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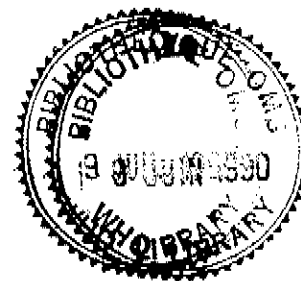
SAFE MOTHERHOOD



World Health Organization
Maternal and Child Health & Family Planning
Division of Family Health, Geneva

THE PREVENTION AND MANAGEMENT OF POSTPARTUM HAEMORRHAGE

REPORT OF A TECHNICAL WORKING GROUP
GENEVA, 3-6 JULY, 1989





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1. PREFACE

The Safe Motherhood Initiative (SMI) is a global effort to reduce maternal mortality and morbidity. The target is to reduce maternal deaths by at least half by the year 2000 and to achieve substantial reductions in maternal morbidity. Activities within the Initiative take many forms: increasing awareness of the nature of the problem and the need for action; strengthening maternal health services; training of health workers and others; facilitating educational and economic opportunities for women; and research, particularly operational research. All these measures, which will help to reduce maternal mortality, will also exert at least equal effect on maternal morbidity which derives from the generally poor health of women and girls and inadequate care during pregnancy and labour.

In order to be able to provide more effective support to countries in technical fields, WHO has been holding a series of meetings and consultations with experts on a variety of subjects relating to maternal health. Their task is to review current knowledge and experience of a given high priority topic, produce guidelines and, if necessary, to recommend needed epidemiological and operational research. Some technical groups have already produced guidelines such as "Studying maternal mortality in developing countries" (1), "Essential obstetric functions at first referral level" (2) and "The prevention and treatment of obstetric fistulae" (3). One working group has prepared guidelines for the use of the partograph and protocols for studies to assess its effectiveness (4), another, the measurement of the prevalence of reproductive morbidity (5).

This Technical Working Group on the prevention and management of postpartum haemorrhage (PPH) is part of the effort to provide more effective support to countries, particularly in areas where WHO has a unique contribution to make in norm-setting and the establishment of agreed standards.

A companion document to this report of the Technical Working Group on the prevention and better management of postpartum haemorrhage is in preparation. It will consist of a review of available information about the aetiology, prevention and treatment of PPH.

2. INTRODUCTION

Worldwide concern about maternal health in developing countries has so far concentrated on the need to reduce high levels of maternal mortality, a major cause of which is postpartum haemorrhage.

An informal meeting of experts with relevant experience in this area was therefore convened in Geneva.

The objectives of the meeting were to identify:

1. what is definitely known about the prevention and management of PPH, and to suggest to the World Health Organization how this knowledge may be disseminated and put into practice as quickly and as widely as possible;
2. important issues for research and evaluation, particularly through operational research, i.e. for evaluations of feasibility, impact and cost in field trials. It was considered that the Group should also try to suggest the methodology of such operational research related to the different issues.

As PPH is both numerically and relatively a much greater problem in developing countries, especially those with underdeveloped maternity services, the Group's discussions centred on the situation in those countries rather than on that in the developed countries.

The meeting was opened by Dr Godfrey Walker (Manager, Safe Motherhood Research Programme) and Dr Mark Belsey (Chief, Maternal and Child Health). Dr Colin Bullough was selected as Chairman and Drs Iain Aitkin and Walter Prendiville as Rapporteurs. A list of the participants is attached to this report (Annex 3).

A background paper for the meeting was prepared by Dr Colin Bullough.

3. BACKGROUND

3.1 Definitions

Postpartum haemorrhage (PPH) was defined as the loss of 500 mls. or more of blood from the genital tract after delivery of the baby.

The choice of 500 mls. as the level of blood loss defining PPH is internationally accepted, but it is an arbitrary figure. Indeed the loss of 500 ml. is not always of great clinical significance. But the Group appreciated that the diagnosis of PPH is a clinical diagnosis and that the clinical assessment of blood loss by the measurement of collected blood frequently and significantly underestimates the actual blood loss. It was therefore agreed that the threshold for making a diagnosis of PPH should stay at 500 ml.

