findings and subsequent decision making.\(^{8}\)

A focus group discussion was held with 31 midwives in the Pretoria region, from different levels of care, in order to try and identify reasons why the partogram was not used correctly in the majority of cases for patients in labour. Three different factors causing obstruction to the use of the partogram were identified:

1. Lack of knowledge on the proper use of the partogram
2. Lack of clinical skills, i.e., skills needed to evaluate patients in labour
3. Low staff morale, resulting from a subjective impression of staff shortages, poor remuneration systems for midwives and also enormous social pressures experienced by the midwives on a personal level \(^{9}\)

**Conclusion:**

From the above findings the core problems are:

1. Inadequate clinical skills.
2. Recording of clinical findings are poor, which leads to substandard (or no) management decisions.
3. Lack of transport for women complicating in labour.  
4. Quality of care experienced by women in labour is poor.  
5. It is not surprising then that intrapartum hypoxia is the 
   major cause of perinatal deaths in South Africa as a 
   whole.

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Chapter 2. Labour in the African woman
Is there a difference?

E Farrell

The physiology of labour is astonishingly poorly understood for the age we live in. There are, to this day, no reliable methods of objectively predicting the outcome of labour in any given patient. Through the past few decades we have had to rely on the clinical tools available to us to monitor the progress of labour and to try and identify the patient deviating from the norm, in order to remedy whatever problems were identified and improve on the outcome of labour.

Certainly one of the best known and most widely used “tools” in this regard, is Friedman’s labour curve. This curve, described in the late 1960’s, gave a very clear picture of how labour progresses from the latent into the active phase, how there is a period of maximum dilatation within the active phase, which is then followed by a deceleration phase after reaching 8cm dilatation. After this publication, the obstetric community grabbed the concept and it was widely implemented in labour records throughout the world, including African countries such as our own. At last we had a means of measuring “normality” in the labouring patient! Or did we?

Subsequent to this publication, there have been studies comparing the labour characteristics of patients from African descent to those of other ethnic groups, and all studies report significant differences in all stages of labour.

Duration of the first stage

Philpott and Castle (1972) proposed an Alert Line for African primigravidae at an acceptable statistical limit of normal cervicographic progress. In attempting to apply Friedman’s curve as a yardstick they found that it was impossible because of the difficulty in defining the commencement of labour in their patients. It also was apparent that the rate of progress during the “phase of maximum
slope” in African primigravidae was half that of the American group of patients. They decided to note arrival time at hospital rather than onset of labour as zero time, as suggested in an American study by Hendricks et al.³ Once again they found that the rate of cervical dilatation amongst African patients were half that of Hendricks’ group, although they were delivered more quickly than their American counterparts because of later arrival in labour.

Duignan et al (1975) compared the labour characteristics of white, Asian and black patients in 3217 consecutive labours and found that African primigravid patients progressed more slowly from 5cm dilatation when compared to white patients. Multigravidas admitted earlier in the active phase (i.e from 3-4cm dilatation) also progressed slower than their white counterparts.⁴

Thom et al (1979) compared the progress of labour in patients from European, Asian and African descent and found no difference in duration of labour amongst primigravidas, but found that African multigravidas had a significantly longer first stage of labour.⁵

In 1983 Tuck et al compared progress of labour in the same 3 groups of patients in a delivery unit in South London and found that cervical dilation was significantly slower in patients from African descent. Both primary and secondary arrest in labour was also more common in this group.⁶

During a randomized controlled trial done at the Pretoria Academic complex comparing the aggressive versus expectant management of labour it was found that more than 50% of primigravid patients crossed the Alert Line described by Philpott that defined the “slowest progressing” 20% of primigravid patients.⁷

**Cervical dilatation on admission**

Thom et al found that the cervical dilatation on admission to labour ward was significantly greater in black than in white multigravidas.⁵ Other studies found no differences in cervical dilatation on admission between different racial groups.
Ruptured membranes

No study demonstrated a significant difference in the incidence of ruptured membranes on admission to hospital amongst different racial groups.

Level of the fetal head

Duignan et al found that the level of the head among African multipara was significantly higher on admission compared with European patients.4 This finding was confirmed in the study by Tuck et al and included primiparous and multiparous patients.6

Uterine pressures in labour

Steer et al, using modern equipment, quantified the intra-uterine pressure during different stages of labour in European patients and found that the mean values increased from 800kPas/15mins in the latent phase to 1200kPas/15mins in the active phase.8 When Cowen et al repeated these tests in African nulliparas with normal progress of labour they found that the intra-uterine pressure almost always exceeded 1200kPas/15mins during the active phase with a median value of 1800 kPas/15mins.9 They also found that labours augmented with oxytocin that ultimately resulted in vaginal births produced the same pressures, whilst those requiring C/S showed much lower levels of intra-uterine pressures. They concluded that, in African patients, intra-uterine pressures of at least 1800kPas/15min are required to fully test the cephalo-pelvic relation.10

Duration of the 2nd Stage

Tuck et al found that the 2nd stage was significantly shorter in African primigravidas and multigravidas than in any other group of patients. Instrumental delivery was also needed less frequently in these 2 groups when compared with other ethnic groups.6
Caesarean Section rates

Thom et al found that the Caesarean Section rate amongst African primigravid and multigravid patients was significantly higher than the 2 other groups. Cephalo-pelvic disproportion (CPD) was the most frequent indication for caesarean sections (C/S) in the primigravidas, whilst CPD and hypertensive complications were the most frequent indications in African multigravidas.\(^5\)

In the study by Tuck et al black primigravidas had significantly higher Caesarean section rates but in black multigravidas the increased rate of caesarean sections did not reach statistical significance.\(^6\)

Pelvic size

In the 1950’s Evans et al conducted a study of sequential X-Ray pelvimetries and proved that the pelvis of the African patient is approximately 20% smaller than that of the Caucasian patient. This study was repeated by Steyn et al in the 1990’s and despite the fact that the average maternal age in the latter study was higher than in the initial study and that the 1990 study included both primigravid and multigravid patients, compared to only primiparas in the first, it was found that the size of the African female pelvis had not changed over the 40 years that had elapsed.\(^11\) This finding may explain why cephalopelvic disproportion is such a major problem amongst African patients and to some extent may explain the increased caesarean section rate in African patients.

The reason for the increased rate of C/S in African patients has not been completely clarified because of lack of research. Caesarean section rates are difficult to audit because classification systems are rarely used and due to a lack of standardisation of indications amongst obstetricians. There is no consensus as to which indication should be used for classification purposes when more than one indication is present.

The Robson classification of caesarean sections addresses this problem.\(^12\) The protocol attempts to identify prospective, clinically relevant groups of women with differences in their C/S rates allowing
comparisons over time within one unit or between units, accommodating changes in management aimed at improving perinatal care.

It consists of 10 well-defined mutually exclusive but totally inclusive sub-groups (meaning that there is a group for each patient, but no patient can fit into more than one of the groups) that are prospective, clinically relevant and simple to understand and organise. There are enough groups to give sufficient detail without losing the advantage of an overview of C/S rates.

Groups can be subdivided when including a heterogeneous population of patients to obtain accurate data and plan management for smaller groups of patients prospectively.

The 10 Robson groups are:

1. Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation in spontaneous labour

2. Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by Caesarean Section before labour

3. Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks in spontaneous labour

4. Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks who either had labour induced or were delivered by Caesarean Section before labour

5. All multiparous women, with at least one previous uterine scar and a single cephalic pregnancy at greater than or equal to 37 weeks gestation

6. All nulliparous women with a single breech pregnancy
7. All multiparous women with a single breech pregnancy, including women with previous uterine scars

8. All women with multiple pregnancies, including women with previous uterine scars

9. All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars

10. All women with a single cephalic pregnancy at less than or equal to 36 weeks gestation, including women with previous uterine scars

Using the Robson classification system will help all units identify groups of patients where the caesarean section rates are unacceptably high and help them to make management changes to rectify the problem.

Conclusion

It appears that the anatomical and physiological differences between African and European patients are significant enough to cause major differences in labour patterns. Intense research is needed for us to understand the labour process in our patients. This will result in a better understanding of the process and enable us to provide optimal care for our patients.

References
Chapter 3. Comprehensive Intrapartum Care Guideline

All women presenting in labour must be fully evaluated. The history should include examination of the antenatal card followed by a full clinical examination including urine testing and haemoglobin assessment. Where possible a cardiotocograph should be performed to confirm fetal wellbeing.

Two questions must be addressed:

What is the risk classification of the woman? Each woman must be risk classified to determine the level at which she should be managed.

Is she in labour? The clinician must make the diagnosis of labour and not rely on the woman’s history. The differential diagnosis for a woman who thinks she is in labour is: labour (latent phase or active phase), a urinary tract infection, an amniotic fluid infection, early abruptio placenta, false labour and other conditions such as gastro-enteritis.

Diagnosis of labour

Criteria: Regular, painful contractions and one of the following:
  cervical changes
  or ruptured membranes
  or show.

Where diagnosis of labour is uncertain, the woman must be observed for 4 hours.

Observations: (same as those in the latent phase).
  Abdominal palpation – 4 hourly
  Vaginal examination – 4 hourly
  BP etc. – 4 hourly
  FHR – 2 hourly

If the condition changes, patients must be observed more often.

After 4 hours a decision is made whether patient is in false labour or latent labour. If she is in latent labour, she should be observed for 8 hours.
Latent phase

**Diagnosis:** Where the diagnosis of labour is made, but the patient’s cervix is less than 4cm dilated. This will usually be a retrospective diagnosis.

The partogram must only be started when diagnosis of latent phase is made, not if the diagnosis of labour is uncertain. Recording of the uncertain latent phase can be done on the table provided for the latent phase in the labour record booklet.

**Motivation:** Patients started on the partogram when the diagnosis of labour is not certain, are often regarded as having poor progress of active labour, and this results in unnecessary interventions. If a patient is mistakenly regarded as being in latent labour when she is actually in the active phase, the true diagnosis will show itself by the time the next vaginal examination is done. A timely diagnosis of active labour before admission to labour ward is associated with less time spent in the labour ward, less use of oxytocin and analgesics, and a greater sense of control among women.¹

**Management of the latent phase:**

**Fetal monitoring**
All monitoring should be performed immediately after a contraction.

**Method** used for fetal monitoring:
- Doptone (preferred)
- Auscultation should still be actively taught
- Pinard/clinical stethoscopes must be available in labour wards.

**Motivation:** The doptone is an effective means of auscultating the fetal heart, which is easy to use and not expensive. The hand-held doptone has been proven in large randomized trials to perform better than intermittent auscultation and similar to continuous electronic fetal monitoring in prevention of hypoxic ischemic encephalopathy.³ The use of continuous electronic fetal monitoring in low-risk patients leads to an increase in operative delivery, with no clear benefit to the
neonate (reduction in neonatal seizures, but a trend to increased cerebral palsy). As these devices are not always available, clinicians should master other means of auscultation.

**Frequency** of fetal monitoring which is considered to be safe:
- 2 hourly

**Observations:** Abdominal palpation – 4 hourly
- Vaginal examination – 4 hourly
- BP, pulse, temperature – 4 hourly
- Fetal heart rate – 2 hourly (doptone); after a contraction

Any change in condition warrants more frequent observations.

It is not necessary to observe patients in a labour ward. However, they must be in an area where they can be regularly observed by a registered midwife.

**After 8 hours:** If the patient is still at a level 1 institution in the latent phase, she should be referred for further assessment by an advanced midwife or experienced doctor at an institution that can perform caesarean sections.

If the reason for poor progress is inadequate contractions and the maternal and fetal conditions are satisfactory, the patient can be managed expectantly at the higher level institution.

**Motivation:** Four-hourly observations in a stable patient should identify all problems timeously. Cervical changes are also more accurately assessed four rather than two hours apart. Four hours is considered too long a period with no fetal monitoring as fetal compromise can develop suddenly, even in the latent phase of labour. It is vital that patients are observed regularly and not left to labour unattended. Women should be in an area where regular observations are performed.
The diagnosis of prolonged latent phase is made eight hours after the initial diagnosis of latent phase of labour was made. An attempt should be made to find a cause for all cases of prolonged latent phase of labour.

There is evidence available that patients with prolonged latent phase are at increased risk of perinatal morbidity and mortality. Pathological causes for prolonged latent phase should be excluded before the patient is managed expectantly.

**Active phase**

**Diagnosis:** The diagnosis of the active phase of labour is made when the woman’s cervix is 4cm dilated *and* less than 1cm long *and* regular uterine contractions are present.

**Motivation:** Effacement of the cervix should play an important part in the diagnosis of active labour, since the cervix of multiparous patients can often be stretched to 4cm when in latent labour.

**Monitoring in the active phase of labour**

**Fetal monitoring**

**Low-risk patient:** Fetal heart rate monitoring every 30 min (doptone) – after a contraction

If individual observations are missed, then the reason should be noted on the partogram.

**High-risk patient:** A cardiotocograph (CTG) should be used to monitor the fetal heart rate pattern. A contraction monitor should also be used routinely. If not available, fetal heart rate should be monitored every 30 minutes.

**Motivation:** Fetal monitoring every half hour has been recognised as the standard for fetal monitoring in low-risk women in labour.
However, it has not been clearly proven to be safer than hourly. It is clear that frequent monitoring of the fetal heart rate pattern (particularly after contractions) is vital to prevent intrapartum hypoxia and fetal or neonatal death. Poor fetal heart rate monitoring is the most frequent avoidable factor identified in deaths of babies due to intrapartum hypoxia in South Africa. The minimum frequency of fetal heart rate monitoring to ensure a safe labour for the fetus presents an important area of research.

Maternal monitoring
Essential observations:
- Blood pressure
- Pulse rate
- Temperature
- Urine dipstix (ketones, protein and blood)
- Urine volume – high risk only
- Respiratory rate – high risk only

Frequency of observations

Low-risk patient
- Blood pressure – hourly
- Pulse rate – hourly
- Temperature – 4 hourly
- Urine output – when urine is passed
- Urine dipstix – on admission and when urine is passed
- Chart fluid intake

High-risk patient
- Blood pressure – hourly (more often if abnormal)
- Pulse rate – hourly (more often if abnormal)
- Respiratory rate – hourly
- Temperature – 4 hourly
- Urine output – hourly if catheterised, otherwise when urine passed
- Urine dipstix – 4 hourly if catheterised, otherwise when urine passed
- Chart fluid intake
**Motivation:** Acute incidents in labour will alter the blood pressure, pulse rate and respiratory rate of the patient immediately, whereas it will only have effect on the other parameters after some time. It is therefore not necessary to do the other observations as frequently. If a patient is catheterized in labour, this means that a risk factor for poor urine output or haematuria has already been identified, and therefore the urine needs to be tested more regularly.

**Monitoring of progress of active labour**

**Abdominal palpation**
- Duration and frequency of contractions
- Head above brim

**Vaginal examination**
- State of the membranes (intact/clear liquor/meconium stained)
- Cervical length
- Cervical dilation
- Application of the presenting part
- Position of the presenting part
- Caput
- Moulding
- Station of presenting part

It is essential that the woman be reviewed after every examination and the problem list updated and management plan reviewed. “Reassess in 2 hours” is not a plan.

**Motivation:** These are the minimum requirements for assessing the progress of labour and identifying possible causes for poor progress in labour.

**Filling in of the partogram**

Filling in of the partogram: Performed with each observation done

**Motivation:** The partogram is widely accepted as a useful method of evaluating progress in labour. Unfortunately evidence from randomized trials on its effectiveness is limited. In order for the partogram to be useful in the management of labour, ALL aspects of
the partogram should be completed, including problems identified and plan of management. This cannot be over-emphasised.

**Frequency of the actions: (Low risk and high risk patient)**

**Abdominal palpation**
- Duration and frequency of contractions – hourly
- Head above brim with each vaginal examination

**Vaginal examination**
- 2 hourly in active phase

**Motivation:** Hourly vaginal examinations increases the risk of postpartum sepsis, even with intact membranes and the intrapersonal variation in findings is too great to be sure of findings 1 hour apart. Four hourly examinations reduces the amount of time available for action (i.e. referral or managing the cause), should there be poor progress of labour. Two hourly vaginal examinations allows for active management of prolonged labour, which has been shown to decrease the length of labour, without increasing the rate of caesarean sections or maternal or neonatal morbidity. Active management of labour also does not adversely affect women’s satisfaction with labour.7

**Managing the active phase of labour in a low-risk pregnant woman**

1. Progress to the left of the alert line: Continue routine monitoring of mother and fetus
2. Progress crosses the alert line: Make a diagnosis of why progress is poor using the 4P’s (patient, powers, passenger and passage) to exclude fetal distress and CPD.
   a. If due to a malposition e.g. occipito-posterior, maternal distress, pain or dehydration, improve maternal status and reassess in two hours.
      i. If remains to the left of the transfer line; reassess 2 hourly until delivery.
      ii. If crosses the transfer line refer to a hospital that can perform caesarean sections
b. If poor progress is due to poor contractions and the institution has the facilities to give oxytocin safely, give oxytocin to augment contractions.
c. If poor progress is due to disproportion, refer to a hospital that can perform caesarean sections for review and further management.

**Doula/Support person in labour**
All patients should be encouraged to have a support person of their choice in labour.

**Motivation:** The evidence from Cochrane reviews clearly shows that a support person in labour reduces the likelihood of requiring pain relief in labour, reduces the duration of labour, reduces the incidence of caesarean section or operative delivery and makes it less likely that the patient will be dissatisfied with the childbirth experience.\(^8\)

**Use of analgesia**
All women in labour should be routinely offered analgesia during labour.
What to use: Pethidine, morphine, nitrous oxide, epidural service.

**Motivation:** The use of pethidine and hydroxyzine in labour is not associated with increased neonatal morbidity and does not significantly impact on APGAR scores after birth.\(^9\) The evidence from randomized trials on the use of other opioids suggests that they may have fewer side-effects than pethidine, but the evidence is not strong enough to justify a change in practice at this stage.\(^10\) Epidural analgesia is proven to be highly effective in relieving pain during labour, but is not readily available and is not without risks.\(^11\)

**Nutrition in labour**
All patients should be allowed to take food when in labour.
Ensure adequate fluids are taken to prevent dehydration.
   For this purpose the patients can be provided with a *rooibos* lemon tea prepared in the hospital kitchen as follows:
   4 *rooibos* tea bags
   400g sugar
4 sliced lemons
10 litres of water
Boil up, strain and store in the fridge.

