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## EARLY SUCKLING AND POSTPARTUM HAEMORRHAGE: CONTROLLED TRIAL IN DELIVERIES BY TRADITIONAL BIRTH ATTENDANTS

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**Summary** A randomised, controlled trial was carried out to determine whether suckling immediately after birth reduces the frequency of postpartum haemorrhage (PPH), the mean blood loss, and the frequency of retained placenta. The trial subjects were attended by traditional birth attendants (TBAs), and randomisation was by TBA and not by mother. 68 TBAs attended a course on third stage management and data collection; 19 had to be excluded from the trial. 23 TBAs in the early suckling group and 26 in the control group recorded blood loss in 2104 and 2123 deliveries of liveborn singletons, respectively. The frequency of PPH (loss greater than 500 ml) was 7.9% in the suckling group and 8.4% in the control group and the mean blood loss 258 ml and 256 ml, respectively. Neither of these results differed significantly between the groups. Analysis of the results by individual TBA showed no significant difference between the groups. The frequency of PPH in women of higher parity and in those with multiple pregnancies and stillbirths was high, as expected, which seems to validate the results. The frequency of retained placenta was too low to be analysed.

### Introduction

POSTPARTUM haemorrhage (PPH) is one of the commonest causes of mortality and morbidity in childbirth, particularly in developing countries, where the risk of death from PPH is some fifty times<sup>1,2</sup> that in England and Wales.<sup>3</sup> The introduction of ergot preparations coincided with a pronounced fall in the death rate from PPH,<sup>4</sup> and evidence

from controlled trials has confirmed that the routine use of oxytocic drugs reduces the incidence of PPH.<sup>5</sup> Prophylactic oxytocics are usually combined with an active method of third stage management, and it has been argued that this results in a cascade of interventions that could be avoided by adoption of a physiological method of management without oxytocics.<sup>6,7</sup> However, in a randomised, controlled trial, active management resulted in significantly less PPH than the physiological alternative.<sup>8</sup> Unfortunately, oxytocic drugs are not available to about half the women of developing countries, who do not deliver under the care of a trained midwife. In an attempt to provide more care for such women, training courses for traditional birth attendants (TBAs) have been instituted in many countries. Since even trained TBAs do not have the skill to administer injectable oxytocics and since the drugs must be refrigerated,<sup>9</sup> it has become the practice in some TBA training programmes to teach that the risk of PPH can be reduced if the mother puts her baby to the breast immediately after delivery. This hypothesis is based on the knowledge that suckling stimulates uterine contractions in lactating women. This effect is probably mediated by the high plasma oxytocin levels that occur during preparations for breast-feeding<sup>10</sup> and again within 3 min of the start of suckling.<sup>11</sup>

A study of the effect of suckling after birth seemed justifiable, both because these theoretical reasons suggested that it might reduce post-partum blood loss and because the method was already being advocated without proof of its efficacy. Adoption of such a policy could result in the need to change traditional customs, something never to be undertaken lightly.

We decided to test whether an educational programme for TBAs which encouraged immediate suckling at birth reduced the frequency of clinically significant PPH, the mean blood loss at delivery, and the frequency of retained placenta, among TBA-attended births.

We planned to randomise into treatment groups by TBA, and estimated the number of deliveries, and hence TBAs, needed as follows. The frequency of PPH was expected to be about 7.5% and a reduction to 5% would be regarded as clinically significant. We calculated that 3900 deliveries would be needed for an 80% chance of detecting this difference at the 5% level of significance.

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## Subjects and Methods

### Background

The study was carried out in the central region of Malawi, where about half all deliveries occur outside hospital. A proportion of these births are attended by TBAs who have received a 4-week training, which includes instruction in carrying out normal deliveries and the recognition of risk factors during antenatal care and in labour. Selective referral of patients for hospital delivery is encouraged. The research was carried out only with trained TBAs in Lilongwe District and contiguous traditional authority areas of Kasungu and Mchinji Districts. All the trained and practising TBAs within this defined area were included in the research except for 8 who attended fewer than 3 deliveries per month, and 1 who was very old and unable to keep records. All the TBAs selected attended deliveries at their own homes. All but 2 lived in rural areas.