Clinicians may decide that in the circumstances of their practice a lower level of blood loss should be the cut-off point for the institution of therapeutic action. This certainly should be the case where the mother is anaemic at the time of delivery or has other complicating medical conditions such as cardiac disease. In these circumstances the need for special prophylactic measures or earlier therapeutic action should be anticipated.

Primary PPH includes all occurrences of bleeding occurring within 24 hours of the delivery of the baby. Secondary PPH includes all cases of PPH occurring between 24 hours after delivery of the baby and six weeks postpartum. The distinction between 'third stage haemorrhage' and 'haemorrhage occurring after delivery of the placenta' should be abandoned, and all cases included under the heading primary PPH.

The term retained placenta should be used to describe a situation in which the placenta has not been delivered within one hour after the birth of the baby.

3.2 The frequency of postpartum haemorrhage

If oxytocic drugs are not used at delivery the frequency of PPH varies between 10 and 20%. A study in Canada (6) in 1941 found that women had a mean blood loss of 206 ml. and a PPH rate of 18.9%. In a recent study carried out in Bristol, England, (7) a control group with a physiologically managed third stage of labour (no prophylactic oxytocic, controlled cord traction, etc) had a 17.9% incidence of PPH even though 20% actually had a prophylactic oxytocic. A study in Malawi of deliveries attended by traditional birth attendants (TBAs) (8) found an 8.4% rate of PPH, this lower rate possibly being because the study included no instrumental deliveries and very few perineal tears.

It is well established that the routine administration of any oxytocic reduces the rate of PPH as shown by an overview of the evidence from controlled trials (9). Routine administration of an oxytocic reduces a PPH rate of about 10% to one of about 6%. In other words for every 22 women given an oxytocic in a population which would otherwise experience a PPH rate of 10%, one PPH could be prevented.

3.3 Maternal mortality caused by PPH

An analysis of the main causes of maternal death in fourteen selected developing countries (10) found that haemorrhage was one of the major causes of death in every country. PPH is the largest component of these deaths from haemorrhage and in a community study in Ethiopia (11) was recorded as causing 33 maternal deaths per 100,000 live births. This compares with a rate of 0.16 per 100,000 live births from PPH in England and Wales (12). Experience in England and Wales shows a dramatic fall in the number of deaths from PPH with the use of effective health care, with 127 occurring during 1952-54 and only 3 in 1982-84.

The figures quoted refer to cases in which PPH was the direct cause of death, but PPH is often an associated factor in deaths from other direct causes, such as obstructed labour and sepsis. The contribution of PPH to such deaths and to the morbidity which occurs following heavy blood loss but the patient survives is not easy to quantify, but is likely to be significant.

There is a paucity of information concerning the underlying causes of PPH which are associated with maternal mortality in the third world.

3.4 The causes of postpartum haemorrhage

While there are many causes of postpartum haemorrhage (see Table 1), the most frequent are retained placenta, associated with between a third and a half of deaths from PPH, and uterine atony. Retained placenta occurs both relatively frequently and has a high case-fatality rate. Coagulation defects and inversion of the uterus, although having high case-fatality rates, are rare occurrences; while genital tract injury such as episiotomy, or the "gishiri" cut, carried out by certain traditional practitioners in West Africa, are more common and may exacerbate bleeding from other causes but alone are very seldom causes of severe postpartum haemorrhage.

Table 1 Causes of primary and secondary postpartum haemorrhage

<u>Primary PPH</u>	<u>Secondary PPH</u>
Retained placenta *	Chorioamnionitis *
Retained cotyledon	Retained placental tissue
Uterine hypotonia *	
Genital trauma (both spontaneous and iatrogenic e.g. instrumental delivery, episiotomy, "gishiri" cut)	
Disseminated intravascular coagulation *	
Inversion of the uterus *	

* Associated with high case-fatality rate

By definition, blood loss at caesarean section should also be included as a cause of PPH since the amount lost is frequently over 500 ml. However, most studies of maternal morbidity and mortality conventionally separate the risks and complications of caesarean section from those of vaginal deliveries.