**Motivation:** Starvation in labour is not an effective means of ensuring gastric emptyiness\textsuperscript{12}, and precautions such as cricoid pressure during induction of anaesthesia and intubation are necessary to prevent aspiration despite starvation of the woman.

**Mobilisation in labour**
Women in labour should be encouraged to mobilise during labour, or at least assume an upright position.

**Rupturing the membranes**
Indications: poor progress in labour where it is documented that patient is HIV negative, otherwise use oxytocin (with intact membranes).
If patient is on antiretroviral therapy, treat as HIV negative.
Contra-indications: HIV positive or unknown status, then membranes should be ruptured as late as possible.

**Motivation:** Systematic reviews have shown that routine amniotomy has both benefits and risks. There was a reduction in labour duration by 1-2 hours, less 5 minute Apgar scores under 7 and less use of oxytocin. There was also a trend to increased caesarean delivery. An association between early amniotomy and increased caesarean delivery for fetal distress was noted in one large trial. The authors suggest that amniotomy should be reserved for women with abnormal labour progress.\textsuperscript{13}

It has been shown that measures aimed at reducing mother to child transmission of HIV infection were only effective in patients with membranes that had been ruptured for less than 4 hours.\textsuperscript{14} It is therefore not advisable to routinely rupture the membranes of an HIV infected patient, or when the HIV status of the patient is unknown.

**Management of the Second stage**
Two phases are recognized:
Full dilation until the head is on the perineum
Head-on- perineum until delivery of the baby

**Diagnosis** of the true second stage should be made at the time the patient has the urge to bear down.

**Motivation:** In randomised trials in women with epidural analgesia, delayed bearing down reduced the use of assisted delivery without fetal compromise. Whether women without epidural analgesia should be encouraged to bear down when full cervical dilation is diagnosed or to await the urge to bear down is unclear.\textsuperscript{App 10}

**Duration of the second stage before help summoned:**

- **Primigravida:** 45 min
- **Multigravida:** 30 min

\textit{Until help should be called or patient referred}

Once the woman is pushing, there should be descent within three effective pushing efforts. If there is no descent after effective pushing, help should be summoned.

**Monitoring of fetus in second stage**

- Midwife constantly with patient in second stage.
- Fetal heart rate after every second contraction (doptone)
- Every 15 min check descent and progress.
- Document fetal heart rate and descent in the delivery notes.

Action must be taken immediately if fetal distress is diagnosed. If immediate delivery is not possible with an assisted delivery, give hexoprenaline and turn on side.

In an institution without caesarean section facilities, the woman must be referred to a hospital where caesarean sections can be performed.

**When to push**

- If no desire to push after being diagnosed fully dilated, re-assess after 1 hour.
- If no progress/desire to push after one hour, call for help or refer.
If the fetal head is on pelvic floor, the patient should be encouraged to push. If the head is higher, the process for referral should be set in motion.

**Motivation:** Encouraging sustained valsalva manoeuvre rather than spontaneous bearing down is associated with somewhat shorter second stage, but may interfere with fetal acid-base status.\textsuperscript{App 10}

**Use of Episiotomy**
The use of episiotomy should be restricted to selected cases.

**Motivation:** Systematic review of 6 randomised trials found that, compared with more routine use, a policy of restrictive episiotomy use was associated with less posterior perineal trauma, less suturing and fewer healing complications, but more anterior perineal trauma and no difference in severe vaginal or perineal trauma, dyspareunia, urinary incontinence or severe pain.\textsuperscript{15} Overall, the evidence favoured a restrictive approach to episiotomy.

**Management of the Third stage**
Active management using oxytocin (10U) IMI as first choice.

**Motivation:** In 5 randomised trials reviewed, active management reduced the duration of the third stage and the proportion of women with blood loss of 500 ml or more, but increased nausea, vomiting and raised blood pressure (probably due to the use of ergometrine).\textsuperscript{16}

A review of 6 trials of oxytocin use compared with placebo showed considerable reduction of estimated blood loss exceeding 500ml, blood loss exceeding 1000ml and therapeutic use of uterotonics.\textsuperscript{17} In 5 trials comparing oxytocin with ergot alkaloids, the difference in estimated blood loss exceeding 500ml was not statistically significant, and manual removal of the placenta was less frequent with the use of oxytocin.\textsuperscript{App 10} No significant differences were found between oxytocin-ergometrine and ergometrine.

In 6 randomised trials, oxytocin-ergometrine was associated with a small reduction in risk of estimated blood loss exceeding 500ml (but
not 1000ml), compared with oxytocin. The difference was smaller for 10 units than for 5 units of oxytocin. Vomiting, nausea and hypertension were more common with oxytocin-ergometrine. These results would support a policy of using oxytocin 10 units routinely, and oxytocin-ergometrine in high-risk situations or when the response to oxytocin is inadequate.

Oral misoprostol 600µg (compared with injectable uterotonics in 7 trails) was associated with more blood loss exceeding 1000ml. Shivering and pyrexia are common with oral misoprostol in doses between 400 and 600µg. Misoprostol should not replace oxytocin as the first-line prophylactic uterotonic. App 10

Five small randomized trials comparing oral misoprostol with placebo found inconsistent effects on blood loss. App 10 A large trial is needed to establish the effectiveness of misoprostol when oxytocin is not available. App 4

**Amnio-infusion**

Amnioinfusion should be performed in the event of repetitive, variable or early decelerations. Isolated meconium stained liquor is not an indication to do an amnioinfusion.

Amnioinfusion can be performed at any institution with fetal heart monitoring facilities, using the following method:

- Connect intrauterine pressure catheter or infant feeding tube or Nelaton catheter via an infusion set to 1 litre normal saline.
- Insert catheter transcervically posterior to the fetal occiput into amniotic cavity.
- Ensure that the catheter is in the amniotic cavity by allowing backflow.
- Infuse saline at 10 – 15 ml per min for 1 hour, then 3 ml per min for the rest of labour.
- If large volume of liquor is lost, increase rate again for 30 – 60 min.
Meconium stained liquor
First stage:
  CTG monitoring
  Particulate (thick) meconium – patient should be referred

**Motivation:** Although meconium passage in labour may simply be a sign of fetal maturity, the presence of particulate meconium more readily indicates fetal compromise or reduced amniotic fluid, which should be managed at a centre where an emergency caesarean section can be performed, if necessary.

Second stage:
  Clean airways of baby after delivery of the head and suction airways before delivery of the shoulders.

Management of suspected fetal distress
Change position to lateral, stop oxytocin, give hexoprenaline. Then make a diagnosis of cause of suspected fetal distress. Oxygen should not be routinely used in cases of suspected fetal distress, but only if delivery is imminent.

**Motivation:** A review of two trials evaluating the effects of routine administration of oxygen in labour has found that the pH of the cord blood after delivery is significantly lower in patients who received oxygen in labour. This finding is alarming and, although there is no data on patients receiving oxygen for suspected fetal distress, at the moment oxygen therapy should be used with caution.

Assisted delivery
**Choice of instrument**
  HIV negative patients or when the HIV status is unknown, vacuum preferable to forceps.
  HIV positive patients – forceps if criteria are met, otherwise use a vacuum.

**Motivation:** There is theoretically an increased risk of HIV transmission to the fetus with the use of a vacuum apparatus. The
vacuum causes micro-scalp lacerations at the site of the vacuum cup, and increased transmission of some viral infections have been documented with the use of a metal cup vacuum.

**Contra-indications:**
Any level of head palpable above the symphysis pubis

**Augmentation of Labour**
Oxytocin should be used for poor progress due to poor contractions. If a patient’s cervical dilatation crosses the alert line when plotted on the partogram, exclude fetal distress and cephalo-pelvic disproportion. If the patient is known to be HIV negative, rupture the membranes. If contractions do not improve after one hour, start oxytocin. Where the HIV status is unknown or positive, then oxytocin is started immediately without rupturing of membranes. Oxytocin can be used with intact membranes.

Oxytocin should be used with extreme caution and proper monitoring in multigravidas. Rupture of the uterus is more common with oxytocin in multigravidas and rare in primigravidas.
Special circumstances

Previous Caesarean Section:

Each unit should conduct an audit of its own success rate of vaginal birth after caesarean section (VBAC), incidence of uterine rupture and other severe morbidity, availability of electronic monitoring and time taken to perform an emergency caesarean section. Attempted VBAC should only take place in an institution that can perform an emergency caesarean section rapidly.

Motivation: Data from an ongoing audit of uterine ruptures at Mahatma Gandhi Memorial Hospital (MGMH) in Durban strongly suggests that the outcomes associated with ruptures during attempted VBAC are far worse than those documented in developed countries. In this audit it was clear that staffing problems (including shortages in midwives, surgeons and anaesthetists) contributed to the problem.\textsuperscript{11}

Prerequisites for VBAC

- Informed consent
- Healthy mother
- Healthy fetus
- Cephalic presentation
- Spontaneous labour
- Previous \textit{lower segment} caesarean section
- No obviously small or deformed pelvis on clinical pelvimetry
- Continuous electronic fetal heart rate monitoring available
- Adequate staff to monitor woman in labour
- Ability to perform a caesarean section within 30 minutes
- Blood available for blood transfusion on the premises

Relative contraindications

- Two previous C/S
- Multiple pregnancy
- Induction of labour
Absolute contraindications
   Previous classical C/S
   More than two previous C/S

Principles of managing labour
   The woman and her fetus must be monitored as a high risk patient.
   Progress must be to the left of the alert line.
   Special attention should be paid to suprapubic pain between contractions, maternal or fetal tachycardia and haematuria. All these are clinical signs of impending uterine rupture.
   The second stage should be short and excessive maternal efforts should be avoided. Preparation for an assisted delivery should take place once the second stage has started, and an early decision to assist the delivery is better than a delayed decision.

**Induction of labour:**
   Labour induction is more dangerous than spontaneous labour; there must be a good reason to induce labour.

   Before labour induction, assess fetal condition by cardiotocograph (CTG), doptone, fetal movements or acoustic stimulation.

   Once in labour, monitor fetal condition by CTG or careful auscultation during and after contractions.

   If the woman is not in labour after 24 hours, review the management options: stop induction, change method, or caesarean section.

Options in various clinical settings:
   **Cervix favourable:** amniotomy (if confirmed HIV negative) plus oxytocin
   Misoprostol
   Foley catheter
   **Cervix unfavourable:** start with misoprostol, dinoprostone or Foley catheter
After 24 hours, add the other method.

_Cervix unfavourable, urgent induction:_ misoprostol plus Foley catheter together.

_Previous caesarean section or potential foetal compromise:_

Amniotomy if cervix favourable and HIV negative,
Foley catheter with normal saline infusion if cervix unfavourable or HIV positive.

**Never use Misoprostol with a previous caesarean section!**

**Oxytocin infusion:**

Add 2 units oxytocin to 1 litre normal saline or Ringers Lactate
Start infusion at 60ml per hour (15dpm in 15drops/ml administration set, i.e. 2mU per minute)
Increase every 30 minutes until 3 strong contractions (>40 seconds) per 10 minutes are achieved: 120ml; 180ml; 240ml per hour.
For hypertensive and cardiac patients use the same dose of oxytocin in 200ml saline at 12, 24, 36 and 48ml per hour.

<table>
<thead>
<tr>
<th>Time</th>
<th>Units/min</th>
<th>Drops/min (15drops/ml set)</th>
<th>Drops/min (60drops/ml set)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start</td>
<td>2 mU</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>30 mins</td>
<td>4 mU</td>
<td>30</td>
<td>24</td>
</tr>
<tr>
<td>1 hour 30 mins</td>
<td>6 mU</td>
<td>45</td>
<td>36</td>
</tr>
<tr>
<td>2 hours</td>
<td>8 mU</td>
<td>60</td>
<td>48</td>
</tr>
</tbody>
</table>

Never use Misoprostol with a previous caesarean section!

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Add 2 units oxytocin to 1 litre normal saline or Ringers Lactate
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<td>36</td>
</tr>
<tr>
<td>2 hours</td>
<td>8 mU</td>
<td>60</td>
<td>48</td>
</tr>
</tbody>
</table>

Once contractions are adequate, slowly reduce the rate (increase again if contractions fade).

Avoid oxytocin in previous caesarean section, evidence of cephalopelvic disproportion, suspected foetal distress and grand multiparity (para 5 or more).
**Extra-amniotic saline infusion:**
(Method least likely to cause hyperstimulation or uterine rupture, because no exogenous uterine stimulants are used.)
- Pass Foley catheter with 30ml bulb through cervix with sterile technique
- Inflate bulb with 50ml water or saline
- Tape catheter to thigh with light traction
- Attach saline 1L with giving set to catheter. Infuse saline at 50ml per hour.
- Remove after 24 hours if catheter has not fallen out.

**Dinoprostone:**
Dinoprostone tablets, intravaginally 0.5 – 1mg.

**Misoprostol:**
Misoprostol is not registered for use in obstetrics. It should be used with caution.
*Patients receiving misoprostol should always receive electronic fetal monitoring. Misoprostol in larger doses than indicated here for labour induction at term may cause uterine rupture.*

Oral Misoprostol may be given as freshly made-up solution of a 200mcg tablet in 200ml water (1mcg/ml solution).
- Give 25mL 2-hourly.
- If not finished after 24 hours, discard solution.
- In nulliparous women increase to 50mcg 2 hourly if necessary.
Shake the bottle well before each dose administration

OR

Misoprostol 25mcg (1/8 200mcg tablet) vaginally, followed after 4 hours by 25mcg orally 2 hourly.
Stop when in labour. Vaginal dose may be omitted if cervix is favourable.
Stop Misoprostol administration when in established labour. Maximum 24 hours – if no response, review need for induction or use another method (e.g. extra-amniotic saline induction).

Never use oxytocin and Misoprostol simultaneously. Misoprostol is contraindicated in women with previous caesarean section and relatively contraindicated in grand multiparous women. Avoid use of dinoprostone and misoprostol in the same patient at any time.

**Breech presentation:**

Before labour

*At 32 – 36 weeks gestation*, confirm fetal well being and exclude placenta praevia.  
*At or after 36 weeks gestation:* ultrasound and CTG. If there are no contra-indications consider external cephalic version. See WHO Reproductive Health Library for video of ECV technique (free from rhl@who.int)

Pre-requisites for ECV:  
Ultrasound if possible; reactive CTG or good fetal movements; informed consent.

Preparation:  
Infuse hexoprenaline 5 – 10 mcg IV over 2 minutes, monitoring the maternal pulse.  
If easy ECV is anticipated, one can attempt ECV without hexoprenaline.  
Apply talcum powder to the abdomen.

ECV Technique:

45° lateral position against wall, foetal back downwards. Operator seated. Disengage the breech from pelvis with fingertips of both hands, then lift upwards with edge of one hand. Gently manipulate the foetal head downwards with other hand.
Encourage the foetus to make a backward somersault. If unsuccessful, re-position with the foetal back upwards to try for a forward somersault.

Alternative technique: Slight lateral tilt. Manipulate foetal head forwards and downwards, then breech upwards with other hand, producing forward somersault.

ECV may be attempted in early labour with hexoprenaline, provided the membranes are intact and all the other parameters are favourable.

Administer anti-D globulin 100mcg to rhesus-negative women before or after ECV attempt.

Persistent breech presentation at term
Elective caesarean section is the safest method of delivery for the baby. This must be weighed against the current and future risks of caesarean section for the mother. Counsel about risks and benefits and offer elective caesarean.

Preparation for Caesarean Section

All patients going for Caesarean Section (elective or emergency) should receive the following medication:

Prophylactic antibiotics: one dose of a first generation cephalosporin.
Motivation: The use of prophylactic antibiotics before caesarean section has been proven to reduce the incidence of postpartum endometritis, urinary tract infection and wound infection.

Antacids: 30ml sodium citrate
Motivation: To neutralize the acid contents of the stomach and reduce the degree of chemical pneumonitis, should the patient
aspirate. Do not use magnesium trisilicate or aluminium hydroxide. Both are effective antacids but are suspensions and the particulate matter if aspirated will cause more damage from a foreign body response than the acid of the stomach.

Metoclopramide: 10mg IMI
Motivation: To promote emptying of the stomach, increase oesophageal tone and decrease sensitivity of vomit centre in the brain.

Thromboprophylaxis: All pregnant women should be evaluated for the need of thromboprophylaxis.

**Principles for managing an HIV infected woman during labour**

- Ensure relevant antiretroviral therapy has been taken
- Avoid rupturing membranes
- Avoid fetal injury like scalp electrodes to monitor fetal well-being
- Douche the vagina with 60ml 5% chlorhexidine in water with every vaginal examination
- Avoid an episiotomy where possible
- Choose a forceps over a vacuum if either instrument would be appropriate for an assisted delivery
- Avoid suctioning the fetus where possible

**References:**


Chapter 4. Strategies to improve intrapartum care

It is clear that, in order to improve intrapartum care, one will have to embark on a mission of further education and skills training for the staff managing patients in labour. Various programs have been tested in this regard and many lessons can be learned from their implementations:

1. **The Maternal Care Manual of the Perinatal Education Programme (PEP)**
   The Maternal Care manual of PEP aims to educate staff in the management of the pregnant patient both before, during and after labour. The effect of introducing the manual to different sites, particularly for skills training, has been tested prospectively. The findings were that the practical skills of midwives improved significantly when following the instructions of the manual closely, regardless of the level of experience of the midwives, and that additional teaching is unnecessary.\(^{12}\)

   The PEP manual is readily available for teaching and improving knowledge and skills of midwives.

2. **The Better Birth Initiative (BBI)**
   The BBI is a global initiative which aims to promote evidence based and humane care for women during childbirth. Specifically, it aims to:
   
   (a) stop the practice of procedures which have no proven benefit e.g. shaving, enemas, supine position at delivery, withholding fluid and food in labour etc.
   