Women delivered by Malawian TBAs, including trained TBAs, do not breast-feed their babies immediately after birth. It is commonly believed that the mother is tired after delivery and requires rest, and that the baby does not need an immediate feed. Nor is it customary for the mother to hold the baby after birth. After being dried and wrapped, the baby is initially cared for by a relative. The mother rests, is given a wash or helped to shower, and then after some hours will first breast-feed.

### Randomisation

Randomisation into early suckling and control groups was by TBA rather than by patient to reduce the likelihood of contamination of the treatment groups by knowledge of the intervention reaching women awaiting delivery. Also, the TBAs might not have followed the randomisation procedure through not understanding its significance. Randomisation of TBAs to treatment or control groups was carried out (by a member of the Malawi Ministry of Health Statistics Department) within districts and after stratification for the number of deliveries attended (more or less than 30 per month), and for distance from a telephone or health centre (less than 5 km, or 5 km and further) since we thought these factors could affect practice and referral patterns. 69 TBAs were randomised, 34 to the early suckling group and 35 to the control group.

### Training Programme

The TBAs selected for participation in the study were invited to attend a 2-day refresher course. Only 1, from the suckling group, could not attend as a result of illness. She did not seem to be atypical in any way and was excluded from the trial. The courses were held between April and July, 1987. TBAs attended in groups of 6 or 7. Courses for suckling group and control group TBAs were held alternately and separately. The content of the courses was identical except for instruction on early suckling in that group. The syllabus was: record keeping, physiology of the third stage, causes of PPH, management of the third stage, measurement of blood loss at delivery, immediate breast suckling after delivery (suckling group only), and reasons for referral for third stage complications. The following methods are as the TBAs were taught.

**Management of third stage of labour.**—After delivery the baby was placed between the mother's legs. After approximately 3 min the cord was tied and divided. In the suckling group the TBA then put the baby to the mother's breast. The TBA did not touch, rub, or push on the fundus. The patient was helped to sit up so that gravity would help her to deliver the placenta. The TBA watched for cord lengthening and then asked the mother to push out the placenta. If there was delay in delivery of the placenta, the mother tried to pass urine, then attempted to deliver the placenta. She could try pushing while squatting or kneeling. After placental delivery the TBA rubbed the fundus to ensure it was hard, and she also did this as necessary to control bleeding. If more than 500 ml blood was lost before placental delivery and bleeding was continuing, the TBA could rub the fundus to produce a contraction and do controlled cord traction.

**Measurement of blood loss at delivery.**—After the delivery all the blood lost was collected, and any amniotic liquor excluded. The

TBA continued to collect blood until all bleeding had stopped. The blood loss was then measured in transparent plastic measuring jugs in units of 100 ml (0 = 0–99 ml, 1 = 100–199 ml, and so on). Since many of the TBAs were innumerate, careful teaching in measurement methods was given.

**Immediate suckling after delivery.**—The teaching was to inform the mother during labour that she would be asked to put the baby to her breast after delivery, as soon as the cord was cut and the baby dried and wrapped. If the baby did not suckle immediately, repeated attempts were made. Even after placental delivery the mother was encouraged to hold the baby at the breast. TBAs were taught that the reasons for this practice are that it helps to keep the baby warm, that it results in earlier successful lactation, as well as prolonged lactation, and that it promotes bonding. They were not told that it reduces blood loss at delivery, but that by producing uterine contractions it should help in delivery of the placenta.

**Referral for third stage complications.**—The TBAs were told to refer to hospital any patient who lost more than 1000 ml blood or who lost 600 ml and whose bleeding was continuing; any patient whose placenta was not complete; any patient whose placenta was undelivered after 1 h; and any patient with a second-degree perineal tear.