3.5 Predisposing conditions

Both the frequency and the case-fatality rate of PPH are higher among women with certain conditions (see Table 2). Some of these can be identified or prevented during the antenatal period. The importance of antenatal factors is their ability to predict those women at high risk of postpartum haemorrhage so that action can be taken to ensure they deliver in a facility capable of managing the haemorrhage if and when it occurs. Recognition of these risk factors during labour should result in the implementation of extra measures to prevent or reduce the impact of haemorrhage.

Table 2 Conditions that predispose to postpartum haemorrhage

<u>Predating pregnancy</u>	<u>Arising antenatally</u>	<u>Arising during labour</u>
Primigravidity	Placenta praevia	Induced labour
Grand multiparity (5+)	Placenta praevia with	Prolonged-obstructed
Fibroids	previous caesarean	labour
Idiopathic thrombocytopenic	section *	Precipitate labour
purpura *	Abruptio placentae	Forceps delivery
Von Willebrand's disease *	Polyhydramnios	Caesarean section
Anaemia	Multiple pregnancy	General/epidural
	Previous third stage	anaesthesia
	complication	Chorioamnionitis *
	Intra-uterine death *	Disseminated
	Eclampsia	intravascular
	Hepatitis	coagulation *

* Associated with high case-fatality rate

However, the predictive value of antenatal factors is generally low and only a minority of postpartum haemorrhages have a predisposing risk factor identifiable in the antenatal period. Some factors like primigravidity and grand multiparity are very common and therefore not very specific when used in screening. On the other hand, women with uncommon conditions such as placenta praevia and/or a previous caesarean section, or intra-uterine death are very likely to have a PPH. The factor which seems to be particularly useful to identify women likely to have a PPH is a history of a previous third stage complication, when the risk of postpartum haemorrhage may be increased two to three times, and up to a quarter of multiparae having a postpartum haemorrhage have had one in a previous pregnancy. (13)

A number of conditions and characteristics of women which do not affect the incidence of PPH are known to increase the serious sequelae of haemorrhage. These factors include age over thirty-five years, anaemia, uterine sepsis and associated medical conditions like cardiac disease and diabetes mellitis.

3.6 Risk factors and the availability and quality of maternal health care

The more limited and poorer the level of care provided, the higher is the risk that a PPH will have a serious outcome. In this respect the factors of greatest relevance in developing countries are the absence of a trained attendant during labour, the unavailability of parenteral oxytocics and intravenous fluids, including blood, and difficulties and delays in transfer to a hospital. (Table 3)

In order to reduce the incidence of and mortality from PPH, different but complementary actions are required at the various levels of the health care delivery system. Antenatally, it is important to ensure that women with previous third stage complications are identified and referred for delivery at a first referral level hospital. Traditional birth attendants may fail to appreciate the dangers of excessive blood loss, and may be unable to manage genital trauma. There may be mismanagement of the third stage of labour and use of traditional herbal medicines can cause a coagulopathy.

Table 3 - Risk factors and the level of care

Domiciliary delivery (TBA)	Health centre (nurse/ midwife)	Referral centre (doctor/ obstetrician)
Risk factor		
<u>Treatment</u>		
<ul style="list-style-type: none"> - failure to recognise and/or treat: high risk pregnancies; genital trauma; excessive blood loss - non-active management of third stage 	<ul style="list-style-type: none"> - episiotomy mistimed - non-active management - mismanagement of third stage 	<ul style="list-style-type: none"> - induction of labour - instrumental of third stage or operative delivery - mismanagement of third stage
<u>Supply</u>		
<ul style="list-style-type: none"> - use of traditional medicines 	<ul style="list-style-type: none"> - lack of blood - lack of qualified personnel - lack of intravenous fluids including plasma expanders - inadequate operative facilities 	<ul style="list-style-type: none"> - organizational constraints - inadequacies in quality of care
<u>Access</u>		
<ul style="list-style-type: none"> - transportation difficulties - poor communications 	<ul style="list-style-type: none"> - transportation difficulties - poor communications 	

At the first level of care, certain interventions, such as the mistiming of an episiotomy or a mismanaged active approach to the third stage of labour, may lead to increased risk of PPH. Other factors increasing the risk of PPH are generally outside the control of the health worker and include non-availability of oxytocic drugs and an inability to refer high risk women to the first referral level because of poor access, or the unwillingness of woman or her family to accept referral.