   (b) stop making procedures “routine” for which there is no proven benefit e.g. episiotomies, artificial rupture of the membranes, routine suctioning of the neonate without meconium,

   (c) promote the practice of procedures for which there is proven benefit e.g. mobility in labour, allowing oral intake of especially fluids in labour, alternative positions for birth, companionship in labour, etc.
This program takes the form of structured workshops for labour ward staff and managers. It is one approach to improve care in labour for which materials are available to any health worker who at local level wishes to bring about change for the better. The BBI has been implemented in many labour wards in South Africa, with some success. It has been shown that, in order for it to be successful, the presence of at least one enthusiast is needed at every institution. App 13

3. Kangaroo Mother Care (KMC) – Lessons from implementation

The aim of KMC is to improve the outcomes of babies born with very low birth weight. Although its objectives fall outside of the scope of intrapartum care, there are valuable lessons to learn from its implementation successes over the past few years. App 14

The KMC program, which consists of a comprehensive training package, was introduced to different sites in 3 different ways: package alone, package and regional facilitation and package and tele-education. In testing the effect of these implementation strategies, it was clearly shown that the best results were obtained with on-site facilitation by an expert. What was also clearly shown, was that there were “winning” and “losing” hospitals, often related to hospital management. This strengthens the findings of the BBI program that one needs enthusiasts to make such a program successful.

4. The Decentralized Education Program for Advanced Midwives (DEPAM)

The objective of this program is to teach advanced skills in midwifery on an on-site basis, where the midwives do not need to leave their facilities in order to be trained in advanced midwifery. In previous studies the data showed that it was an effective means of improving maternal and neonatal care within maternity units, even during the training stage. The cost of such a program is, unfortunately, the limiting factor in its usefulness.1
5. **The Peninsula Maternal and Neonatal Services (PMNS) model**

In the PMNS, midwife obstetric units (MOU’s) are visited by an expert obstetrician/paediatrician on a weekly basis. During these visits training is done, problems discussed and support rendered in general. This includes not only professional support, by problem solving and feedback on referred cases, but also emotional support. This program has to be recognized as contributing at least to some extent to the reduced perinatal death rate due to IPH reported in the PMNS over the past 20 years.\(^{\text{App}15}\)

6. **The Robson Classification of Caesarean Sections**

This classification system aims to identify prospective, clinically relevant groups of women in which there are differences in their C/S rates. It makes possible comparisons over time within one unit or between units, allowing for changes in management that may improve perinatal care.\(^2\)

The classification system consists of 10 well-defined sub-groups of women: mutually exclusive but totally inclusive (meaning that each woman will fit into only one group, but there will be a group for every woman), prospective and clinically relevant, simple to understand and organise.

The groups that consist of women presenting in spontaneous labour at term, with a fetus in the cephalic presentation, represents patients that are low risk. The caesarean section rate in these groups should be a true reflection of how well labour is managed. An abnormally high caesarean section rate probably indicates that there is a problem with either the diagnosis or management of labour in that specific unit. This would indicate specific focus areas of training that may be needed by specific units.
**Proposed strategies for improving the quality of intrapartum care:**

These strategies are based on the successful implementation of the intrapartum care guidelines.

1. Training
A comprehensive training package based on the intrapartum care guidelines should be developed, which should include the following:

   1.1 A portable kit consisting of models and learning material to teach the basic skills needed to manage a patient in labour (i.e. abdominal palpation, pelvimetry, vaginal examination of the birth canal and presenting part of the fetus, fetal wellbeing)
   1.2 Training material on the use and interpretation of the partogram
   1.3 Training material on the interpretation of the cardiotocograph

2. Audit of Management of Labour
Units should be audited on their day-to-day management of labour. The components incorporated into the evaluation process should include the following:

   2.1 The 25-point score of the partogram
   2.2 The Robson Classification of caesarean sections
   2.3 The Perinatal Problem Identification Programme (PPIP)
   2.4 A 20-point exit questionnaire completed by the patients on quality of care during labour

3. Implementation
3.1 The on-site Champion
A strong effort should be made to identify at least one person at each site with a special interest and enthusiasm to drive the process, as this has been shown to be the factor that has the largest impact on whether the program will be successfully implemented and sustained. A special effort should also be made to include the supervisors and hospital managers in the process.

3.2 The Community Midwife Practitioner/ Obstetrician/ Paediatrician
In view of the evidence available, the package should be introduced by means of on-site, face to face facilitation by an expert in the field. This person needs to be available for regular visits to the units, for both the purposes of training and ongoing support of the staff at the institution, as is the case in the PMNS model. Introduction of the program would possibly be more effective using on-site facilitation rather than training the trainers methodology. Training on the package could possibly be incorporated into the BBI workshops, or be stand-alone, specifically targeted programs.

References:

1. Garde PM. Aspects of the decentralized education program of advanced midwives (DEPAM). 8th Proceeding of the Priorities in Perinatal Care Congress; 1989: 17 (14)
Appendix 1

Babies who die from labour related intrapartum hypoxia: a confidential enquiry in South African public hospitals

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RC Pattinson MD, FCOG(SA), MRCOG
Medical Research Council Unit for Maternal and Infant Health Care Strategies, University of Pretoria

Summary
Seventeen hospitals, from a range of health care environments, participated in confidential enquiries of perinatal deaths resulting from labour related intrapartum hypoxia. Data from 102 deaths, including 22 stillbirths and 80 neonatal deaths, were analysed. The mean birthweight was 3021 g. There were six breech presentations, and seven cases of cord prolapse. Oxytocin was used in ten women, and the first stage of labour was prolonged in six. Regarding neonatal deaths only, fetal heart decelerations were evident in 39 patients, with meconium passage in 50, although caesarean section or vacuum extraction for fetal distress was done in only 16. The total number of caesarean sections and assisted vaginal deliveries were 35 and 14 respectively. The majority of these deaths occurred in low-risk women with apparently uncomplicated labour. There appears to be a failure to detect or respond to evidence of fetal distress. Intrapartum care for all women in labour requires close attention to detail in monitoring fetal health.

Introduction
Stillbirths or neonatal deaths from intrapartum hypoxia should be rare events. Monitoring of fetal condition during labour provides opportunities for intervention when a fetus shows evidence of hypoxia. Yet, intrapartum hypoxia, also called asphyxia, remains a common cause of perinatal death in sub-Saharan Africa\textsuperscript{1,2,3}. In a recent nationwide review of perinatal mortality in South Africa, the ‘Saving Babies 2000’ survey of perinatal deaths at 27 state hospitals
reported a high rate of death from intrapartum hypoxia (4.8 per 1000 births)\textsuperscript{4,5}. This compares poorly with corresponding rates from the United Kingdom (0.9 per 1000)\textsuperscript{6}. The Saving Babies survey found that most of these deaths were preventable, 37% because of delay in women presenting to health institutions, 43% as a result of inadequate fetal monitoring in labour, and 19% following a failure of health workers to respond to poor labour progress. It was recommended that detailed confidential enquiries of all such deaths be instituted, to give ‘more precise information on the weaknesses in perinatal services in South Africa, so that specific recommendations for improvement’ could be made.

This study is a follow-up to the findings of the Saving Babies survey, with the objective of identifying more clearly the events that lead to perinatal death from intrapartum hypoxia, in a range of health care environments in South Africa.

**Methods**

We asked the hospitals that participated in the Saving Babies survey to contribute to this study. Nineteen hospitals (5 level 1, 12 level 2 and 3 level 3 institutions)* expressed their willingness to participate and were sent data sheets in a confidential enquiry format, on which to enter detailed information for every death caused by labour related intrapartum hypoxia. This was defined as any death where labour alone was considered to be the cause, i.e. fresh stillbirth, neonatal death associated with low Apgar scores or failure to breathe after birth, and also included cord prolapse, meconium aspiration, birth trauma and uterine rupture. Deaths associated with congenital abnormalities, antepartum haemorrhage, severe pre-eclampsia, prematurity and infection were excluded. The data sheets required entry of information on facilities, transport, professional staff, and obstetric factors such as maternal problems, progress of labour, mode of delivery and fetal monitoring. To maintain confidentiality, names of patients, midwives and doctors, and the dates and times of the events, were not entered on the forms. Microsoft Excel and Epi-Info 6 software were used for data analysis.

The study was approved by the University of Pretoria, Faculty of Health Sciences Ethics Committee. Consent was obtained from the
Chief Executive Officers of each of the institutions to use the information. Every case was anonymised before leaving the hospital.


**Results**

One hundred and thirty-one data sheets were returned, but 29 were rejected, because the primary causes of death were not labour related intrapartum hypoxia as defined above. This left 102 deaths resulting from intrapartum hypoxia, with 23 from metropolitan, 35 from city and town, and 34 from rural hospitals. There were 22 stillbirths and 80 neonatal deaths. The mean birth weight was 3021 g (range 1600-4700), with a median gestational age of 38 weeks. Two infants had gestational ages of 41 weeks, and one of 42 weeks. There were seven breech presentations, and one transverse lie. Five mothers had mild to moderate hypertension. Four deaths followed induction of labour. The primary causes of death were labour alone (82), meconium aspiration (8), cord prolapse (7), trauma from breech delivery or shoulder dystocia (3) and uterine rupture (2).

The median time the mothers were in hospital before delivery was 6.5 hours, with 24% in hospital less than two hours before giving birth. The length of the active phase of labour was greater than 12 hours in six of 86 women in whom this was recorded (7%). Partograms were used in 90 cases. Oxytocin for augmentation or induction was used in 10 women. The length of the second stage of labour was recorded in 66 women who did not have first-stage caesarean sections, and the length of the second stage exceeded two hours in 12 (18%). Shoulder dystocia was recorded in four cases and in all of these the birth weight was less than 4000 g.
Fetal monitoring was noted in 80 cases, and the method described in 75. Cardiotocography was used in 41 (55%), hand-held Doppler in 10 (13%), and fetal stethoscope alone in 24 (32%). Fetal heart decelerations were detected in 39 cases, and late decelerations in 27 of these. Thick meconium staining of the liquor was recorded in 37 cases, and in 17 of these was associated with fetal heart decelerations. This is shown, with modes of delivery, in table 1.

Thirty-five infants were born by caesarean section, with the indication being 11 for fetal distress and three for cord prolapse. All the other indications were maternal or obstetric, including cephalopelvic disproportion, breech presentation, previous caesarean section and transverse lie. Caesarean section was done on 18 of the 27 patients in whom late decelerations were detected. There were 14 assisted vaginal deliveries (21% of vaginal births), including one forceps and 13 vacuum deliveries. Two of the assisted deliveries were performed for fetal distress, and the remaining 12 were done for prolonged second stage or maternal exhaustion.

Table 1. Detection of intrapartum fetal distress and mode of delivery preceding neonatal death caused by intrapartum hypoxia (n=80, cardiotocograph used in 41)

<table>
<thead>
<tr>
<th>Event</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any fetal heart decelerations detected</td>
<td>39</td>
<td>49</td>
</tr>
<tr>
<td>Early decelerations or variable decelerations</td>
<td>22</td>
<td>28</td>
</tr>
<tr>
<td>Late decelerations</td>
<td>27</td>
<td>37</td>
</tr>
<tr>
<td>Meconium staining of the liquor</td>
<td>50</td>
<td>63</td>
</tr>
<tr>
<td>Thick meconium staining of the liquor</td>
<td>37</td>
<td>46</td>
</tr>
<tr>
<td>Thick meconium staining of the liquor with decelerations</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Caesarean section (all indications)</td>
<td>35</td>
<td>44</td>
</tr>
<tr>
<td>Caesarean section for fetal distress or cord prolapse</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Assisted vaginal delivery (all indications)</td>
<td>14</td>
<td>18</td>
</tr>
<tr>
<td>Assisted vaginal delivery for fetal distress</td>
<td>2</td>
<td>3</td>
</tr>
</tbody>
</table>

Eighty babies were born alive. Seventy had Apgar scores recorded, and 62 (89%) had scores less than seven at five minutes. Fifty-two newborns required intubation. Details on the timing and circumstances
of neonatal resuscitation were insufficient for meaningful analysis. Fifteen infants went on to receive intensive care ventilation. In the opinions of the persons completing the forms, 19 babies would probably have survived had ventilation facilities been available at their institutions.

Delay in presentation in labour was noted in 27 cases, with eight related to transport difficulties from home to the labour unit, and four caused by delays in transport from community health centre to referral hospital. The median number of babies born during a 12-hour shift was 6, with the median number of staff being three midwives and one assistant nurse. Doctors were noted to be immediately available in 91% of the cases. Cardiotocography monitors (CTGs) were available in the hospitals of 98 out of the 102 cases, with the hospitals having a mean of 4.5 and a median of 2 CTGs. A mean of 3.9 CTGs were in working order at the time of the deaths. Basic neonatal resuscitation equipment, including endotracheal tubes and laryngoscopes, were available in all instances, but in only 51 (50%) was it possible to provide ventilation for newborns after initial resuscitation.

**Discussion**

In searching for a common thread that links these deaths, it was possible to reject a number of factors as major contributors. Post-term pregnancy, oxytocin use, breech presentation, and prolonged first stage of labour were not prominent in this sample of perinatal deaths. Labour prolongation was surprisingly uncommon. The majority of deaths from intrapartum hypoxia therefore occurred during or after apparently normal labour. Skilled staff and appropriate equipment were available in all these hospitals. The midwife to births ratio was not helpful in identifying staff shortages as a problem, as midwifery staffing norms have not been established in South Africa. Cardiotocography and neonatal resuscitation equipment is available and mostly in good working order, although it is possible that CTGs are in short supply in some of the institutions. As expected, delay in presentation during labour proved to be a common problem, with transport difficulties predominating. Almost one quarter of the women delivered within two hours of arrival, making it difficult for any hospital interventions to be effective. Transport problems in obstetric care go far beyond the health service. Poverty, distance,
telephone and road infrastructure, and local administrative capacity all play an important role. In rural areas, mothers’ waiting areas in hospitals and community health centres will continue to be an effective way for women to ensure safe and supervised delivery.7

The most striking finding in this study was the failure, in most of these deaths, to detect signs of fetal distress. It is likely that these babies would have shown some evidence of intrapartum hypoxia during labour. Late decelerations, the hallmark of fetal distress, were detected in just over one quarter of these cases. Caesarean section or assisted vaginal delivery was done for 49 of these women, but fetal distress was the indication for operative delivery in only 16 (33%). In the majority of deliveries, the poor condition of the babies at birth must have been surprising to the attending midwives or doctors. It appears that there is a serious deficiency in intrapartum fetal monitoring in the hospitals studied, and probably in most other state hospitals in South Africa. For low-risk labour, intermittent auscultation, using a hand-held Doppler instrument, is the method of choice for monitoring the fetus in labour.8 Cardiotocography, which is available in almost all hospital labour units, should be used for fetuses who have abnormalities on auscultation. It seems likely that insufficient time and care is taken with auscultation, and that the early signs of fetal hypoxia – fetal heart decelerations – are frequently missed. The rates of prolonged second stage and assisted delivery (18% and 21% of vaginal births respectively) were high, especially as none of these units employ epidural analgesia in labour. It is not possible to say whether the assisted deliveries contributed to the deaths of these babies. The second stage of labour, with strong uterine contractions and maternal expulsive efforts, exerts a significant hypoxic stress on the fetus.9 Women who are pushing in the second stage of labour should not be left alone, and fetal heart auscultation must be done after each contraction to confirm return to the baseline. This will allow early detection of fetal bradycardia, so that appropriate action can be taken.

The data in this study does not permit comment on the quality of immediate neonatal resuscitation at these hospitals. Effective resuscitation gives an asphyxiated newborn the best chance for recovery.10 All institutions must ensure that skills and equipment for
neonatal resuscitation are available in their labour wards. The absence of neonatal ventilation facilities is problematic as small district hospitals in South Africa cannot run and maintain neonatal intensive care units. Transfer of very ill infants to regional hospitals is currently the only solution.

Two recent case-control studies from Sweden and Uganda investigated risk factors for birth asphyxia \(^{11,12}\). Both found prolonged labour, oxytocin use, malpresentation, meconium passage, vacuum extraction and emergency caesarean section to be associated with subsequent birth asphyxia. While such factors may identify babies at risk for complications of intrapartum hypoxia, our study adds the important point that intrapartum death or birth asphyxia frequently occurs in situations of entirely normal labour.

Limitations of this study are mainly concerned with the sample and whether it is representative of South African institutions. The sample was self-selected, and may represent institutions that have an interest in improving obstetric and neonatal care, and systematically exclude those where perinatal care is not considered a priority. The sampling method also excluded home deliveries and births at midwife-run community health centres. It is also possible that the midwives or doctors who completed the forms may have reported events in a fashion that would exonerate them from blame in the perinatal death. This is however unlikely, as they were aware that this was a confidential enquiry.

**Conclusion**
Labour related intrapartum hypoxia is a common and avoidable cause of perinatal death in South Africa, and the majority of these deaths occur in low-risk situations where labour appears to be normal. The overwhelming problem seems to be failure to detect evidence of fetal distress. To prevent these unnecessary deaths, the emphasis in labour ward care should be close and careful monitoring of all women in labour, with particular attention to detail in fetal heart rate monitoring.

**References**


Appendix 2

What is the best midwife obstetric unit (MOU) model for Metropolitan areas?
T Mabale, RC Pattinson, C van der Walt
MRC Maternal and Infant Health Care Strategies Research Unit

Introduction:
Four MOUs in the Pretoria Region were analysed. They represent the “Peninsular Maternal and Neonatal Service (PMNS)” model of having a stand alone MOU with the midwives having responsibility for referral of patients. There may or may not be a doctor on-site in casualty. The primary level hospital which does not perform caesarean section with the doctor being responsible and the midwives report to the doctor who refers the patients as need be. The final model is the traditional model with a MOU within a large labour ward where doctors are available, but who only see the patients if asked to by the midwives.