**Other aspects.**—To avoid possible bias, the TBAs were not informed that they were taking part in a trial, and we tried to avoid giving the impression that the methods taught might reduce blood loss. Since the control group TBAs were following a standard method of management, this feature of the trial seemed ethical. Herbal medicines are administered by TBAs, but they were taught in their original training not to give any during or immediately after labour. This teaching was reinforced.

### Recordings

A PPH was defined as loss of more than 500 ml blood during the third stage of labour or within the first 24 h after delivery.

A record collection form was designed with drawings to represent the information required. It was printed in continuity with the record form that the TBAs were already used to completing. An entry was made for each delivery as follows: maternal survival or death; live birth or stillbirth; singleton or multiple pregnancy; referral to hospital; parity; blood loss; placenta delivered or retained; perineal tear; baby suckled at breast before placental delivery, after placental delivery, or not at all (treatment group only).

The TBAs were encouraged to use the methods taught and to begin record-keeping immediately on return from the course. Follow-up visits to their homes were made 3 weeks after the course, then every 4 weeks, and finally every 5 weeks, to assess the TBAs' performance, to reinforce the teaching given, and to collect the data recorded. Reasons for referral to hospital were also recorded. By inquiry from puerperal patients we were able to confirm whether or not breast suckling had been carried out after delivery as appropriate to the TBA's study group.

After a referral for PPH or retained placenta the appropriate hospital was visited, the case-notes obtained where possible, and details of the outcome recorded. There were only a few hospitals to which these TBAs would be likely to refer patients, and labour ward staff in the hospitals cooperated by maintaining a record of any referrals from TBAs for PPH or retained placenta.

Most of the TBAs had had no formal education, and we therefore instituted a quality control mechanism to ensure that data were being recorded accurately. About halfway through the study a community midwife not involved in the research project took part in one of the follow-up visits. She asked about the methods used to collect the blood for measurement and to exclude amniotic fluid, and tested the TBA on measurement of blood loss. The results of any TBA who failed any part of the test were excluded from the analysis. The midwife also talked when possible to a delivered mother about suckling after delivery.

Data were collected from as soon as the TBA returned from her refresher course until Jan 12, 1988.

Ethical permission for the trial and approval of the methods was given by the Health Sciences Research Committee of the Malawi Ministry of Health. The data were entered on the computer of the

TABLE I—DISTRIBUTION OF TBAS ACCORDING TO STRATIFICATION

	Suckling (n=23)	Control (n=26)
<i>District</i>		
Lilongwe	8	10
Kasungu	11	10
Mchinji	4	6
<i>Case-load (per mo)</i>		
≥30	8	9
<30	15	17
<i>Distance from telephone or health centre</i>		
<5 km	5	6
≥5 km	18	20

University of Newcastle upon Tyne and analysed by the SPSSX statistical analysis programme.

### Results

68 TBAs attended the refresher course before the trial, 33 in the suckling group and 35 in the control group. 10 in the suckling group and 9 in the control group had to be excluded from most of the analysis (4 suckling, 1 control untrainable; 1 suckling, 6 control failed quality control test; 5 suckling, 1 control were strongly suspected of fabricating results; and 1 control TBA died). A few of the TBAs whose results were included in the trial initially had very high results for blood loss. On questioning, they admitted that they were measuring liquor. After this was corrected all their results were included. The 23 TBAs in the suckling group attended 2184 deliveries and 26 TBAs in the control group attended 2201 deliveries. The distribution of stratification factors is shown in table I. The mean case-load of TBAs was 21.9 per month in the suckling group and 17.5 per month in the control group.

Blood loss measurements were missing for 114 (59 control group, 55 suckling group) of the 4385 deliveries. Table II shows the comparability of the two groups for factors that might affect the frequency of PPH among deliveries with blood loss measurements.

Since only 1 mother with a perineal tear had a PPH, women with tears were not excluded from the analysis; nor were cases of neonatal death. However, the main analysis was carried out on 4227 deliveries of singleton liveborn babies from mothers whose blood loss was measured (control 2123, suckling 2104).