The increased risk of PPH associated with medical interventions like induction of labour, instrumental or operative delivery and general or epidural anaesthesia are in general confined to first referral level facilities which must be made capable of managing such haemorrhage.

3.7 Epidemiological research

The most important conclusion from this consideration of the causes and risk factors for PPH is that there is a need to improve knowledge on their (quantified) relevance in women in developing countries. The Group therefore recommend that WHO should support studies in several countries which quantify the relative importance of different causes and associated risk factors of having a PPH and mortality from it. Because of the relative infrequency of these deaths, a case-control approach would be appropriate.

4. ANTENATAL ACTIVITIES TO REDUCE THE INCIDENCE AND IMPACT OF PPH

Antenatal care should be concerned with reducing both the incidence of PPH and its impact on the woman. Both can be achieved through the identification and referral of high risk mothers to the appropriate level of care. There are four requirements of success in this endeavour.

- Community members need to be educated about pregnancy high risk factors and the importance of antenatal care. This can be done by health workers, through community associations or through the mass media.
- Pregnant women need to have access to antenatal care. Barriers, whether physical, financial, or social need to be minimized.
- Staff responsible for antenatal care need to be adequately trained to recognise risk factors, both through history taking and physical examination, and with the help of an action-orientated antenatal record card.
- Health workers need the motivation and skills to persuade the high risk woman and her family that she should go to the appropriate health facility for delivery.

The incidence of PPH can also be reduced by the prevention and treatment of severe toxæmia of pregnancy and eclampsia, and by the recognition and appropriate management of antepartum haemorrhage and intra-uterine death.

The impact of PPH can be reduced by preventing and treating anaemia during pregnancy, so that the woman will be better able to withstand any loss of blood. This will usually be achieved by the prescription of haematinics and/or anti-parasitic agents, and by blood transfusion for women with severe anaemia in late pregnancy. In some areas therapeutic measures should include the prevention and treatment of malaria, the treatment of hookworm and the appropriate management of hereditary haemoglobinopathies.

An additional important activity during antenatal care is the education of the community in the importance of relatives of the woman requiring blood transfusions to be ready to travel with her to hospital in order to donate blood for her.

5. PRACTICES FOR MANAGING THE THIRD STAGE OF LABOUR

5.1 Delivery of the placenta

The methods used in clinical practice to achieve delivery of the placenta are extremely varied. The Group sought to clarify these and was able to identify the following three main approaches.

Expectant approach

- No use of prophylactic oxytocic.
- Signs of placental separation are awaited (lengthening of the cord, fresh bleeding at the vulva and contraction and rising of the uterine fundus).
- Expulsion of the placenta is by gravity and maternal effort. (There should be no fundal massage before the placenta is delivered and no traction on the cord).

The Brandt-Andrews method (14)

- No use of prophylactic oxytocic.
- No action taken for 5 to 10 minutes after delivery to allow for separation and descent of the placenta.
- Separation of the placenta and its descent into the open cervix or upper vagina is tested by holding the cord taut in one hand and gently pushing the uterus up towards the diaphragm with the other hand by pressure over the lower segment.
- If this procedure produces only slight tension in the cord, several repeat pushes will ensure that the placenta and membranes come into the vagina.
- If the procedure causes increased tension in the cord, it is assumed that the cervix is closed. The attendant waits a few minutes and attempts the procedure again. (There should be no massage of the uterus).

A variation of this procedure practised in the Netherlands and some other countries encourages gentle cord traction to lift out the placenta once it is clear that the placenta has separated and descended.