Aim:
To assess four model of Midwife Obstetric Units (MOUs) to determine which model is best for metropolitan areas

MOU Models

<table>
<thead>
<tr>
<th>MOU Models</th>
<th>MOU 1 (PMNS 1)</th>
<th>MOU 2 (PMNS 2)</th>
<th>MOU 3 (Dr ref.)</th>
<th>MOU 4 (Trad.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stand alone</td>
<td>Stand alone</td>
<td>Stand alone</td>
<td>Within large LW</td>
<td></td>
</tr>
<tr>
<td>Doctor in casualty</td>
<td>No Doctor on site</td>
<td>Doctor in casualty</td>
<td>Doctor in LW</td>
<td></td>
</tr>
<tr>
<td>Midwife refers</td>
<td>Midwife refers</td>
<td>Doctor refers</td>
<td>Midwife refers</td>
<td></td>
</tr>
<tr>
<td>PMNS Model (1)</td>
<td>PMNS Model (2)</td>
<td>Primary level hospital- not doing C/S</td>
<td>Traditional Model</td>
<td></td>
</tr>
</tbody>
</table>

Methodology:
The method used was quantitative using auditing of patient files and wards monthly statistics. Questionnaires consisting of Likert scales
were administered to patients in order to assess their perception of quality of care.

**Method of evaluation:**

To assess **safety** the following variables were looked at:
- Fresh Stillbirth (FSB) rate >2.5kg (/1000 births)
- 5 min Apgar score <8
- Neonatal referral out
- Retained placenta
- Reported PPH
- Other maternal trauma

To assess **cost effectiveness** the following variables were looked at:
- Staff/births/day ratio
- % transfers of mothers in labour
- % patients bypassing MOU (September)
- Admissions in labour/year
- Low birth weight rate

To assess **quality of care** the following variables were looked at:
- Patients perceptions
- Partogram score
- Problems identified
- Action taken on problems
- Episiotomy rate

**Results:**

Assessment of Safety of MOU’s

<table>
<thead>
<tr>
<th>Model of MOU</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>FSB Rate &gt;2.5kg</td>
<td>9.8</td>
<td>14.1</td>
<td>39.1</td>
<td>4.8</td>
</tr>
<tr>
<td>5 min Apgar &lt;8 (%)</td>
<td>3.0</td>
<td>11.8</td>
<td>22.4</td>
<td>11.3</td>
</tr>
<tr>
<td>Neonatal referral out</td>
<td>2.3</td>
<td>1.6</td>
<td>2.2</td>
<td>1.1</td>
</tr>
<tr>
<td>Retained placenta (%)</td>
<td>0.4</td>
<td>0.2</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>Reported PPH (%)</td>
<td>7.6</td>
<td>0.7</td>
<td>0.8</td>
<td>2.1</td>
</tr>
<tr>
<td>Other maternal trauma</td>
<td>1.1</td>
<td>1.7</td>
<td>3.2</td>
<td>1.8</td>
</tr>
</tbody>
</table>
Assessment of Cost-effectiveness of MOU’s

<table>
<thead>
<tr>
<th>Model of MOU</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staff/births/day Ratio</td>
<td>6.54</td>
<td>1.53</td>
<td>2.06</td>
<td>0.51</td>
</tr>
<tr>
<td>% Transfer of mothers in</td>
<td>8.7</td>
<td>31.0</td>
<td>33.9</td>
<td>24.9</td>
</tr>
<tr>
<td>% of patients bypassing MOU</td>
<td>12</td>
<td>17.6</td>
<td>20</td>
<td>2.6</td>
</tr>
<tr>
<td>Admissions in labour/year</td>
<td>116</td>
<td>3378</td>
<td>331</td>
<td>369</td>
</tr>
<tr>
<td>Low birth weight rate (%)</td>
<td>3</td>
<td>10</td>
<td>11</td>
<td>3</td>
</tr>
</tbody>
</table>

Quality of Care of MOUs

<table>
<thead>
<tr>
<th>Model of MOU</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients perceptions</td>
<td>Highes</td>
<td>Second</td>
<td>Lowes</td>
<td>Third</td>
</tr>
<tr>
<td>Partogram score (%)</td>
<td>82.3</td>
<td>86.8</td>
<td>61.8</td>
<td>81.5</td>
</tr>
<tr>
<td>Problems identified (%)</td>
<td>36</td>
<td>32</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Action taken on problem</td>
<td>61</td>
<td>63</td>
<td>50</td>
<td>64</td>
</tr>
<tr>
<td>Episiotomy rate (%)</td>
<td>29.7</td>
<td>11.8</td>
<td>22.7</td>
<td>20.1</td>
</tr>
</tbody>
</table>

Conclusions
- MOU 4 (Traditional Model) safest, most cost-effective, moderate quality of care
- MOU 3 (Primary level hospital not doing C/S) least safe, not cost-effective, poor quality of care
- MOUs 1 and 2 (PMNS Model) safe, good quality of care, moderate cost-effectiveness
- Obstetrics must be run by professionals, either midwives with responsibility to refer, or by dedicated doctors.
- Obstetrics is NOT for occasional operators!!!
Appendix 3

The relationship between staffing of labour wards and deaths due to intrapartum hypoxia

RC Pattinson, R Prinsloo

MRC Maternal and Infant Health Care Strategies Research Unit and Obstetrics and Gynaecology Department, University of Pretoria

Aim: To investigate the relationship between the number of staff per delivery per day and the deaths due to intrapartum asphyxia.

Method: A postal survey was conducted of the PPIP sites requesting details of the staffing of their labour wards. The deliveries per site and the intrapartum hypoxia deaths were taken from the hospitals’ PPIP data. The number of midwives per delivery per day and the rate of deaths due to intrapartum hypoxia were calculated per institution. A correlation was sought using Pearson’s Test.

Results: There were 49 sites which replied and where PPIP data was available.

There was no significant correlation between staff and deaths due to intrapartum hypoxia.
The only significant association was with hospitals between 1000-4999 deliveries. This surprisingly has a positive correlation, i.e. the more staff the higher the deaths due to intrapartum hypoxia.

Discussion
The lack of association between amount of staff/delivery/day and the deaths due to intrapartum hypoxia was surprising. There are a number of possible explanations for this.

- Inadequate skills due to staff rotations, inadequate training or lack of specialisation
- Inadequate motivation
- Inadequate staff

Conclusion: There was no clear association between the staffing of labour wards and deaths due to intrapartum hypoxia.
Appendix 4

The Design and Function of the Labour Ward as it Influences Quality of Care

Hugh Philpott

Introduction

As part of a study of the quality of observations, recordings and decisions in labour in four randomly selected hospitals in KwaZulu Natal, Anna Voce and Hugh Philpott looked at the design and function of the labour wards as they influenced the quality of care provided. This study was conducted as part of the baseline assessment in the four hospitals. The findings in the hospitals as a group were as follows.

Labour Ward design

- There was no designated Admission Room
- The Labour Ward was only used for patients in the second stage of labour.
- Patients were sent elsewhere until they were in the second stage.
- Observations in the first stage were only carried out sporadically, if at all, as the waiting area was overcrowded, under-equipped and under-staffed.
- Even in the Labour Ward, the space was used for other activities such as administration.

Supervision in the Labour Ward

- This is not happening for the following reasons:
  - The senior staff are all ‘too busy’ with hands-on work and administration
  - Personnel in the Labour Ward are not familiar with the concept and need for supervision.
  - No one is designated as the supervisor.

Consequences of no supervision

- Findings and decisions are not double-checked
- Records are not checked
- Protocols are not kept
- Staff competence is not monitored
- Perinatal and maternal deaths are not audited accurately
• In-service training is not conducted

**Fetal condition is not monitored**

• There is inconsistence as to how and when to record the fetal heart rate
• The Pinard stethoscope is not being used
• The CTG is used, but only sporadically, without protocols for its use.
• The CTG is often not applied correctly. As a result, the contractions are often not recorded and decelerations cannot be properly diagnosed.
• The CTG is usually not interpreted and the findings not recorded on the labour graph
• Molding is not assessed.

**Staffing**

• Junior staff are rotated every three months
• There is no staffing norms in the Province, which makes it difficult to assess whether staffing is adequate or not.
• It is difficult to assess work load because the midwives are responsible for Labour Ward and the rest of Maternity
• The doctors in Labour Ward are usually COSMOS and are therefore inexperienced. The decisions made are often incorrect and ill-informed.

**Paralysis in the system**

• The quality of the service is not monitored and analyzed
• Nobody takes a decision to change even when they know it is needed
• Even when change is agreed upon, it is not done, even when the changes called for are not major.
Appendix 5

Problems with patient Transport

Tillie Jantjes

The World Health Assembly Policy statement: “Make Every Mother and Child Count” alludes amongst others: “… end exclusion from life-saving health services” (Phumaphi 2005: Unpublished). South African health care services are based on a primary health care model using district systems. The principles of the DHS are to ensure equity, increase efficiency and accessibility of health care services to the population. It is expected that patients should be attended to at the lowest appropriate level before being referred to a higher level.

In a, currently unpublished, PhD study dealing with referral of labouring women, transport was identified as one of a number of problems impacting on the delivery of health care to these women.

SETTING
This research is undertaken in a metropolitan area where intrapartum care is provided by four midwife obstetric units (MOUs) and one referral hospital.

RESEARCH DESIGN AND METHOD

The objective that elicited the responses for this part of the study was as follows:

“describe the perceptions and experiences of midwives working at lower level maternity services responsible for inter level health care referrals of labouring women”

A qualitative research design was used for this part of the study.
ETHICAL PRINCIPLES OBSERVED
Ethical principles of research were adhered to throughout the research process including the principles informed consent, beneficence, non-malificence, privacy and confidentiality.

The research population consisted of 48 midwives responsible for inter level health referral of labouring women. As the study developed the need for including data from interviews with a midwifery manager as well as an ambulance services manager, was identified.

The researcher was the primary instrument for data collection using audiotaped semi-structured interviews, written responses and field notes as data base. An open ended question on the health care provider questionnaire invited participants to give a general comment on referral of labouring women.

Data analysis took place using Tesch’s method of thematic analysis (Tesch 1990 in Creswell, 1994: 153). The researcher will adhere to the principles of trustworthiness namely ensuring truth value, applicability; consistency and neutrality are throughout the research study. Krefting (1991: 221-222) proposes that neutrality in qualitative research emphasizes the neutrality of the data rather than that of the researcher.

An independent coder, with whom a consensus discussion was held, was used to verify the analysed data. Material resource related issues were identified as one of 4 (four) main themes with transport related issues as a sub theme. These included long waiting periods for ambulances resulting in making complications worse and no designated ambulance for maternity patients.

MIDWIFE RESPONSES
A brief summary of midwife responses on transport issues are as follows:

1 AMBULANCE
   o DELAYS for as long as 4 – 6 and even 12 hours: midwives expressed concern about the possibility of having maternal
deaths due to delays. One mentioned having had a fresh stillborn relating this to transport delay. MOUs’ staff recorded calls made before ambulance arrived.

- ILL EQUIPED AMBULANCES where no basic equipment for resuscitation or transport incubator(s) were available.

- COMMUNICATION: Difficulty was experienced getting an ambulance when needed. Midwives reportedly have to report to the ambulance operator the number of calls regarding a specific case referred. As indicated, if it was the first time a call was made, one can expect a waiting period.

2 USE OF ALTERNATIVE TRANSPORT

- PRIVATE TRANSPORT including the use of ordinary hospital transport and patient vehicles. One participant expressed having to transport a patient at the back of an open bakkie at night time during winter in desperation of getting the patient to hospital knowing that one has to wait for hours at a time for an ambulance to arrive.

- NO MIDWIFE/HCP to accompany high risk patients to hospital identified as needing accompaniment.

3 COMMUNICATION

- Participants experienced frustration having to convince the ambulance call center operator that a patient needs to be referred. At times participants were challenged with getting referral authorized by a doctor at referral hospital. The latter were more severe at night time when the medical superintendent had to be phoned by a doctor to obtain such authorization.

AMBULANCE SERVICES MANAGER
The ambulance services manager stated that there were:
- too few vehicles especially those servicing the peri urban and rural areas
- Competitiveness with Private Sector: experienced senior staff lost;
• Urgent need for training;
• Lack of incentives for staff contributes to failure to retain competent personnel;
• This person echoed the midwife participants’ notion that the ambulances were in a poor state.

MIDWIFERY SERVICES MANAGER
The midwifery services manager’s responses supported the written and interview responses of midwives as well as ambulance services manager.

Effective patient transportation during inter level health referral of labouring women may mean a difference between life and death. Transport is a resource related issue and can be addressed.

WE CAN MAKE A DIFFERENCE!!
Appendix 6

Cervical dilatation, descent, moulding and position – how good are obstetricians with clinical signs of labour progress?

E J Buchmann
Chris Hani Baragwanath Hospital and University of the Witwatersrand

Introduction
It seems essential that clinical information entered onto the partogram - cervical dilatation, descent, moulding and position – should reflect what is correct and true. No studies have been done to determine if doctors agree on these clinical findings done simultaneously in individual patients. The objective of this study was to measure inter-observer agreement in these clinical assessments in labour.

Methods
This was a cross-sectional comparative study done in the Chris Hani Baragwanath Hospital Labour Ward. Patients studied were women in the active phase of labour, at term, with a live baby in a cephalic presentation. Patients with previous caesarean section were excluded. The researcher (EJB) performed abdominal and vaginal examinations within 5 minutes of the same examinations done by the clinician on duty (consultant obstetrician or registrar) in the labour ward. Cervical dilatation, descent, moulding and position were measured. At each examination, the researcher and the clinician on duty were not aware of each other’s findings. The researcher was also unaware of the patient’s parity, obstetric history and previous intrapartum clinical findings. Ultrasound examination of the fetal head was done by the researcher on a consecutive sample of patients to verify the findings on position. Kappa analysis for inter-observer agreement was done for cervical dilatation, descent and moulding using Epi-Info 6 statistical software.

Results
Five hundred and eight patients were examined. The clinicians on duty were registrars (55%) and obstetric consultants (44%). Cervical dilatation was measured by both the researcher and the clinician on
duty in 498 patients, and in 250 (50%) there was agreement. There was disagreement by 1 cm in 192 (39%) of patients, by 2 cm in 50 (10%), and by 3 cm in 6 (1%) of patients. The Kappa score for rater agreement was 0.52. Descent in fifths was measured by both the researcher and the clinician on duty in 506 patients. The findings are shown in table 1. The findings on descent according to station are shown in table 2. Agreement on sagittal suture and lambdoid suture moulding scores are shown in tables 3 and 4 respectively.

Table 1. Agreement between the researcher and the clinician on duty as regards level of the fetal head in fifths (N=506).

Descent ≤2/5 is suggestive of engagement. The shaded blocks show agreement. Kappa = 0.43.

<table>
<thead>
<tr>
<th>Researcher: Clinician on duty:</th>
<th>Head ≤2/5</th>
<th>Head ≥3/5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Head ≤2/5</td>
<td>71</td>
<td>50</td>
</tr>
<tr>
<td>Head ≥3/5</td>
<td>58</td>
<td>327</td>
</tr>
</tbody>
</table>

Table 2. Agreement between the researcher and the clinician on duty as regards station of the fetal head (N=446).

Station ≥+1 is suggestive of engagement. The shaded blocks show agreement. Kappa = 0.39.

<table>
<thead>
<tr>
<th>EJB: Clinician on duty:</th>
<th>Station ≥+1</th>
<th>Station ≤0</th>
</tr>
</thead>
<tbody>
<tr>
<td>Station ≥+1</td>
<td>47</td>
<td>35</td>
</tr>
<tr>
<td>Station ≤0</td>
<td>55</td>
<td>309</td>
</tr>
</tbody>
</table>
Table 3. Agreement between the researcher and the clinician on duty as regards sagittal suture moulding score (N=482).
Shaded blocks show agreement. Kappa = 0.15.

<table>
<thead>
<tr>
<th>EJB: Clinician on duty:</th>
<th>No moulding</th>
<th>Moulding grade 1</th>
<th>Moulding grade 2</th>
<th>Moulding grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No moulding</td>
<td>184</td>
<td>74</td>
<td>32</td>
<td>3</td>
</tr>
<tr>
<td>Moulding grade 1</td>
<td>55</td>
<td>48</td>
<td>26</td>
<td>1</td>
</tr>
<tr>
<td>Moulding grade 2</td>
<td>14</td>
<td>23</td>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>Moulding grade 3</td>
<td>0</td>
<td>3</td>
<td>7</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 4. Agreement between the researcher and the clinician on duty as regards lambdoid suture moulding score (N=326).
The shaded blocks show agreement. Kappa = 0.08.

<table>
<thead>
<tr>
<th>EJB: Clinician on duty:</th>
<th>No moulding</th>
<th>Moulding grade 1</th>
<th>Moulding grade 2</th>
<th>Moulding grade 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>No moulding</td>
<td>42</td>
<td>55</td>
<td>86</td>
<td>6</td>
</tr>
<tr>
<td>Moulding grade 1</td>
<td>3</td>
<td>11</td>
<td>43</td>
<td>10</td>
</tr>
<tr>
<td>Moulding grade 2</td>
<td>2</td>
<td>8</td>
<td>43</td>
<td>5</td>
</tr>
<tr>
<td>Moulding grade 3</td>
<td>0</td>
<td>1</td>
<td>10</td>
<td>1</td>
</tr>
</tbody>
</table>
Position of the fetal head was ascertained by both the researcher and the clinician on duty in 452 patients. There was agreement on position in 163 cases (36%), and a difference of 45 degrees in 93 (21%). The difference was 90 degrees in 54 (12%), 135 degrees in 69 (15%) and 180 degrees in 75 cases (17%). Ultrasound verification in 30 consecutive cases showed that the clinician on duty differed from the ultrasound by 90 degrees or more in 18 cases (60%) and the researcher differed from the ultrasound by 90 degrees or more in 3 cases (10%). Thirteen of the 18 errors by the clinician on duty were the result of transposition of the anterior and posterior fontanelles.