In the suckling group, suckling took place before placental delivery in 889 cases, both before and after in 575, only after placental delivery in 507, and not at all in 32. The information was not recorded in 101 cases. We believe that none of the control group mothers breast-fed early.

4 patients (2 from each group) all from different TBAs were transferred to hospital owing to retained placenta; 1 (suckling group) died shortly after admission. Another, in the control group, was transferred in shock by the research team and might otherwise have died.

TABLE II—COMPARABILITY OF STUDY GROUPS

	No (%) of deliveries	
	Suckling (n=2129)	Control (n=2142)
Twin pregnancy	7 (0.3%)	2 (0.1%)
Stillbirths	18 (0.08%)	17 (0.08%)
Neonatal deaths	2	2
Perineal tears	20	7
Mean (SD) parity	3.5 (2.6)	3.4 (2.6)

TABLE III—PARITY DISTRIBUTION AND FREQUENCY OF PPH IN SINGLETON, LIVEBORN BABIES WITH KNOWN MATERNAL BLOOD LOSS

Parity*	Suckling		Control	
	No (%) of deliveries	No (%) with PPH	No (%) of deliveries	No (%) with PPH
Primigravida	252 (12.7)	14 (5.6)	289 (13.8)	15 (5.2)
Para 1-3	847 (42.8)	63 (7.4)	882 (42.3)	65 (7.4)
Para 4-6	619 (31.3)	60 (9.7)	658 (31.5)	62 (9.4)
Para ≥7	260 (13.1)	26 (10.0)	258 (12.4)	33 (12.8)
Not known	126		36	

\*Refers to previous pregnancies, not including the study pregnancy.

The frequency of PPH did not differ significantly between the groups (suckling 167 [7.9%] vs control 178 [8.4%];  $p > 0.6$  by chi-square test; 95% confidence interval suckling minus control = -2.1% to +1.2%). Analysis by the likelihood ratio test showed no evidence of any difference between suckling and control groups in the rate of PPH by individual TBA ( $p > 0.9$ ). 3 patients in the suckling group and 1 in the control group were transferred to hospital with PPH not associated with retained placenta. The mean blood loss in the two groups was similar (suckling 258 [SD 163] ml [ $n = 2104$ ] vs control 256 [148] ml [ $n = 2123$ ]). Analysis of blood loss by mean for each TBA also showed no difference between suckling and control groups.

The difference in the frequency of PPH within parity groups was not significant ( $\chi^2 = 2.5$  on 1 degree of freedom; table III) but in both groups there was a significant rise in PPH rate with increasing parity ( $\chi^2 = 96$ ,  $p < 0.001$ ).

Twin pregnancies and pregnancies ending in stillbirth were analysed separately. PPH occurred in 3 of 7 live twin deliveries in the suckling group but in neither of 2 such deliveries in the control group. There was no significant difference between the groups (Fisher's test,  $p = 0.16$ ). When the figures for the groups were combined, twin deliveries had a PPH rate of 33.3% compared with a rate of 8.2% in single live births (Mantel-Haenszel test  $\chi^2 = 7.68$ ,  $p = 0.006$ ; odds 5.7 times higher, 95% confidence interval 1.66 to 19.5). Of the 35 women whose babies were stillborn, 8 had a PPH (22.9%). This rate was significantly higher than that for single live births (Mantel-Haenszel test,  $p = 0.0017$ ).

Since we could only rarely attend deliveries during the study, we carried out a study concurrently at Kamuzu Central Hospital, Lilongwe, to see how successfully newborn infants could suckle immediately after birth. 76 mothers with spontaneous vertex deliveries had the cord cut 3 min after delivery and were then encouraged to breast-feed. All the babies suckled within 20 min of birth (20 within 5 min, 53 within 10 min). The mean time of first suckling was 7.25 min (range 3.5-15 min) after birth and the mean number of suckling movements within the first 20 min was 141 (range 10-400).

### Discussion

In this study the educational programme, in which TBAs were taught to encourage suckling immediately after birth, did not reduce the frequency of PPH or mean post-partum blood loss in single live births. However, this negative result is valid only in the context in which the study was carried out. A policy of early breast suckling after deliveries attended by trained midwives rather than TBAs might have a different effect.