Active management

- An oxytocic is given after delivery of the anterior shoulder or the whole baby.
- The cord is clamped and cut.
- The lateral surface of one hand is placed firmly over the lower segment of the uterus and the cord is firmly pulled with the other hand until the placenta and membranes are delivered.

It is likely that the Brandt-Andrews method results in less bleeding than the non-intervention approach, and that active management is safer than the other two. However, the level of skill required and the risks of mismanagement are correlated. The decision as to which method should be used will depend upon the level of training and experience of the person attending the birth.

5.2 Variations in practice in the management of the third stage of labour

The way in which the third stage is managed differs from country to country. In order to be able to assess whether there are advantages of one method over others, there is an urgent need for widespread audit of practice. Terms, however, need to be defined. For example the use of the term "physiological" is confusing, and means different things to different people. In the Netherlands, for instance, it is taken to mean waiting for signs of placental separation, after which the placenta is delivered either by maternal effort alone, or maternal effort aided by fundal pressure or by the Brandt-Andrews technique. In parts of Africa physiological management is taken to mean controlled cord traction but without a prophylactic oxytocic. In the United Kingdom it usually means no intervention of any kind, other than encouraging the mother to adopt a position which makes use of gravity, and to push out the placenta when signs of separation have occurred.

5.3 Management of the third stage of labour by the traditional birth attendant

General considerations

The majority of the world's women are delivered at home in situations where if PPH does occur, recourse to skilled assistance is usually very difficult. The majority of deaths from PPH probably occur under these circumstances (15). Special consideration must, therefore, be given to the management of the third stage of labour by traditional birth attendants (TBAs), or other community members who have been given a short training to improve their management of domiciliary deliveries.

Traditional practices vary a great deal. In general the routine management of the third stage is non-interventionist. In some cultures, herbal teas may be given at this time, in some cases with the intention of promoting delivery of the placenta. Various forms of uterine massage and traction on the cord are also sometimes used.

While it has been shown in the context of professional midwifery practice that active management of the third stage of labour is safer than a non-interventionist approach, it has to be recognised that trained TBAs vary a great deal in their levels of skill and experience. In some situations it is not possible for birth attendants to obtain much experience because communities are too small or too scattered. Other TBAs carry out many deliveries because women have access to their services, and their role in the community is a well-recognised one, sometimes carrying high status. In addition, the length of training given to TBAs in different parts of the world also varies greatly. These issues must be taken into account when making decisions about the particular method of third stage management to be followed including the use, in this context, of oxytocics, the stimulation of uterine contractions and methods of delivery of the placenta.

Oxytocic stimulation of uterine contractions

Very few TBA programmes currently provide the trained TBA with any oxytocic drug. Documentation on this matter is poor, but it was the Group's impression that if any drug is provided it is oral ergometrine tablets, intended for use in the treatment of PPH rather than its prevention. This may reflect the general reluctance to encourage an active approach to the third stage by TBAs and the absence of experience with any alternative to parenteral oxytocics in obstetric practice.

One alternative which has been tried is the encouragement of early suckling by the baby, based on the hypothesis that suckling would increase uterine contractility by stimulating oxytocin release. This has recently been studied in Malawi (8) in a randomised controlled trial. The trial was conducted on deliveries attended by TBAs. The TBAs were given a refresher course in third stage management. After delivery the baby was placed between the mother's legs, and after a delay of three minutes, the cord was tied and divided. In the experimental group the birth attendant would then put the baby to the mother's breast. The placenta was delivered by gravity and maternal effort alone. The attendant was taught to rub-up a contraction of the uterus after the delivery. The PPH rate was 7.9% in the experimental group and 8.4% in the control group, the mean blood loss respectively 258 ml. and 256 ml. These differences were not statistically significant. Analysis of the individual birth attendants' results also showed no significant difference between the groups.

The failure to demonstrate a difference between the groups may be explained by a delay in the effective stimulation of oxytocin release by suckling. A hospital based observational study of suckling in 76 mothers, carried out in association with the above trial showed that 20 of the newborns suckled within five minutes of birth, and 53 by 10 minutes. The mean number of suckling movements achieved by those times being 8 and 23. The mean time of first suckling was 7 minutes 15 seconds after delivery (range 3m. 30s. to 15m). This means that in the great majority of women, placental separation would have taken place before any possibility of effective suckling had occurred.