**Conclusion**

There was moderate agreement between the researcher and clinician on duty in measurement of cervical dilatation. Agreement on engagement, by fifths and by station, was fair to moderate. The researcher and clinician frequently disagreed on moulding scores, especially in assessment of lambdoid moulding. It is possible that the problems with lambdoid moulding assessment were the result of transposition of the fontanelles as shown by the ultrasound verification. There was also poor agreement on position of the fetal head, with ultrasound verification suggesting problems with the clinician on duty’s assessment. All of these clinical measurements are considered important in assessment of labour progress, but only cervical dilatation showed acceptable inter-observer agreement. Descent, moulding and position in this study were poorly reproducible, suggesting that these clinical assessments are either too difficult for clinicians in a teaching hospital or that the clinicians place no value on their accurate assessment. This presents a challenge to teachers of obstetric clinical skills.
Appendix 7

Improving the quality of observations, recordings and decisions during labour

A Voce1 H Philpott2 N Mzolo2 D Nyasulu3 C Connolly4

1Department of Public Health Medicine; 2Centre for Rural Health; 3KZN MCWH Directorate; 4Medical Research Council
With funding from the Medical Research Council

Introduction
This exploratory study was implemented in response to the recommendation in the Report on the Confidential Enquiries into Maternal Deaths in South Africa (1998, 2002) and Saving Babies Report (2001) that there needs to be improved use of the partogram in labour. The recommendations call for a quality assurance programme to ensure that the partogram is used correctly during the management of labour.

A checklist has been developed to enable labour ward supervisors to review the quality of labour records. This checklist was used in the labour wards of four (4) Level 1 Hospitals. Deficiencies in the recordings during labour management were identified. In one hospital formal teaching was provided on the management of labour. In the second hospital, a supervisory intervention was implemented, where supervisors were supported in using the checklist to monitor the quality of recordings and provide feedback on the deficiencies identified through the checklist. In the third hospital feedback only was provided on the identified deficiencies. No intervention was implemented in the fourth hospital. The value of the checklist was assessed, and different approaches to dealing with deficiencies were compared against measures of quality of care and outcome measures. This presentation reports on selected findings that arose from the initial baseline assessment.
Objectives of the study
1. Conduct a baseline assessment of:
   a. The quality of recordings during the management of labour
   b. The quality of intrapartum care as measured by perinatal care indicators
2. Identify the deficiencies in the recordings
3. Implement quality improvement interventions
4. Conduct end of intervention assessments:
   a. Of the quality of recordings
   b. Of the quality of intrapartum care
5. Identify lessons learned and develop recommendations that will lead to improvements in the observations, recordings and decisions during the management of labour.

Summary of methodology
An action-research design was implemented, using both quantitative and qualitative methodology, in four randomly selected rural Level 1 Hospitals. Each of these hospitals was randomly assigned to an intervention. A baseline assessment was conducted in each hospital, for the 6 months prior to the study (Sep 04-Feb 05) measuring:
- the quality of intrapartum care (by calculating the standard intrapartum care indicators from data collected from the delivery register);
- the quality of observations, recordings and decisions during labour (by using the Philpott-Voce Labour Record Checklist to review a representative number of randomly selected labour records of deliveries conducted in each institution during the above period)
- background factors that may have an effect on the quality of care and the quality of observations, recordings and decisions during labour (e.g. workload, absenteeism rate)

The intervention phase was implemented over a 6-month period (May 05-Oct 05), after which two follow-up assessments were carried out in each of the four hospitals. The first follow-up assessment was carried out on the immediate month post-intervention (Nov 05), and the second follow-up assessment was conducted on the 6th month post-intervention (April 06).
Summary of selected findings in the baseline assessment

For the purpose of this presentation, the findings of the baseline assessment from the 4 hospitals have been aggregated.

Quality of intrapartum care

Standard perinatal care indicators were measured and the results reported in Table 1. The results show the mean and the range for each indicator as measured in the four study hospitals.

Table 1: Perinatal care indicators: mean and range in the study hospitals (Sept04 to Feb05)

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Mean</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perinatal Mortality Rate</td>
<td>48/1000</td>
<td>42 – 52/1000</td>
</tr>
<tr>
<td>Fresh Still Birth Rate</td>
<td>9/1000</td>
<td>8 – 14/1000</td>
</tr>
<tr>
<td>Early Neonatal Death Rate</td>
<td>22/1000</td>
<td>17 – 25/1000</td>
</tr>
<tr>
<td>Perinatal Care Index</td>
<td>6</td>
<td>3 – 7</td>
</tr>
<tr>
<td>Caesarean Section Rate</td>
<td>19%</td>
<td>13 – 31%</td>
</tr>
</tbody>
</table>

Quality of the observations, recordings and decisions during labour

For the labour record review, a total of 906 records were randomly selected. Of these, a number of records were excluded, either because the women were admitted with their cervix fully dilated, or because they had been admitted for an elective caesarean section, or because the baby was ‘born before arrival’ (BBA), or because there was no record of the labour in the file. Table 2 summarises the reasons for which selected records were excluded. The mean and the range are presented.
Table 2: Summary of the reasons for which selected records were excluded from the review

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage Excluded</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>“cervix fully dilated”</td>
<td>16%</td>
<td>8–23%</td>
</tr>
<tr>
<td>“elective caesarean section”</td>
<td>9%</td>
<td>4 – 18%</td>
</tr>
<tr>
<td>“born before arrival”</td>
<td>3%</td>
<td>0 – 4%</td>
</tr>
<tr>
<td>“no record in file”</td>
<td>3%</td>
<td>0 – 8%</td>
</tr>
<tr>
<td>Other</td>
<td>3%</td>
<td></td>
</tr>
</tbody>
</table>

Thus a total number of 583 records were reviewed. In 24% of records (range 22-33%), it was found that the women had not been monitored at all during their labour. These were records of women who had been admitted early in labour (at 3 or 4cm of cervical dilatation) and were sent to the antenatal ward, and were only next seen when the cervix was fully dilated.

In the remaining 76% of records it was found that:

- The median score for the admission assessment was 40%. In 52% of records the antenatal care record had been reviewed; 57% had a complete admission form; 44% had recorded a diagnosis and decision on further management; and only 2% had any evidence that the admission assessment had been double-checked by a senior or more experienced practitioner (either by a doctor or a midwife) (see Figure 1).

- The overall median score for the labour graph was 40%; the overall median score for fetal condition was 40%, for the progress of labour was 51% and for maternal condition was 22% (see Figure 2). Figure 3 summarises the median score per individual item in the labour graph.

- The overall median score for the ‘Management of Labour form’ was 20%. In 36% of records a management decision had been recorded after pelvic examination; 22% had a summary of the fetal condition; 18% had a summary of the progress of labour; 26% had a summary of the maternal condition; 24% had recorded
a decision on the further management of labour as based on the findings (see Figure 4).

Measurement of background factors

With regards to the measurement of background factors that may impact on the quality of care and on the recordings during labour, the following selected factors are reported here:

- **Workload:** Three workload indicators were measured in order to get an estimation of the workload - the deliveries per midwife per day (mean 0.8; range 0.7 – 1.4); the admissions per midwife per day (mean 1.0; range 0.8 – 1.5) and the discharges per midwife per day (mean 0.8; range 0.7 – 1.4).
- **Absenteeism rates:** calculated for sick leave (median 6%; range 3% - 24%) and inclusive of time off taken to attend meetings and workshops (median 9%; range 6% - 28%)
- **Rotation of staff:** Two hospitals rotated their staff daily within maternity, one hospital rotated its staff weekly within maternity and the last hospital rotated its staff monthly within maternity. Only one hospital kept all of its staff within maternity. The other three rotated their junior staff to other wards in the hospitals three-monthly.

Summary of findings

A generally poor quality of care was found when aggregating the findings from the four study hospitals. This is consistent with the overall poor quality of observations, recordings and decisions during the management of the labour. Superficially, the poor monitoring of labour cannot fully be explained by contextual health system factors such as workload. The absenteeism rates are higher than the recommended acceptable level of less than 3%. It is not clear what influence the rotation practices may have on the quality of care.
Figure 1: Summary of the findings for the admission assessment

![Summary of Labour Record Review Median Score per Item in the Admission Assessment](image)

Figure 2: Summary of the findings per category in the labour graph

![Summary Labour Record Review Median Score per Category in the Labour Graph](image)
Figure 3: Summary of the findings per item in the labour graph

Figure 4: Summary of findings on the management of labour form
Appendix 8

Clinical decision making in labour by registered midwives
S Clow
Division of Nursing and Midwifery, University of Cape Town

Context
When the first Saving Mothers report was released in 1999 the Minister of Health noted, ‘In almost half of all the maternal deaths reported there was an opportunity to prevent that death, but that opportunity was missed.’ (Minister of Health, 1999) A key recommendation for the 1999-2001 triennium is that, “The correct use of the partogram should become the norm in each institution conducting births. A quality assurance programme should be implemented using an appropriate tool.” (Department of Health NCCEMD 2002, x)

The correct use of the partograph is recognised by the World Health Organisation as a key strategy for effective management of labour and timely referral of developing complications. (World Health Organisation 1989). However, it is merely a recording instrument. Its VALUE is dependent on accurate observations, completion in full, and effective application of knowledge and skills in order to make the necessary conclusions which affect clinical decision making.

It appears that the departure point for research and surveillance in this area is the completion of the partograph. Where these are incomplete conclusions are reached about inaccurate diagnoses or substandard care. What is not known is why the partographs are incomplete.

- Is it because the labour wards are hopelessly understaffed and there is no time to perform, let alone record, the observations on a regular basis?
- Is it because the staff are merely lazy or disinterested?
- Is it because they do not understand the relevance and significance of accurate findings and recording?
- Is it that the process and progress of labour are inadequately understood, and thus observations are done incompletely resulting in premature or inaccurate conclusions?
Is it that clinical skills are poorly developed and that there is little confidence in one’s ability to make a firm clinical finding?

Each of these areas merit serious investigation, but it is the last two questions which interest me.

Clinical reasoning needs at least the following building blocks.

- Knowledge
- Accurate and full clinical assessment
- Analysis and application of theory to clinical findings

At present we do not know these capacities amongst those working in maternity settings. Training programmes that are currently available tend to address the lower levels of cognitive functioning, i.e. knowledge & comprehension, rather than the higher levels, e.g. application, analysis, & synthesis which are necessary for quality clinical practice. (Quinn 1988)

It is my belief that, unless there is clinical understanding and reasoning behind its use, the partograph will remain just a recording instrument. Any efforts to increase the disciplined and complete use must address the more fundamental issues of clinical reasoning.

**Intervention programme**

An intervention programme, linked to an initiative to adopt a standardised partograph for the Western Cape province, aims to improve the quality of clinical management in labour at primary level by registered midwives in the public sector health service. Phase 1 is a training intervention (with a diagnostic component on the registered midwives’ current knowledge, skills and clinical decision-making abilities.

**Purpose of the training programme**

- Enhance the correct and appropriate use of the partograph for clinical management in labour
- Introduce the revised format of the partograph developed for the Western Cape
- Develop the necessary clinical skills and understanding amongst midwives for labour management.
The workshops which have been offered twice in each of the 4 regions, last approximately 4 hours. Participants were assigned to groups, and the workshop is highly interactive which facilitates peer learning and teaching. Interpretation of a clinical situation in labour presented on a partograph

- Accurate recording of a text description of a labour onto a partograph
- Appropriate management in labour, with reference to the national maternity guidelines
- Identifying areas of need for ongoing skills development

Areas of disagreement or where there was lack of knowledge were identified within the groups and formed part of the wider discussion. The methodology used is critical to developing thinking and analytical skills.

Pre- and post training tests each lasting about 45 minutes were done on the training day. These were matched for content areas and cognitive levels to test knowledge of the correct use of the partograph, knowledge of labour, application and interpretation of clinical information, and appropriate clinical decision making. The purpose was to determine the baseline level of functioning and to evaluate the immediate effect of the training, and this paper will report these findings.

**Ethical considerations**

Permission to conduct study and have access to midwives, informed participation by midwives & protection of identity, benefits to services and midwives were accommodated and ethics committee approval obtained.

**Results**

There were 143 participants in the training programme from the 4 regions of the province. Those from secondary, tertiary or private institutions, and local authority clinics were excluded from this analysis. Therefore there were 102 participants included in this study. 14 were excluded for various reasons – being called away to attend to theatre and labour ward emergencies, called away due to family illness, or non-completion of both evaluations. This paper reports on
88 respondents who were distributed across all 4 regions of the province.

- **aspects to be reported on:**
  - use of the partograph
  - knowledge
  - analysis of clinical information

The combined score reflected a mean score of 49%.

Breaking this down into its component parts

**Use of partograph**
The mean score obtained was 64%.
This was made up of
a) Completeness which includes risk and labour assessment (maternal, fetal and progress of labour) had a mean score of 71%.
Example: More than ½ of the respondents did not identify the aspects that would contribute to assessing risk and
b) Correctness which relates to how data was recorded had a mean score of 21%. Common errors were the representation of time where hourly lines were interpreted as ½ hour or sometimes 2 hours. This has significant implications for determining progress of labour. Also the level of the presentation was frequently confused with the station.

The evaluation section consisting of knowledge and analysis had a mean score of 41%

**Knowledge**
The mean score for knowledge was 56%. Examples of weak answers were:
- Diagnosis of established labour was described as “contractions” or “3 strong”
- Recognising fetal distress— not able to give an account of early decelerations + MSL

**Analysis**
The mean score for analysis was 38%.
Some examples include:
Latent phase not recognised but interpreted as slow progress of labour
- Risk level ignored or risks not recognised e.g risk of prolapsed cord in the presence of a high presentation and ROM

Results which combine knowledge and analysis of certain facets yield the following mean scores:
- Maternal assessment 55%
- Fetal assessment 38%
- Progress of labour 32%

A matched test was done immediately after the intervention training programme. Overall in most parameters there was a statistically significant improvement in the second score.

<table>
<thead>
<tr>
<th>Item</th>
<th>Test 1</th>
<th>Test 2</th>
<th>Wilcoxon test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total score</td>
<td>50.2</td>
<td>55.8</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Overall partograph score</td>
<td>64.3</td>
<td>71.2</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Partograph completion</td>
<td>71.1</td>
<td>75.7</td>
<td>P=0.0002</td>
</tr>
<tr>
<td>Partograph correctly filled in</td>
<td>21.9</td>
<td>49.8</td>
<td>P=0.001</td>
</tr>
<tr>
<td>Evaluation score</td>
<td>42.2</td>
<td>46.3</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Knowledge</td>
<td>56.4</td>
<td>58</td>
<td>P=0.4005 NS</td>
</tr>
<tr>
<td>Analysis</td>
<td>40.1</td>
<td>45.3</td>
<td>P=0.001</td>
</tr>
<tr>
<td>Knowledge + Analysis</td>
<td>44.7</td>
<td>48.5</td>
<td>P=0.0006</td>
</tr>
<tr>
<td>Fetal assessment</td>
<td>39.0</td>
<td>42.2</td>
<td>P&lt;0.001</td>
</tr>
<tr>
<td>Maternal assessment</td>
<td>55.9</td>
<td>52.6</td>
<td>P=0.3443 NS</td>
</tr>
<tr>
<td>Progress of labour</td>
<td>32.9</td>
<td>45.0</td>
<td>P&lt;0.001</td>
</tr>
</tbody>
</table>

Referring back to the building blocks for clinical decision making, we should take cognisance of the fact that the higher order of cognitive thinking scored significantly lower at 38% than the lower level (56%), and it is this higher order thinking that is necessary to make reasoned conclusions of the often complex developments in labour. Benner et al, in their research entitled “clinical wisdom in critical care nursing” state: “Although scientific evidence is essential to good practice, the clinician must develop skills of reasoning that are closer to moving
picture whose sequence, development, change and nuance can be considered.” (1999;11)

Given that there is generally a lower than desired level of knowledge and analytical skill apparent the significance is that there will be inadequate interpretation → wrong or incomplete diagnosis → incorrect management decision → potential for missed opportunities

It is therefore to the benefit of maternity care for us to address the factors that can prevent this cascade of poor management, which is costly in terms of lives, resources and time.

**Recommendations**

- Need for a common understanding of how to use the partograph (Guidelines and protocols to be applied consistently)
- Strengthening knowledge base
- Development of clinical reasoning
- Training and mentoring policies and implementation for improved midwifery clinical practice
- Sustainable quality assurance programme in relation to labour management

Further education and focussed in-service training is not an optional extra or luxury – it is important to the service to ensure that omissions or errors are minimised and morbidity and mortality is reduced.

**References**


Minister of Health  Speech to launch the  Saving mothers report : report on the confidential enquiry into Maternal deaths in South Africa 1998, October 1999

Provincial Government of the Western Cape Maternity guidelines reference group  Guidelines for the use of the partogram  PGWC 2004


Appendix 9

Obstructions to the proper use of the partogram

Lawrence Chauke
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Introduction
Obstructed labour is a common cause of maternal and neonatal morbidity and deaths worldwide. Obstructed labour is responsible for up to 8% of maternal deaths in the world. Apart from graphic representation of the progress of labour, the introduction of the partogram was an effort to decrease fetal and maternal death due to obstructed labour. However, intrapartum fetal asphyxia has not declined, and poor knowledge, scanty staff, inefficient health care systems and lack of skills has been cited amongst possible causes.

We therefore undertook a study with the aim of identification of possible obstacles to the use of the partogram in the four hospitals that form the Pretoria Academic Complex (including one tertiary, one tertiary-secondary and two district hospitals).

Methods
This was a qualitative study conducted in four hospitals. Consent was obtained from hospital management and individual participants prior to entry into the study. All nursing staff working in the four labour wards underwent focus group discussions where their views about the partogram and discussion on their understanding, examination and recording of all the components of the partogram were elicited. The discussion was tape-recorded for later analysis.

Results
A total of 31 nursing personnel members participated. The majority were professional nurses (45%), followed by chief professional nurses (42%), with senior professional nurses and enrolled nurses forming 9.7% and 3.2% of the group respectively. The number of deliveries in each unit and the midwife to patient ratio is depicted in table 1.
Table 1: Total deliveries per annum and midwife:patient ratio

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Deliveries per annum</th>
<th>Midwives per shift</th>
<th>Patients per midwife</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic A</td>
<td>7000</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>Academic B</td>
<td>7000-7500</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>District/MOU A</td>
<td>5000</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>District/MOU B</td>
<td>1200</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>

MOU: midwife obstetric unit

16% of the staff have been working in a labour ward less than 2 years, 29% for two to five years, 26% six to ten years, 19% 11 to 20 years, and only 3.2% has been working there for 20 years or more.