The accuracy of blood loss measurements by TBAs who were mostly illiterate and/or innumerate may be doubted.

However, the presence of the expected associations between greater risk of PPH and high parity, stillbirth, and twin pregnancy tends to validate the accuracy of the data. The small numbers of twin pregnancies and stillbirths are explained by the TBAs' practice of referring such cases for hospital delivery.

Primigravidae in this study did not have the higher blood loss recorded in previous studies,<sup>12,13</sup> possibly because so few of the mothers had perineal tears and none had episiotomies. Episiotomies result in more blood loss than tears,<sup>13</sup> and in one series caused an extra loss of about 250 ml in primigravidae.<sup>14</sup> None of our patients were sedated or had received oxytocic infusions to accelerate labour.

The reasons for choosing the particular methods of third stage management are as follows. Delayed clamping of the cord was advised to allow placental-fetal transfusion to occur. This process reduces placental volume and may facilitate placental separation<sup>7</sup> and the passage of the placenta through the cervix.<sup>6</sup> The baby was placed between the mother's legs rather than on her abdomen, since placental-fetal transfusion is affected by gravity.<sup>15</sup> The cord was ligated and divided 3 min after birth, when placental transfusion is virtually complete.<sup>16</sup> The alternative practice of not cutting the cord until the placenta was delivered was rejected when in a small pilot study 2 of 7 newborn infants had cords so short that suckling resulted in tension on the cord (unpublished). The other instructions given were standard for third stage management without the use of prophylactic oxytocics, the emphasis being on non-interference. We advised TBAs to try controlled cord traction only after blood loss of over 500 ml; this intervention would therefore have had no effect on the chosen end-point of a PPH of more than 500 ml.

This study was based on the assumption that the newborn baby can successfully suckle at the breast almost immediately after birth. It is likely that the infants in the suckling group of our TBA study would follow the same pattern, as in the study at Kamuzu Central Hospital. Although the overall success in suckling was encouraging, the small proportion suckling by 5 min means that in most cases placental separation would occur before suckling started. This may be a factor in our inability to show a reduction in blood loss. Various measures were taken to avoid sources of error. We hoped that if we did not say the methods taught might reduce blood loss, TBAs would not record low results out of a desire to please. It was possible that control TBAs could have heard about the intervention in the suckling group, but very few of the TBAs lived close together, and they do not seem to share professional knowledge readily. As a precaution, control group TBAs, and when possible the mothers they attended, were asked about their breast-feeding practice and no evidence of contamination was uncovered. Our inquiries to mothers in the suckling group about early suckling satisfied us that it was being practised. We thought two factors might confound the results. The first, perineal tears, has already been commented upon. The second, the possible use of herbal oxytocic drugs, cannot be excluded, but no evidence of this factor came to our notice. The need to exclude several TBAs from the trial was unfortunate. The reasons for the exclusions, however, suggest that they should not have affected the endpoint.

There was 1 maternal death from PPH in the 4385 deliveries analysed and none in the deliveries by excluded TBAs. This frequency is close to that found in other studies

in developing countries. It emphasises the need to continue the search for ways of reducing the risk of PPH where modern techniques are not available. Since this study has thrown doubts on the effectiveness of early breast suckling, perhaps digital stimulation of the nipples after birth should now be tested. This method would have the advantage of not depending on the baby's ability to suckle. We suggest, however, that no controlled trial should be planned until more basic physiological research has been carried out. Thornton et al<sup>17</sup> have shown that there is a rise in the plasma oxytocin level after delivery in some women. Their results, although based on small numbers, suggest that this may be a physiological mechanism of advantage to the mother. Their study could be repeated with nipple stimulation to ascertain whether this increases oxytocin secretion. Measurements of uterine pressure during the third stage could be made, by the principles described by Dunn.<sup>18</sup> If positive results are obtained, the same investigations could be done for early breast suckling; such studies might throw light on our results and determine whether further trials should be carried out.

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