If the baby's suckling cannot reduce the risk of PPH, it is possible that an alternative form of nipple stimulation may help. A study in Singapore (16) has demonstrated the effectiveness of self-applied digital nipple stimulation in pregnant mothers at term in increasing uterine activity index (the product of the intrauterine pressure and frequency of contractions) within three minutes of commencing nipple stimulation. The Group was, however, not aware of any work that had been done on the effect of nipple stimulation after delivery of the baby.

There is currently, therefore, no proven effective alternative to the prophylactic parenteral administration of an oxytocic drug given as part of the routine active management of the third stage of labour. The Group realised the difficulty of putting this into practice in some third world settings where problems of supply, sterilisation and misuse might preclude its use. However the strong recommendation of the Group was that, where acceptable, the practice of active management, including intramuscular prophylactic oxytocic administration, should be followed at the most peripheral/lowest level of the maternal health care system, as possible.

5.4 Management of the third stage in the health centre and hospital

Information from controlled trials indicate that oxytocic drugs used routinely in the third stage of labour reduce the risk of PPH by about 40% (typical odds ratio of 0.57, 95% CI = 0.44 - 0.73) (7), (9), (17). This implies that for every 22 women given an oxytocic, one PPH could be prevented. Available data are insufficient to assess the possible effects of this policy on the incidence of retained placenta, hypertension and other possible adverse effects.

The protagonists of non-intervention, passive, expectant or physiological management of the third stage of labour have argued (18) that the practice of active management is a cascade of intervention in which the prophylactic use of an oxytocic necessitates early clamping of the cord which then produces a need for controlled cord traction. They have argued that expectant management, that is, the use of gravity and maternal effort, is an equal or better alternative to active management of the third stage of labour. A randomized controlled trial of active versus physiological management of the third stage of labour was conducted in Bristol, U.K. (7). The active method used in this trial was that followed in most maternity units in England, namely giving a combined injection of oxytocin and ergometrine, clamping the cord early, and applying controlled cord traction with a protective hand on the abdomen helping to shear off the placenta and preventing uterine inversion. (19) The study showed that routine use of an oxytocic (5 units oxytocin and 0.5mg. ergometrine maleate), as part of the active management of the third stage, reduced the incidence of PPH and shortened the third stage. The reduction in the PPH rate was highly significant, the incidence being 17.9% in the physiologically managed group and 5.9% in the active management group.

The Group concluded that:

- in the case of women delivered by trained attendants, active management of the third stage of labour is superior to physiological management in terms of reducing the incidence of PPH and of shortening the length of the third stage;

- active management has not been shown to increase the risk of retained placenta;
- active management in which ergometrine is employed (either alone or in combination with oxytocin) produces an increased risk of a rise in blood pressure. Oxytocin alone should be used for hypertensive patients.

Recommendation

It is recommended that active management of the third stage of labour be used wherever appropriately trained staff are available. The reduction in the incidence of PPH is likely to have even greater beneficial effects in developing countries where many women are anaemic, and where the treatment of blood loss may present more problems than in developed countries.

5.5 Oxytocic drugs Choice of drug

Criteria to be taken into account in selecting the most appropriate oxytocic drug to use in specific circumstances should include the drug's effectiveness, cost, availability, route of administration, safety, stability, potential for abuse and the skills of health workers. Evidence of effectiveness has been assessed for the currently commonly used drugs in an overview of the evidence from controlled trials (20). This found no evidence to support the continued use of ergot alkaloids alone in comparison to oxytocin or a combination of oxytocin and ergometrine. Limited evidence suggests that the combination is more effective in reducing the risk of PPH than oxytocin alone, but this may be at the expense of a greater risk of producing temporary hypertension and vomiting.