Knowledge and skills were obstacles identified. Common errors were in explaining how to take blood pressure, assessing cervical dilation and effacement, head above pelvic brim, moulding and when and how to intervene in case of poor progress of labour. Staff shortages and staff morale appeared to be a serious problem and so is the animosity between doctors and nursing staff. Stress levels was identified as a critical issue due to both work and family related problems and almost complete lack of support from senior management.

Discussion

It became clear that multiple problems are obstacles in the provision of proper intrapartum care to pregnant women in these institutions. Knowledge, skills and staff morale are the three critical areas that need urgent attention. Staff training in both theory and skills, perhaps with the use of mannequins, need to be instituted. Correct staffing and remuneration cannot be ignored. Staff need support psychosocially and understanding, especially with regards to family stressors and chronic illness, not ignoring the impact of HIV/Aids both to the family and individual health worker.
Conclusion
The situation in the labour wards of most South African hospitals has reached a disastrous condition that need a multifaceted approach, teamwork and political will in order to improve the care of women in labour.

References:
Appendix 10

Evidence-based intrapartum care

Hofmeyr GJ. Best Practice & Research Clinical Obstetrics & Gynaecology 2005; 19(1); 103-115.

Effective Care Research Unit, University of the Witwatersrand/University of Fort Hare/Eastern Cape Department of Health

ECRU, Frere Maternity Hospital, P Bag x9047, East London 5201, South Africa

Abstract
Routine care in normal labour may range from supportive care at home, to intensive monitoring and multiple interventions in hospital. Good evidence of effectiveness is necessary to justify interventions in the normal process of labour. Inadequate evidence is available to support perineal shaving, routine enemas, starvation in labour and excluding the choice for home births. Evidence supports continuity of care led by midwives, companionship in labour, restricting the use of episiotomy, and active management of the third stage of labour, including routine oxytocin 10 units. Both benefits and risks are associated with routine amniotomy, continuous electronic fetal heart rate monitoring, epidural analgesia, and oxytocin-ergometrine to prevent postpartum haemorrhage. More evidence is needed regarding the emotional consequences of labour interventions, home births, vaginal cleansing, opioid use, the partograph, labour second stage techniques, misoprostol for primary prevention of postpartum haemorrhage and strategies to promote evidence-based care in labour.

Introduction
This paper will focus on evidence available from randomized trials comparing alternative forms of care during labour. Space does not allow detailed discussion of the interventions, nor a comprehensive account of aspects of labour care which have not been the subject of randomized trials. Readers are referred to standard textbooks and the WHO report on care in labour for more details.
The extent to which routine medical care during labour is appropriate at all, is contentious. On the one hand, labour is a natural process which may be disturbed and distorted by medical intervention. This view is supported by comparative biological studies: “Removal of the labouring animal from her safe environment invariably results in inhibition of uterine contractions. Our own species is not an exception….The safest way to help labouring women is to respect nature and not to interfere with spontaneous events unless there is clear evidence that to do so would be beneficial”. An opposing view is that labour is a high-risk process requiring intensive medical monitoring and intervention. There even is an increasing opinion that labour is best avoided altogether. Women may request elective caesarean section because the risks of caesarean section have been greatly reduced, and elective caesarean section may reduce the risk of urinary and faecal incontinence, as well as the chance of emergency caesarean section.

A fundamental issue in assessing different approaches to care during labour, is the choice of outcomes to be measured. Most trials focus on short-term, medical outcomes such as duration of labour and neonatal condition. Long-term outcomes such as the emotional health of the child and family might be more important, but are difficult and expensive to measure. In the rare instances in which long-term outcomes of childbirth are measured, the findings are sometimes unexpected. Continuous electronic fetal heart rate monitoring in labour was associated with reduced neonatal convulsions, yet long-term follow-up in two studies showed a trend to increased cerebral palsy compared with the intermittent auscultation group (relative risk (RR) 1.66, 95% confidence interval (CI) 0.92 to 3.0).

Evidence from a trial of companionship during labour suggested that labouring in a supportive environment promotes self-esteem, a sense of confidence in one’s child-rearing ability and positive mother-infant relationships. The possibility that a positive experience of labour may play a part in the development of these relationships is difficult to measure, but should be kept in mind when considering interventions for which only short-term effects have been measured. Ideally, technical interventions such as routine elective caesarean section should be measured against outcomes of labour in an optimal environment, and include experiential and long-term outcomes.
In 1920, in the first issue of the American Journal of Obstetrics and Gynecology, De Lee argued that all ‘primiparous labors and those in which the condition of the soft parts approximates a first labor’ should labour under ‘twilight sleep’ and be delivered by a specialist obstetrician under general anaesthesia with elective forceps and episiotomy. Over the next 60 years there was in general a trend to increased medicalisation of labour. Many interventions were introduced as routine, often without good evidence of effectiveness.

From the 1980’s, strengthening public opinion in countries such as the United Kingdom began to challenge the medical approach to childbirth, and brought about a shift away from unsubstantiated interventions in the birth process and towards an evidence-based approach to care. In low-income countries where public opinion is less effective, outdated childbirth practices continue to prevail. Despite these influences, overall trends in the UK have been a reduction in births in small birth centres from 13% in 1970 to 3% in 2000, an increase in caesarean sections from 9% in 1980 to 20% in 2000, and an increase in routine birth interventions.

Practicing evidence-informed care is counter-intuitive for clinicians. It involves a conscious decision to rely on objective evidence rather than our clinical convictions. This implies a fundamental acknowledgement that our clinical convictions and intuitions may be wrong.

Because for most healthy women childbirth is a normal process, the potential for routine interventions to do harm is greater than that for interventions used in the context of established ill-health. It is therefore particularly important that routine interventions are not implemented without clear evidence that they improve outcomes.

Knowledge of the effectiveness of alternative forms of care is only the starting point for clinical decision-making. Clinicians have the task of applying the results of clinical trials to individual women, who may differ from the norm in terms of their specific risk factors, the importance they attach to different outcomes, their value systems and their idiosyncratic preferences.

This paper will summarise the evidence regarding various options for care during labour. Robust evidence of the effectiveness of medical or
social interventions is limited to specific interventions which have been compared with alternative forms of care by random allocation. There are clearly many choices for which no reliable evidence is available. The scope is limited to routine care during normal labour.

**The place and social context of labour**

**Birth at home**

Planned birth at home has decreased in many countries, mainly because of a perception that it is not safe. The risk of complications related to lack of medical facilities in home births needs to be weighed against the risk of complications related to medical interventions and mishaps (such as hospital-acquired infections), in institutional births. The lower the intrinsic risk in an individual, the more likely are the relative risks to favour home birth. Other than safety, there are many factors such as emotional security, preference, cost, and the discomfort of transfer to hospital should it become necessary in advanced labour, which need to be taken into account.

In the absence of randomized trials (with the exception of one feasibility trial of 11 women)\(^{10}\), meta-analysis of controlled studies has found that planned birth at home is associated with fewer medical interventions, low Apgar scores and neonatal complications, and no statistically significant difference in perinatal mortality (odds ratio (OR) 0.87, 95% CI 0.54 to 1.41).\(^{11}\) Typical perinatal mortality rates in planned home births of low-risk women with ready access to referral centres are too low (<2 per 1000 births) to be evaluated in even large randomised trials. Excellent perinatal outcomes have been achieved in the Netherlands with home birth rates as high as 30%.\(^{12}\)

At present, there does not appear to be robust evidence to support insistence on hospital birth for low-risk women who prefer to give birth at home. Where specific risk factors exist which are likely to require hospital-dependent interventions, recommendations regarding the place of birth should be based on consideration of individual factors, and evidence of the effectiveness of the potential interventions.
Homely birth units

A compromise between the advantages of birth at home and access to a medical facility has been the establishment of home-like birth units close to conventional labour wards. In 6 randomised trials, women using such units had less analgesia use, augmented labour, operative delivery and dissatisfaction with care. There was a statistically non-significant trend to increased perinatal mortality. Larger trials are needed to evaluate the safety of such units for the baby.\(^\text{13}\)

A structured review of free-standing, midwife led birth units found no randomized trials. Five comparative studies found better outcomes for the free-standing midwife-led than consultant units, but the possibility of selection bias cannot be excluded.\(^\text{14}\)

Continuity of care

Continuity of care during pregnancy, childbirth and the postnatal period has been assessed in two trials of good quality in 1815 women, comparing continuity of care by midwives with non-continuity of care by a combination of physicians and midwives.\(^\text{15}\) Women who had continuity of care were less likely to have drugs for pain relief during labour (OR 0.53, 95% CI 0.44 to 0.64), their newborns were less likely to require resuscitation (OR 0.66, 95% CI 0.52 to 0.83), they were less likely to have an episiotomy (OR 0.75, 95% CI 0.60 to 0.94), but more likely to have either a vaginal or perineal tear (OR 1.28, 95% CI 1.05, 1.56). They were more likely to be pleased with their intrapartum care.

No differences were detected in Apgar scores, low birth weight and stillbirths or neonatal deaths. It is not clear whether the beneficial effects are due to greater continuity of care, or to midwifery led care.

Companionship

Continuous support for women during labour has been studied extensively. A review of 15 trials including 12,791 women found that women who had continuous support were less likely to receive analgesia during labour, to be delivered by caesarean section or by instrumental vaginal delivery, or to report dissatisfaction with their childbirth experiences.\(^\text{16}\) The benefits appeared to be greatest when the supporter was not a member of the hospital staff, when support
began early in labour, and when epidural analgesia was not generally available. No adverse effects of continuous support were reported.

The policy of not allowing companions during labour was presumably based on the fear that companions would introduce infections or interfere with staff duties, and is still widely practiced in low-income countries. Unlike the introduction of straightforward medical interventions, the introduction of policies to allow or provide companions during labour may be extremely difficult. In view of the clearly-defined benefits, considerable effort should be put into the introduction of such policies (see ‘Implementing effective intrapartum care’, below).

**General care during labour**

Perineal shaving in early labour is one of several ‘routines’ which became part of hospital practice. The limited evidence available does not support its use.17

Routine enemas during labour have been advocated for decades, on the basis that an empty rectum will facilitate easy delivery, reduced faecal contamination at birth and reduce maternal and neonatal infections. Two trials involving 665 women have been reviewed.18 These showed no clear difference in infection rates for puerperal mothers (OR 0.61, 95% CI 0.36 to 1.04) or newborn children. There is no evidence to support the routine use of enemas, nor to discourage their use if it is the woman’s wish.

Oral fluid and food intake may be restricted during labour to reduce the risk of inhaling stomach contents in the event of general anaesthesia. This complication is too infrequent to be measured by randomized trials, and is becoming less frequent with the increased use of spinal or epidural analgesia for caesarean section. During labour, starvation is not an effective method of ensuring gastric emptiness19, and precautions such as cricoid pressure during induction of anaesthesia and intubation are necessary to prevent inhalation despite starvation of the woman. Systematic review found 3 small trials with insufficient numbers to be able to draw conclusions.20 There is thus no good evidence to justify routine starvation of women during labour.
Preventing perinatal infections

Perinatal infections such as group B streptococcus are an important cause of neonatal morbidity and mortality. Childhood deaths from HIV infection may reach 100 per 1000 births in services with a high prevalence of HIV infection and limited resources, and are partially preventable by strategies instituted during labour. Women with infections such as group B streptococcus and HIV are not always identified. Routine care during labour should aim to minimize the chances of perinatal infections, particularly in services with a high prevalence of infections. Measures recommended on first principles but not well evaluated include restricting amniotomy and avoiding unnecessary suctioning of babies without meconium-stained liquor.

Vaginal cleansing with 0.25% chlorhexidine solution has been investigated as a simple, routine strategy to reduce infections. Review of one small study (602 women) using alternate week allocation found no effect of vaginal irrigation with 0.2–0.4% chlorhexidine on neonatal HIV infection. In a non-randomised trial in Malawi involving 6965 women, neonatal and maternal infections were compared during 3 months of routine use and the two preceding and one subsequent month without vaginal cleansing. Neonatal HIV infection was reduced only in a cohort of babies with ruptured membranes for more than 4 hours. Neonatal mortality from infections (2.4 versus 7.3 per 1000 live births) and maternal admissions for postpartum sepsis (1.7 versus 5.1 per 1000 births) were reduced. These results need to be confirmed by more rigorous methods, but pending such evidence the chance of benefit appears greater than the chance of harm from vaginal cleansing during labour, at least in services with a high prevalence of infections.

Counselling of previously untested women for HIV testing during early labour is ethically controversial and far from ideal, but affords the opportunity of using intrapartum chemoprophylaxis such as nevirapine to reduce the risk of mother to child transmission of HIV.

Pain relief

Pethidine is widely used for pain relief during labour, though doubt has been expressed about its effectiveness and side-effects. Review of 16 randomised trials suggests that other opioids such as tramadol and
Pentazocine may have fewer side effects, but the evidence is not strong enough to justify a change in practice. More research is needed on the use of other opioids such as morphine, and the intravenous route of administration. Theoretically, intravenous administration at the onset of a uterine contraction may limit fetal exposure by bypassing the placental circulation.

Complementary methods of pain relief during labour are popular because of the desire of women to avoid chemical analgesia which might affect the baby. Only 7 randomised trials involving 366 women have been reviewed. One trial of acupuncture (n = 100) decreased the need for pain relief (RR 0.56, 95% CI 0.39 to 0.81). In 3 trials (189 women), women receiving hypnosis were more satisfied with their pain management in labour compared with controls (RR 2.33, 95% CI 1.55 to 4.71). No differences were seen for women receiving aromatherapy, music or audio analgesia. The numbers studied are too small to provide clear guidance.

Immersion in water during labour has been investigated as a method of promoting relaxation and pain relief. Systematic review of 4 randomised trials (2406 women) was associated with reduced use of regional analgesia (OR 0.84, 95% CI 0.71 to 0.99), reduced reporting of pain, and no other differences between groups. The limited evidence available suggests that immersion in water during labour may have benefits for women. The water temperature should be carefully controlled to avoid increased body temperature.

Epidural analgesia is recognized as a highly effective method of pain relief during labour. Systematic review of 11 studies with 3157 women found that epidural was more effective than other methods of pain relief, but had some adverse effects: increased duration of first and second stages of labour, use of oxytocin, fetal malposition and instrumental vaginal deliveries. Rare adverse outcomes are difficult to assess with randomized trials. However, certain risks specifically associated with epidural analgesia are well known, including hypotension, respiratory arrest and headache following dural puncture.

Combined spinal-epidural analgesia (CSE) has been compared with conventional epidural analgesia in 14 trials (2047 women). Of the 25 outcomes analysed from these studies CSE shows a reduced time from
first injection to effective maternal analgesia (weighted mean difference (WMD) –5.50 minutes, 95% CI –6.47 to –4.52; four trials), an increased incidence of maternal satisfaction (OR 4.69, 95% CI 1.27 to 17.29; three trials), and an increased incidence of pruritis (OR 2.79, 95% CI 1.87 to 4.18; nine trials). No difference was found between CSE and epidural techniques with regards to maternal mobility, rescue analgesia requirements, the incidence of post dural puncture headache or blood patch, hypotension, urinary retention, mode of delivery, or admission of the baby to the neonatal unit. It is not possible to draw any meaningful conclusions regarding rare complications such as nerve injury and meningitis.

**Mobility and posture**

Confining labouring women to bed is convenient for hospital personnel and facilitates continuous electronic fetal heart rate monitoring. Many women prefer to be ambulant, particularly in early labour. In the absence of clear evidence to the contrary, the choice of position and mobility of women should not be routinely restricted, except that the supine position should be avoided on the basis of physiological evidence that it may impair uterine contractility and placental perfusion.\(^{29}\)

The hands knees posture was found to correct a lateral or posterior position of the fetal presenting part in one small study, but there are no data on whether this improves labour outcome.\(^{30}\)

**Progress of labour**

The partogram or labour graph is widely accepted as a useful method for tracking the progress of labour with respect to time.\(^{31}\) Evidence from randomized trials on the benefits of the partogram and the many variations in the way it is used, is limited. A limiting factor in the use of the partogram is the clinical difficulty of diagnosing the onset of labour, and of the active phase of labour, with accuracy. Over-diagnosis of labour results in unnecessary intervention when the ‘labour’ fails to progress. Use of a labour assessment program to try to confirm the diagnosis of active labour before admission to the
labour ward was associated with less time spent in the labour ward, less use of oxytocics and analgesics, and a greater sense of control among the women. The one study with 209 women reviewed was too small to assess other outcomes of labour.

‘Active management’ of normal labour was advocated by O’Driscoll in the 1970’s on the basis of large observational studies. Active management included early amniotomy, early oxytocin infusion and ‘a prior guarantee of continuous personal attention during labour’. Researchers have subsequently attempted to define the effects of active management of labour and its individual components through randomized trials.

A systematic review of 8 trials with 4008 women in 1999 found that routine amniotomy was associated with both beneficial and adverse effects. There was a reduction in labour duration by 1-2 hours, 5 minute Apgar score less than 7 (OR 0.54; 95% CI 0.30 to 0.96), and use of oxytocin (OR 0.79; 95% CI 0.67 to 0.92) There was a trend to increased Caesarean delivery (OR 1.26; 95% CI 0.96 to 1.66). An association between early amniotomy and caesarean delivery for fetal distress was noted in one large trial. The authors suggest that amniotomy should be reserved for women with abnormal labour progress.

In a subsequent study (n = 651), active management of nulliparous labour (amniotomy and early use of high dose oxytocin) reduced the duration of the first stage of labour without affecting the rate of caesarean section or other maternal or newborn morbidity. Active management did not adversely affect women’s satisfaction with labour.

Fetal wellbeing

The primary method of fetal assessment during labour over the last century was intermittent auscultation with a fetal stethoscope. The objective is to detect baseline tachycardia or bradycardia, and decelerations which persist after the end of a uterine contraction. Similar information can be obtained with a hand-held ‘doptone’ heart rate detector, but neither method can detect fetal heart rate variability. In a randomized trial (1255 women), hypoxic ischaemic
encephalopathy was less frequent with use of the dopitone than with routine auscultation, and similar to the results with continuous electronic fetal monitoring.37

Continuous electronic fetal heart rate monitoring during labour was introduced into clinical practice before being well evaluated for potential benefits and risks, on the assumption that increased information about the fetal heart rate must be beneficial. Randomised trials comparing continuous electronic monitoring with intermittent auscultation of the fetal heart rate have shown some benefits and some risks. Review of 10 trials (18927 women) showed a reduction in neonatal seizures (RR 0.51, 95% CI 0.32 to 0.82) but an increase in caesarean sections (RR 1.41, 95% CI 1.23 to 1.61) and operative vaginal delivery (RR 1.20, 95% CI 1.11 to 1.30), and a trend to increased cerebral palsy (RR 1.66, 95% CI 0.92 to 3.00). The benefits were greatest and adverse effects least when electronic monitoring was backed up with fetal scalp blood sampling to reduce the over-diagnosis of fetal distress. Whether electronic fetal monitoring is used should depend on the value that clinicians and parents attach to the various outcomes listed.

A compromise which has been suggested is the use of a limited period of electronic monitoring to establish fetal wellbeing on admission in labour.

Second stage of labour

The supine posture has been widely used for the second stage of labour, mainly because of improved access for the caregiver, and in spite of physiological evidence of reduced uterine efficiency and impaired placental blood flow in this position. Randomised trials of alternative postures for second stage have in general not been of good quality. Review of 19 trials (5764 women) found that upright or lateral positions were associated with reduced duration of second stage, fetal heart rate abnormalities, reporting of severe pain and episiotomies, but more perineal tears and estimated blood loss. The balance of evidence favours non-supine postures, though more stringent trials are needed to confirm these findings.38
Birth in water has received increasing attention in recent years. Systematic review found only one randomized trial. The numbers studied (120 women) were too small to draw conclusions. A strong case can be made for adding salt to delivery tubs to approximate a normal saline concentration, to avoid the risks associated with fresh water inhalation, but no trials comparing the water composition have been found.

The onset of the second stage of labour is defined as full cervical dilation, but women may experience the urge to bear down at an earlier or later time. Diagnosis of full cervical dilation is made by vaginal examination at an unknown period of time after it has been reached. In randomised trials in women with epidural analgesia, delayed bearing down reduced the use of assisted delivery without fetal compromise. Whether women without epidural analgesia should be encouraged to bear down when full cervical dilation is diagnosed, or to await the urge to bear down, is unclear.

Encouraging sustained valsalva manoeuvre rather than spontaneous bearing down is associated with somewhat shorter second stage, but may interfere with fetal acid-base status.

Limiting the duration of second stage (eg to 1 hour in primiparous women) is associated with increased neonatal pH values, but at the expense of more operative deliveries.

Manual support for the perineum during delivery in one large trial was associated with less reported perineal pain 10 days after delivery, despite more episiotomies being performed.

Episiotomy may be used to facilitate delivery, and in the belief that it will reduce perineal trauma and facilitate repair and healing. Systematic review of 6 randomised trials (4850 women) found that, compared with more routine use (73%), a policy of restrictive episiotomy use (28%) was associated with less posterior perineal trauma (RR 0.88, 95% CI 0.84 to 0.92), less suturing (RR 0.74, 95% CI 0.71 to 0.77) and fewer healing complications (RR 0.69, 95% CI 0.56 to 0.85), but more anterior perineal trauma (RR 1.79, 95% CI 1.55 to 2.07); and no difference in severe vaginal or perineal trauma, dyspareunia, urinary incontinence or severe pain. Overall, the evidence favoured a restrictive approach to episiotomy.
Third stage of labour

Delivery of the placenta may be allowed to take place spontaneously, or managed actively, usually by giving a uterotonic drug and using controlled cord traction. In 5 randomised trials reviewed, active management reduced the duration of the third stage and the proportion of women with blood loss of 500 ml or more (RR 0.38, 95% CI 0.32 to 0.46); but increased nausea, vomiting and raised blood pressure (probably due to the use of ergometrine).45

The uterotonics most used for routine management of the third stage of labour are oxytocin, ergometrine, oxytocin-ergometrine combination, and prostaglandins. Review of 6 trials of oxytocin use compared with placebo (3193 women) showed considerable reduction of estimated blood loss exceeding 500ml (RR 0.5, 95% CI 0.43 to 0.59), blood loss exceeding 1000ml and therapeutic use of uterotonic.46 In 5 trials (2719 women) comparing oxytocin with ergot alkaloids, the difference in estimated blood loss exceeding 500ml was not statistically significant, and manual removal of the placenta was less frequent with oxytocin (RR 0.57, 95% CI 0.41 to 0.79). No significant differences were found between oxytocin-ergometrine and ergometrine.

In 6 randomised trials (9332 women), oxytocin-ergometrine was associated with a small reduction in risk of estimated blood loss exceeding 500ml (but not 1000ml), compared with oxytocin.47 The difference was smaller for 10 units than for 5 units of oxytocin. Vomiting, nausea and hypertension were more common with oxytocin-ergometrine. These results would support a policy of using oxytocin 10 units routinely, and oxytocin-ergometrine in high-risk situations or when the response to oxytocin is inadequate.

The use of the prostaglandin E1 analogue misoprostol in the third stage of labour is of considerable interest because it is an inexpensive oral preparation which could be used in diverse settings, particularly in low-income countries. Compared with injectable uterotonics in 7 trails (22,749 women), oral misoprostol 600µg was associated with more blood loss exceeding 1000ml (RR 1.34, 95% CI 1.16 to 1.55). Shivering and pyrexia are common with oral misoprostol in doses
between 400 and 600μg. These side-effects appear less common with the rectal route of administration. The buccal or sublingual route is also worth investigating further, as pharmacokinetic studies have shown greater bio-availability and longer duration of action than for the oral route. Misoprostol should not replace oxytocin as the first-line prophylactic uterotonic.

Five small randomized trials comparing oral misoprostol with placebo found inconsistent effects on blood loss. A large trial is needed to establish the effectiveness of misoprostol when oxytocin is not available.

Skin-to-skin contact between baby and mother soon after birth has been advocated to promote positive interaction. A systematic review of 17 trials (only 806 mothers and babies) found that early skin-to-skin contact was associated with enhanced breastfeeding and other behavioural patterns. No adverse effects were found. A large trial is needed to confirm the findings of these small trials. At present, early skin to skin contact should be regarded as the norm.

**Implementing evidence-based care in labour**

Studies in low-income countries have highlighted outdated and inhumane labour practices. Changing entrenched practices is known to be exceptionally difficult. In collaboration with researchers in South Africa, the United Kingdom and other countries, we have developed the ‘Better Births Initiative’ to promote humane, evidence-based care in labour. Participative workshops are used to challenge current practices and facilitate staff decisions to identify changes they wish to make, and bring about practical changes.

Information and the workshop materials are available at [http://www.liv.ac.uk/lstm/bbimainpage.html](http://www.liv.ac.uk/lstm/bbimainpage.html) and on the WHO Reproductive Health Library from rhl@who.int.

**Summary**

Consideration of the appropriateness and nature of care during normal labour raises tensions between those who wish to implement
monitoring and intervention strategies in case of unexpected complications, and the view of labour and birth as a profound human experience which may impact either positively or negatively on the mother’s confidence, adaptation to parenthood and family relationships. The fundamental thesis of this paper is that technical interventions in the normal labour process may have unanticipated adverse effects which are difficult to measure. On this basis, only interventions with clear evidence of effectiveness should be used, as these at least have the potential to do more good than harm. Failure to give serious attention to the emotional aspects of childbirth will inevitably result in spiralling interventions to the point that labour and vaginal birth become so technically orientated as to be not worth the effort.

While clear evidence is available for some interventions, many are to date inadequately researched. Benefits of strategies such as continuity of care, companionship, avoidance of supine posture, epidural analgesia for pain relief and interventions to prevent postpartum haemorrhage are clear. There is considerable doubt regarding the extent to which the labour process should be driven, and what measures of labour progress are useful to guide intervention.

As clinicians we do not in general like the evidence-based approach to care. Effective strategies are needed to promote the uptake of evidence-based practices, particularly when this involves abandoning long-held clinical convictions.

**Acknowledgements**

The Cochrane Pregnancy and Childbirth Group, on whose collective work much of this paper is based

Tina Lavender for commenting on a draft of the paper
References:


Appendix 11

Vaginal Birth After Caesarean Section (VBAC): is it a Safe Procedure in South Africa?

Neil F. Moran
Mahatma Gandhi Memorial Hospital

Introduction
Many people working in maternity care in South Africa have a positive attitude towards VBAC. It is a widely held view that hospitals with the facilities to perform caesarean section should be encouraged to offer VBAC to appropriately selected women. The only reasonable alternative to offering VBAC is to offer the woman an elective caesarean section at term. If a hospital institutes a policy of not offering VBAC, then either it will have to plan to do elective caesarean sections on all women with a previous caesarean delivery, or it would have to refer selected women to another hospital for VBAC.

There are two major concerns with attempting VBAC:
1. There is an increased risk of rupture of the uterus compared to an attempted vaginal delivery in a woman without a scarred uterus.
2. There is a risk that a vaginal delivery will not actually be achieved, and that instead an emergency caesarean section will be required. This is an important concern because an emergency caesarean section is more dangerous and less desirable for the mother than an elective caesarean section.

In the National Department of Health’s document Saving Mothers: policy and management guidelines for common causes of maternal death, the chapter on VBAC begins: “VBAC is a safe and desirable procedure likely to succeed in about 60% of patients attempting it”. This paper looks at whether there is good evidence to support this statement, and discusses the place of VBAC in the South African situation.
What information do we need regarding VBAC?
Before deciding on a policy with regard to VBAC, there are three important questions that need to be considered:

- What is the rate of rupture of the uterus during attempted VBAC?
- When rupture occurs during attempted VBAC, what is the resultant morbidity and mortality?
- What is the success rate of VBAC (i.e. vaginal delivery rate)?

Rate of rupture in VBAC
Reports from developed countries suggest that one can expect a rupture rate of approximately 1% during attempted VBAC\(^2\). There are few reports from less developed countries which look at rupture rates specifically in the context of VBAC. However such reports as there are would suggest that rupture rate during VBAC may be similar to the 1% found in developed countries\(^2\).

Morbidity and mortality following rupture in VBAC
In developed countries, rupture of the uterus following previous caesarean section has a low morbidity and mortality associated with it. Perinatal mortality associated with such ruptures is approximately 2%\(^3\), and maternal mortality is a rarity. There is limited data from less developed countries about the morbidity and mortality associated with VBAC. The Confidential Enquiries into Maternal Deaths in South Africa has shown that rupture of the uterus in the presence of previous caesarean section accounts for 13% of deaths due to post-partum haemorrhage\(^4\), although it is not stated in how many of these a VBAC was being attempted. Data from an ongoing audit of uterine ruptures at Mahatma Gandhi Memorial Hospital (MGMH) in Durban\(^5\) strongly suggests that the outcomes associated with ruptures during attempted VBAC are far worse than those documented in developed countries:

In the four year period from July 2001 to June 2005, 13 ruptures were documented in women with one previous caesarean undergoing attempted VBAC. Perinatal death related to the rupture occurred in 9 of these 13 cases (69%). Maternal death related to the rupture occurred in 3 cases (23%). In only 3 out 13 cases (23%) did both mother and baby survive. In 8 cases (61.5%), the uterus was repaired, in 4 (30.8%)
hysterectomy was done (2 survived), and in one case, the mother died before any surgical intervention. In all cases rupture occurred after admission to hospital. All were spontaneous labours, and no oxytocin was used. In 11 out of 13 of the cases, the birth weight was between 2.5 and 3.5 kg.

When there is a very low mortality rate associated with rupture (as in developed countries), a rupture rate of 1% would appear to be an acceptable risk. But when the majority of cases of rupture lead to a catastrophic outcome, then a 1% risk of rupture would be regarded by many as being unacceptably high. There is no data at present regarding the rate of rupture of the uterus with attempted VBAC at MGMH, but if we assume that the rate is approximately 1%, it could be argued that, in the MGMH setting, VBAC does not appear to be an acceptably safe procedure.

**Reasons for poor outcome following rupture of the uterus**

Why should the outcomes following the ruptures at MGMH be so poor? To answer this it is necessary to consider what the requirements are for minimizing morbidity and mortality associated with rupture during attempted VBAC. Important requirements would include the following:

- Intensive clinical monitoring (maternal and fetal) so that any sign of rupture is detected promptly
- Facilities to allow C/S within 30 minutes once signs of rupture are detected
- Surgical expertise to manage a rupture

At MGMH, although there is adequate surgical expertise, there are staffing constraints which make it difficult to fulfill the other two requirements listed above:

- The patient to midwife ratio is such that one midwife is often responsible for the care of 3 or more labouring women at a time. This makes adequate monitoring impossible much of the time and early signs of a rupture are likely to be missed.
- The doctor on-call for the labour ward is not always immediately available to come to the labour ward, because of theatre or casualty responsibilities. This delays the time to C/S if signs of a possible rupture are detected.
There is only one anaesthetist and one theatre team in the hospital, meaning only one theatre case can be done at a time. This can often delay the time to C/S. Several of the cases in the MGMH series do highlight these staffing problems.

**Saving Mothers Guidelines for Safe VBAC**

According to the Saving Mothers Guidelines\(^1\) the following circumstances are required for safe VBAC:

- Meticulous and very close clinical monitoring in labour
- Doctor (capable of C/S) immediately available throughout labour
- Capacity to perform Emergency C/S within 30 minutes

In the chapter on Obstetric Haemorrhage in The Saving Mothers 1999-2001 report\(^4\), one of the key recommendations is the following: “Vaginal birth after caesarean section should only be conducted at institutions where caesarean sections can be safely done according to the Policy and Management Guidelines for Common Causes of Maternal Deaths.”

It is clear that not just MGMH, but many if not most of the government hospitals conducting VBACs in South Africa are not able to comply with these guidelines at all times. Such hospitals need to consider whether a policy of elective caesarean section for all previous C/S patients or referral of selected patients to other centers for VBAC might be safer options than conducting VBAC in their own setting.

**What is the success rate of VBAC?**

Any centre conducting VBAC should audit its success rate with the procedure (i.e. vaginal delivery rate). If the success rate is 50%, then for every two VBACs attempted, there will be one emergency C/S performed. The morbidity or mortality associated with one emergency C/S may be as much as or greater than that associated with two elective C/S. Thus if the success rate at an institution is 50% or less, there is all the more reason for a policy of elective caesarean for patients with previous C/S to be carefully considered as an option.
Conclusion
There is no comfortable solution for the safe management of patients with one previous caesarean section. It is likely that elective C/S would be a safer option than VBAC at many hospitals in South Africa currently offering VBAC.

Recommendations
- In order to minimize the problem, it is essential to avoid unnecessary C/S in women with unscarred uteri.
- Great care needs to be taken in selecting suitable candidates for VBAC
- Informed consent for VBAC should include an honest discussion, relevant to the local setting, about the risks of the procedure
- More attention should be paid to staffing guidelines for safe VBAC
- All hospitals conducting VBAC should audit the practice to ascertain: rate of rupture, morbidity of rupture, and rate of vaginal delivery

References
Appendix 12

The impact of the maternal care manual of the perinatal education programme on the practical skills of midwives

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Department of Obstetrics and Gynaecology, University of Stellenbosch

Objective: This study assessed whether practical skills of midwives who studied the Maternal care Manual of the Perinatal Education Programme (PEP) improved significantly.

Methods: A prospective controlled study was conducted in a region where PEP has not been implemented at all. A study town and 2 control towns were selected. Fourteen practical skills were evaluated. Midwives rendering antenatal care were evaluated on 2 skills each and those working in the labour wards on 4 skills (pretests). All midwives rendering antenatal care in these towns and midwives working in the labour wards of the 3 hospitals were tested. The Maternal Care Manual of PEP was subsequently studied in the study town. On completion of the programme the same skills were again evaluated (post tests).

Outcome Measures: The ability to correctly perform practical skills scored strictly according to a preset memorandum.

Results: A total of 31 and 36 midwives were included in the study and control towns respectively (Table I). There were no differences regarding the age, level of training and experience between the 2 groups. The mean percentages obtained in the pre-tests did not differ between the study and control towns (Table II). The post tests showed a significant (p=0,0000) improvement of 35,8% in the study town and no change in the control towns (Table II). A stratified analysis was done on the midwives involved with antenatal care only and those working in labour wards of the hospitals. The skills of the antenatal care midwives in the study town improved significantly (p=0,0000) with 44,3% with no change in the control towns (Table III). The skills of the labour ward midwives in the study town also improved
significantly \((p=0.0000)\) with 29.9\% with no change in the control towns (Table IV).

**Conclusion:** The practical skills of both midwives rendering antenatal care and those working in the labour ward that studied the Maternal Care Manual of PEP improved significantly. This is of particular importance because practical skills are not tested as part of the examination taken on completion of the programme.

### Table I Midwives

<table>
<thead>
<tr>
<th>Study town</th>
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<tr>
<td>Antenatal care</td>
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<td>16</td>
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<tr>
<td>Labour ward</td>
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<tr>
<td>Total</td>
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### Table II Percentages scored assessing skills

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<tr>
<td>- mean (s)</td>
<td>- median</td>
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<tr>
<td>48,8 (33,9)</td>
<td>50,0</td>
<td>85,4 (23,7)</td>
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- mean improvement = 36,6\%

<table>
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<tr>
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<th>pretest</th>
<th>post test</th>
<th>p-value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>- mean (s)</td>
<td>- median</td>
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<td></td>
</tr>
<tr>
<td>48,6 (31,2)</td>
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### Table III  Antenatal care midwives - percentages scored

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<td></td>
<td>- median</td>
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<tr>
<td></td>
<td>- mean improvement = 44,3%</td>
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### Table IV  Labour ward midwives - percentages scored

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<table>
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<th>pretest</th>
<th>post test</th>
<th>p-value*</th>
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Appendix 13

Improving the experience of birth in poor communities


1 Department of Nursing Sciences, University of Fort Hare, South Africa

2 Effective Care Research Unit, East London Hospital Complex and Universities of Witwatersrand and Fort Hare, South Africa

Pregnancy and childbirth have a profound effect on a woman’s life along with that of her spouse and family. Yet often in poor communities the joy which should accompany such a momentous experience is overshadowed by obstetric complications, serious illness, disability and in some cases untimely maternal or perinatal death. For women from poor communities who give birth in ‘Western’ health facilities, these hardships are often compounded by care from health professionals which imposes unnecessary, uncomfortable and humiliating medical procedures, lacks respectful communication and is even on occasions abusive.