The Group noted that in the third world ergometrine is currently the cheapest and most widely available oxytocic and although its use is associated with an increased risk of nausea, vomiting and raised blood pressure, it is likely to continue to be the most widely used oxytocic until clearer evidence of benefit for another oxytocic becomes available. It should not, however, be used for patients with raised blood pressure or cardiac disease.

Storage of ergometrine and oxytocin

Recent evidence has shown that ergometrine stored in peripheral health facilities in tropical countries may lose a considerable amount of its potency (21). Until the results of more detailed studies of the stability of oxytocics are available, they should be stored at a temperature between 2 and 8 degrees Celsius and should be protected from light. In essence this implies that they should be refrigerated.

The timing of prophylactic oxytocic administration

There is inadequate information on this subject. In view of this, and because of the risks of giving an oxytocic injection to a mother with an unrecognised multiple pregnancy, the oxytocic should be given after delivery of the baby and after the birth attendant is satisfied that the pregnancy is not multiple.

5.6 Other obstetric practices which have an effect on blood loss

Attention should be paid to other aspects of the management of labour and delivery which can affect the risk of PPH.

- The use of the partograph with alert and action lines may reduce the incidence of prolonged labour, and hence may also reduce the risk of PPH.
- Episiotomy performed too early results in excess bleeding. If episiotomy is deemed necessary, it should only be performed when the head is distending the perineum, so that delivery follows quickly after its performance.
- Where appropriate, the use of the vacuum extractor rather than forceps will reduce blood loss. The silicone cup may be better than the metal cup in this respect (22).