Although the cornerstone of international efforts to reduce maternal mortality in poor countries is ‘skilled attendance at birth’, little attention has been paid to the fact that women avoid attending services where they receive disrespectful care. This commentary will outline the issues at stake, and propose practical solutions.

Contextual factors within poor communities

Poor communities are characterized by limited access to basic public services such as water, sanitation, and electricity.1 Many women live below the poverty line, have minimal schooling, low social status, and are burdened with heavy work from an early age - all factors which leave them with little sense of entitlement to health care. In areas of the world where girls are less valued than boys, girls have less access to health care, receive less food and have lower immunization rates. Poor nutrition and chronic illness increase the risk of death during childbirth.
Many poor communities are located in inaccessible geographic terrain, a factor which makes it difficult for women to reach the health facilities when obstetric emergencies arise. This situation is further aggravated by poor transport. Other factors, which contribute to unsafe motherhood include inadequate, inaccessible or unaffordable health care, and poor hygiene.

Cultural realities and gender roles have lifelong health consequences for poor women, starting in infancy. In some poor communities, early childbearing, genital mutilation, and gender violence, including rape, domestic violence, and sexual abuse increase the women’s vulnerability to sexually transmitted diseases and HIV. Women are further constrained by their lack of decision-making power in their families, an aspect which may influence the outcome of labour. The extent to which adverse social circumstances impact on safe childbearing is highlighted by the fact the maternal mortality is the health statistic for which the greatest discrepancy exists between developed and developing countries. It is against this background that we explore the birthing environment in low-income communities.

The Birthing Environment
There is a close correlation between the quality of care provided during childbirth and labour outcome. Whilst the technical clinical care during labour is of fundamental importance, one should not ignore the fact that the birth of a child is an event of great emotional and cultural significance to the family.

Health workers appear to apply, explicitly or implicitly, a hierarchy of priorities whereby limited resources for providing basic care for physical safety are used as a reason not to attend to the emotional needs of women during labour. In this commentary we will discuss how ‘higher order’ needs may be met without compromising basic needs, and indeed the extent to which attention to emotional needs and comfort may improve the physical safety of childbirth.

Over the last half-century the ‘medicalisation’ of labour resulted in the use of procedures that were often uncomfortable or unnecessary, regardless of how they affected women. These included routine enemas, routine pubic shaving, the withholding of food and fluids, the
confining of the women to bed, the isolation of women from supportive companions and from their community, and a preference that women deliver in the supine position. Many of these practices, whilst based on compelling theoretical rationale, have not been substantiated by empirical research. It is ironic, therefore, that ineffective and unpleasant medical traditions which have been abandoned in their countries of origin, continue to be practised in developing countries, while women’s traditional practices such as upright birth postures are discouraged.

A large proportion of births in developing countries take place in non-clinical settings, mainly in homes. An objective of international efforts to reduce maternal mortality is for all births to be attended by trained midwives, yet midwifery training programs often advocate approaches that are impractical in out-of-hospital settings.

**Availability, content of care and quality of health services**

Respect and recognition of the dignity of each woman should be a central element in rendering care to women during labour. Many of the women who are admitted to a health facility during labour will have encountered experiences that violated their dignity and rights at different stages in their lives, and will carry the scars of such experiences to the birthing environment. In the light of these experiences, an attempt should be made to ensure that in addition to having clinically competent health professionals, labour is characterized by a respectful climate that contributes to a positive and memorable birthing experience.

Observational studies from low-income countries describe conditions in labour wards which fall far short of this ideal. Women are often not treated with respect, spending large parts of their labour alone, with minimal comfort, subject to unpleasant practices and sometimes shouted at, struck or slapped by health workers.

This is of particular concern as poor quality care often leads to the poor uptake of services. Studies in Zimbabwe showed that that non-use of services is associated with poor fetal and maternal outcomes and that the pattern of utilisation of maternity services by rural women was based on rational decision-making which took into account not
only the distance to a service but also whether the care provided was seen to be good\(^6\). South African women describe preferring to stay away from formal care structures for their deliveries\(^4\). This is bad news, given that the greater use of services (‘skilled attendance at birth’) is a key step in reducing the half a million maternal deaths in developing countries each year.

The importance of the empowerment of women is now enshrined in major policy statements. At the International Conference on Population Development (ICPD) in 1994, a new global policy consensus was reached on the relationships between population policy and sexual and reproductive health and rights. This policy places emphasis on women’s empowerment and the recognition of choice and opportunity, not coercion and control. The rights-based approach which was reaffirmed and extended at the Fourth World Conference on Women (FWCW) in Beijing in 1995, and again at the ICPD+5 review in 1999, has an important place in the delivery of safe and client-centred obstetric services.

**Interventions aimed at improving childbirth in poor communities**

Evidence-based care requires the integration of clinical expertise with the best available evidence from robust research. However, clinicians are often reluctant to change the way they practice, even when rigorous evidence of effectiveness exists\(^7\). Disparities between clinical practice and research evidence are well documented in obstetric care. For example, there is considerable evidence of beneficial effects from the presence of a supportive companion during labour, yet lack of social support and restricting access of family members to labour wards is the norm in developing countries. There is increasing recognition that many factors influence the change process, and that using multiple strategies is more likely to effect change in health professional behaviour and practice\(^8\).

**The Better Births Initiative**

The Better Births Initiative (BBI) developed in response to observational studies of obstetric practice conducted in China\(^2\), South Africa\(^4\) and Zimbabwe\(^6\) which indicated that obstetric practice and quality of care could be improved if changes were made to some routine practices. Drawing evidence available in the World Health
Organisation Reproductive Health Library (RHL)⁹, the BBI aims to ensure that clinical practices used in essential obstetric services are grounded in reliable research evidence.

The programme takes the form of structured workshops for labour ward staff and managers with several components. There is a presentation on the principles of an evidence-based approach to care, and a video presentation on childbirth companions. Small-group exercises enable participants to discuss their current childbirth practices and write these down in workbooks. They compare these practices with evidence of effectiveness from a reference booklet, and decide whether there are practices they think should be changed. If so, they work out a strategy for change with clear commitments as to what each person is responsible for, and are provided with charts on which to monitor their progress towards change.

The principles of the Better Births Initiative are:
- Humanity: women treated with respect
- Benefit: care that is based on the best available evidence
- Commitment: health professionals committed to improving care
- Action: effective strategies to change current practices

The materials used for the BBI workshops are available in the WHO Reproductive Health Library (RHL) which is distributed annually free of charge to over 15 000 health professionals in developing countries⁹. The RHL is available in English and Spanish, and soon will be available in Chinese.

The BBI programme was evaluated at ten government maternity units in Gauteng Province, South Africa¹⁰. A single educational workshop was conducted with labour ward staff at each study site. Pre- and post test observations at approximately 6 months showed a trend towards an increase in the number of hospitals with good practice at follow-up for: not restricting oral fluids, allowing companionship, and avoiding
routine use of enemas, perineal shaving and episiotomy. Restricting mobility and use of the supine position for birth were not improved.

BBI programs have been implemented in several provinces in South Africa, as well as in other countries, including Egypt, China, Tanzania\textsuperscript{11} and Thailand. Implementation of the workshop in pilot sites in the Western Cape, South Africa, followed up by two-monthly progress meetings, has resulted in considerable changes to practices and improved motivation of labour ward staff (S Fawcus, personal communication). The programme appears to be most effective when supported by the health services management, and when at least one member of staff at the facility is enthusiastic about bringing about change.

In conclusion it is clear that many outdated, scientifically unfounded and uncomfortable practices still persist on labour wards throughout the world. This and the disrespectful treatment of women rendered vulnerable by the pain and fear of labour is an indictment on our professions and our society. To address this issue effectively on a large scale will take commitment at many levels. The Better Births Initiative is one approach to improving care in labour for which materials are available to any health worker who at a local level wishes to bring about change for the better.

References


Appendix 14

Lessons learnt from implementing Kangaroo Mother Care

RC Pattinson
University of Pretoria; Medical Research Council Maternal and Infant Health Care Strategies Research Unit, Pretoria.

Implementing a new intervention or a quality improvement programme is a difficult process. Improving knowledge does not equate to improving clinical practice. Drawing up guidelines does not mean that the guidelines will be implemented. The process is much more complex. There is a new science developing what the best methods are to implement change and how to perform effective outreach. Below is a list of the key principles involved in implementing change as we understand it now.

Principles of implementing a programme

- Get backing (political, in broadest sense, support)
- Ensure adequate resources (financial and human)
- Ensure a common vision (reduction in deaths/ improved care)
- Ensure focused intervention
- Use adult education methods
  Adult learning is all to do with change, since adults learn in order to change
  Adults learn best when:
  - They have identified the need to change (audit)
  - When they engage in interaction with other learners (PNM and M&M Meetings)
  - When they have repeated opportunities to apply theory and information to practical situations
- Use effective outreach strategies
  - Outreach visits
    - On-site facilitation by an expert with adequate training materials is most effective
      - But time consuming and expensive
• “Hands-on, off-site” training at a Centre of Excellence with adequate training materials is probably equally effective
  – Costs are the same as on site facilitation
  – Persuade opinion leaders in the area
  – Use multifaceted training activities
• Measure the effect (audit cycle)

Other issues related to implementing change are:
• How to ensure the process is sustainable and what factors influence sustainability are not clear
• There is a difference between quality improvement of an existing programme and the introduction of a new programme and what strategies work best in each are unclear
• Training of trainers has limited success and ways of strengthening this cascade learning process need to be developed
• There are “winning” and “losing” hospitals often related to management. Sometimes, no matter how effective a programme, nothing can be achieved until the hospital management is improved.

Bibliography


Appendix 15

Outreach in the PMNS, and its impact

S Fawcus.
Peninsula Maternal and Neonatal Service.

Essential features of a Community Perinatal Service
1. Regionalization
2. Provision of a tiered system of perinatal care
3. Comprehensive referral system
4. Continuing education of staff and patients
5. Adequate communication channels & transport facilities
6. Appropriate equipment
7. Efficient system of perinatal audit
8. Prevention and health promotion
9. Attention to social problems
10. Community acceptance

PMNS - Referral Patterns
Table 1.
OUTREACH

A: Hospitals to MOUs

1) **Clinical Visits by base Hospital**
   - High risk clinics (obstetric and neonatal) / Triage
   - Feedback about referred patients
   - Skills training
   - Personalised communication between levels
   - Trouble shooting
   - Community orientation of doctors/students
   - Reinforcement of protocols
   - Support of new programmes

2) **Perinatal audit meetings**
   - Discussion of all perinatal deaths at, and referred from, the MOU.
     *(Midwife presentations with input from community and base hospital doctors)*
   - Systematic feedback of all referred neonates. *(NB Positive feedback as well as negative)*
   - Reinforcing of emergency protocols and introduction of new ones.

3) **Community ultrasound service**

4) **Perinatal update courses/ongoing education**
   (provided by MMH)

5) **PMNS coordinating committee**
   *(for meeting of all levels of the service)*

B: MOUs to Communities

- Open days
- District Health forums
- Links with NGOs
- “Friends” / Volunteers

*NB. Importance of community acceptance*
THE IMPACT OF OUTREACH SERVICES

♀ Difficult to quantify, since OUTREACH is just one component of a regionalised service.
♀ Subjectively: facilitates the implementation of new programmes: facilitates ongoing education, audit and communication between levels

How successful has the Community Perinatal Service been in providing better care?

Table 2. Contribution of Primary service in 1999

<table>
<thead>
<tr>
<th>PMNS: Outpatient visits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Antenatal and postnatal outpatient visits:</td>
</tr>
<tr>
<td>MOUs (primary level) : 80%</td>
</tr>
<tr>
<td>MMH +NSH (secondary level) : 14%</td>
</tr>
<tr>
<td>GSH (tertiary) : 6%</td>
</tr>
</tbody>
</table>

PAWC Health plan for 2010 recommends: Primary: Secondary: Tertiary = 90:8:2
### MORTALITY INDICATORS IN THE PMNS

#### Table 3.

<table>
<thead>
<tr>
<th>Perinatal Mortality Rate</th>
<th>GSH</th>
<th>MMH &amp; NSH</th>
<th>MOU’s</th>
<th>Whole PMNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Births over 100 grams</td>
<td></td>
<td></td>
<td></td>
<td>18</td>
</tr>
<tr>
<td>Births over 500 grams</td>
<td>81</td>
<td>30</td>
<td>13</td>
<td>31</td>
</tr>
</tbody>
</table>

#### Maternal Mortality Rate

#### Table 4.

![Graph showing maternal mortality rate over years](image)

#### Table 5.
OUTREACH

**Ongoing Challenges:**
- Maintenance of vertical clinical linkages with development of district health systems
- Outreach into communities
- Improve obstetric feedback of referred cases
Appendix 16

QUALITY CHECK OF LABOUR RECORDS

For each ‘yes’ answer, score 1 point. You can give half points where the information is incomplete.

Admission assessment form
1. Is there evidence that the health worker has reviewed and summarised the ANC record and listed the maternal and fetal risk factors?
2. Check the items on the admission form. Are all completed?
3. At the end of the form, is there a decision on diagnosis and management?
4. Were the admission findings checked and counter-signed by an Advanced Midwife (or doctor or experienced midwife if no ADM available)?

Labour graph
5. Is the list of risk factors recorded at the top of the labour graph?
6. Has the fetal heart rate been recorded half-hourly?
7. Has the state of the liquor (as recognised by a pad check) been recorded at least 4-hourly?
8. Has the degree of moulding been recorded when a P.V. has been done?
9. Have the contractions been recorded half-hourly?
10. Has the cervical dilatation been recorded at least 4-hourly during the Latent Phase and at least two-hourly in the Active Phase.
11. Has the cervical dilatation been plotted in relation to the lines drawn for the Latent and Active Phases, and for the Alert and Action Lines?
12. Has the level of the head in relation to the brim of the pelvis been recorded at least 4-hourly since admission?
13. Have the maternal BP and pulse been recorded at least hourly?
14. Have the maternal temperature and urinary output been recorded at least 4-hourly?
15. Is there a record of drugs and IV fluids given?

Management of Labour Form (On a page separate from the Labour Graph)
16. Is this recorded after doing each vaginal examination, or at least 4-hourly?
17. Is the summary of fetal condition recorded?
18. Is the summary of labour progress recorded?
19. Is the summary of maternal condition recorded?
20. Is the decision on further action recorded?
21. Is the time of next intended review stated?
22. Were these assessments checked 4-hourly by an ADM (or doctor or senior midwife)?

The Assessment of the Newborn
23. Has this form been completed?

Final Summary of Labour
24. Has this form been completed?
25. In the third stage of labour, is there a record that active management was carried out?

TOTAL out of 25: _____
Multiply by 4: = _____ %
Appendix 17

The Robson Classification of Caesarean Sections

The 10 Groups:

1. **Nulliparous** women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation in **spontaneous labour**
2. Nulliparous women with a single cephalic pregnancy, at greater than or equal to 37 weeks gestation who either had labour induced or were delivered by Caesarean Section before labour
3. **Multiparous** women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks in spontaneous labour
4. Multiparous women, without a previous uterine scar, with a single cephalic pregnancy at greater than or equal to 37 weeks who either had labour induced or were delivered by Caesarean Section before labour
5. All multiparous women, with at least one previous uterine scar and a single cephalic pregnancy at greater than or equal to 37 weeks gestation
6. All nulliparous women with a single breech pregnancy
7. All multiparous women with a single breech pregnancy, including women with previous uterine scars
8. All women with multiple pregnancies, including women with previous uterine scars
9. All women with a single pregnancy with a transverse or oblique lie, including women with previous uterine scars
10. All women with a single cephalic pregnancy at less than or equal to 36 weeks gestation, including women with previous uterine scars
Appendix 18

Quality of Care during Labour

This information is confidential and you do not have to discuss it with anyone. The purpose of this form is to see whether patients are being treated with respect and good quality medical care during labour. Please answer truthfully.

1. Were you properly examined (did the doctor or midwife feel your abdomen and do a vaginal examination and listen to the baby’s heart) soon after you came into the hospital?
2. Were any bloods taken from you for anemia testing when you were admitted in the hospital?
3. Did you have an enema before admission to the labour ward, even though you did not think it was necessary?
4. Were your pubic hair shaven before admission to labour ward?
5. Where did you spend most of your time in labour (at home/ in the corridor/ in another ward/ in the labour ward)?
6. Did you receive anything to eat or drink while you were in labour?
7. Were you allowed to move around and get out of bed during labour?
8. Did you have someone with you during labour (such as your partner/friend/relative)? If not, was it because:
   - you were not allowed by the staff
   - you preferred not to have someone with you
   - you had no-one to ask to be with you in labour?
9. Did you get anything for pain during labour?
10. Did you see the attending midwife/doctor regularly during your labour (at least every 30 minutes)?
11. Did they listen to the baby’s heart at least every 30 minutes?
12. Did the staff explain to you how your labour was progressing after every examination?
13. Did the midwife/doctor give you a cut before delivery of the baby?
14. If you did have a cut, did you have an injection to make the area pain free before the cut?
15. Did you have an injection in your leg immediately after the baby was born?
16. Did the midwife/doctor deliver the placenta, or did it come out by itself?
17. Did they give you your baby to hold immediately after the delivery?
18. Did the staff treat you with respect and respect your privacy while you were in labour?
19. Were the staff easily available if you called for them while you were in labour?
20. Was the baby given to you for breastfeeding soon after delivery?
21. Was the baby properly identified by a name band immediately after birth?
22. Would you like to deliver at the same clinic/hospital if you were ever in labour again?
Delegate List

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