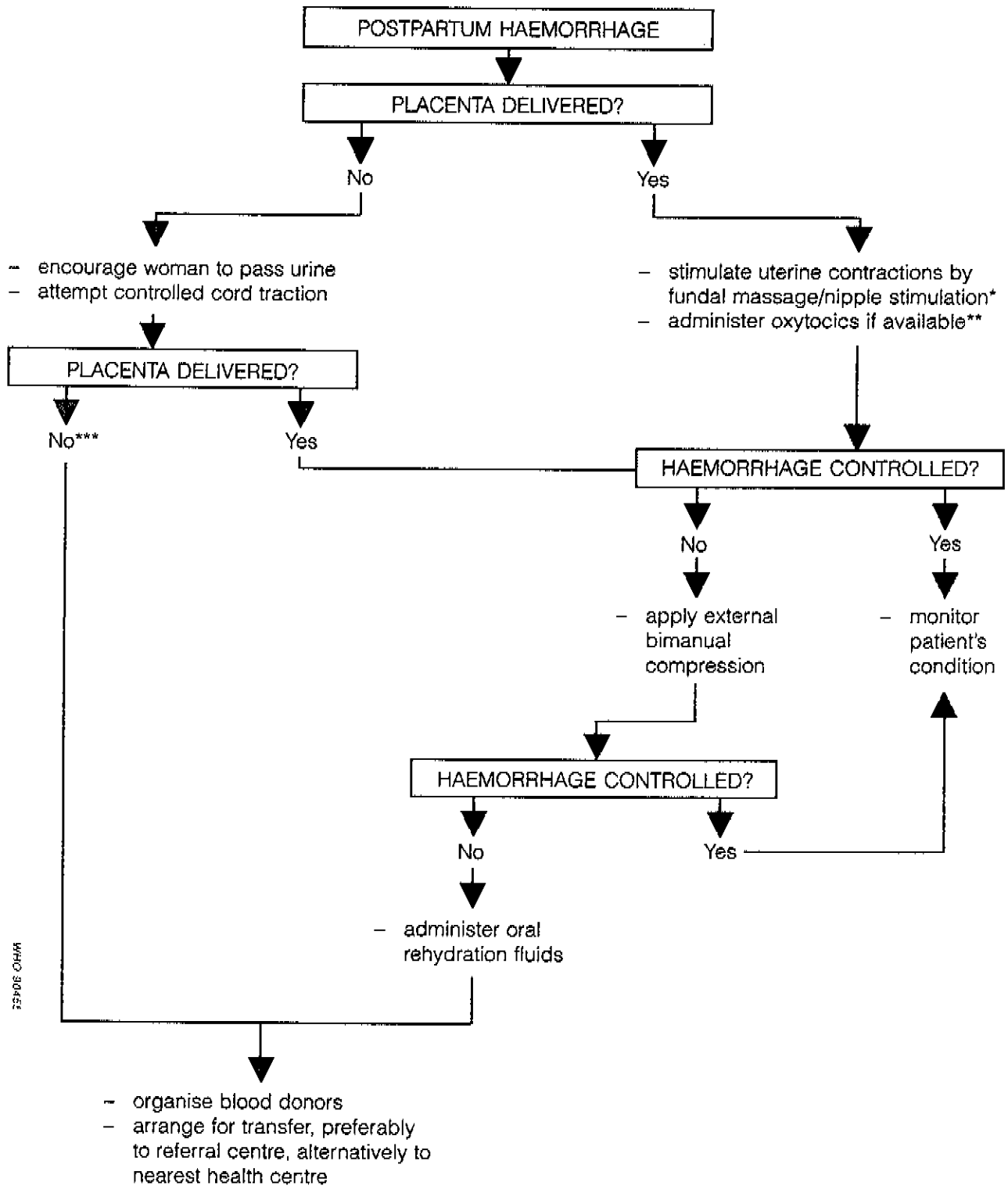
6. MANAGEMENT OF PRIMARY POSTPARTUM HAEMORRHAGE

6.1 Management of postpartum haemorrhage by the birth attendant with limited training

For a summary of the steps which can be taken by a TBA faced with a postpartum haemorrhage see Figure 1. Again the Group noted that the training, experience and circumstances of TBAs vary considerably in different parts of the world. However, on the principle that desperate situations often require desperate measures the Group reaffirmed the principle that skills and technologies should be made available as far out to the periphery of the health care system as possible.

If a woman is bleeding severely and the placenta has not been delivered systematic efforts should be made to remove it. First the woman should be encouraged to pass urine. If the Brandt-Andrews manoeuvre has failed to deliver the placenta, controlled cord traction should be attempted. During training, while it may be prudent to discourage TBAs from using cord traction, they should, however, be taught the importance of guarding the uterus with one hand when gently pulling on the cord with the other. The Group also recognised that while the performance of a manual removal of a placenta by a TBA is controversial, it is already carried out by TBAs in some countries and should not be censored if it is the only option left for saving the women's life.

Figure 1
Domiciliary delivery
(TBA with limited midwifery training)



* Research is needed on the efficacy of these procedures

** Research is needed on alternative methods of administration of oxytocics by TBAs.

*** Where there is no possibility of transfer, it may be necessary to train TBAs to undertake manual removal of placentae. Research is needed to determine the effectiveness, feasibility and value of such training.

If the placenta is delivered, the most important thing is to stimulate the uterus to contract. Fundal massage can be done by the mother if necessary. Putting the baby to the breast, or nipple stimulation, should be tried. If oral ergometrine is available it should be given; or if there is a health worker close by who has been taught to give parenteral ergometrine, he/she should be called. If these actions fail, the TBA should apply external bimanual compression. This involves placing a hand above and behind the uterus, pushing it forward and compressing it between this hand and the other hand placed on the lower abdomen. This should be continued while the woman is being transferred to a facility with a more skilled maternal health worker.

The need for transfer should be anticipated once a PPH is diagnosed and should not be delayed. Oral rehydration fluids or coconut water should be given and when the woman is transferred, potential blood donors should go with her. Temporary elevation of the legs for about twenty minutes is helpful in countering shock due to blood loss.

6.2 Management of PPH at a health or maternity centre

The recommended management of a woman with PPH at a health or maternity centre is summarised in Figure 2. It is assumed that in this type of facility the delivery is being managed by a midwife or an obstetrically-trained health worker, such as a clinical or medical assistant, and that third stage management has been active including the use of a parenteral oxytocic. If the placenta is still undelivered and controlled cord traction has not been tried, it should be attempted straight away.

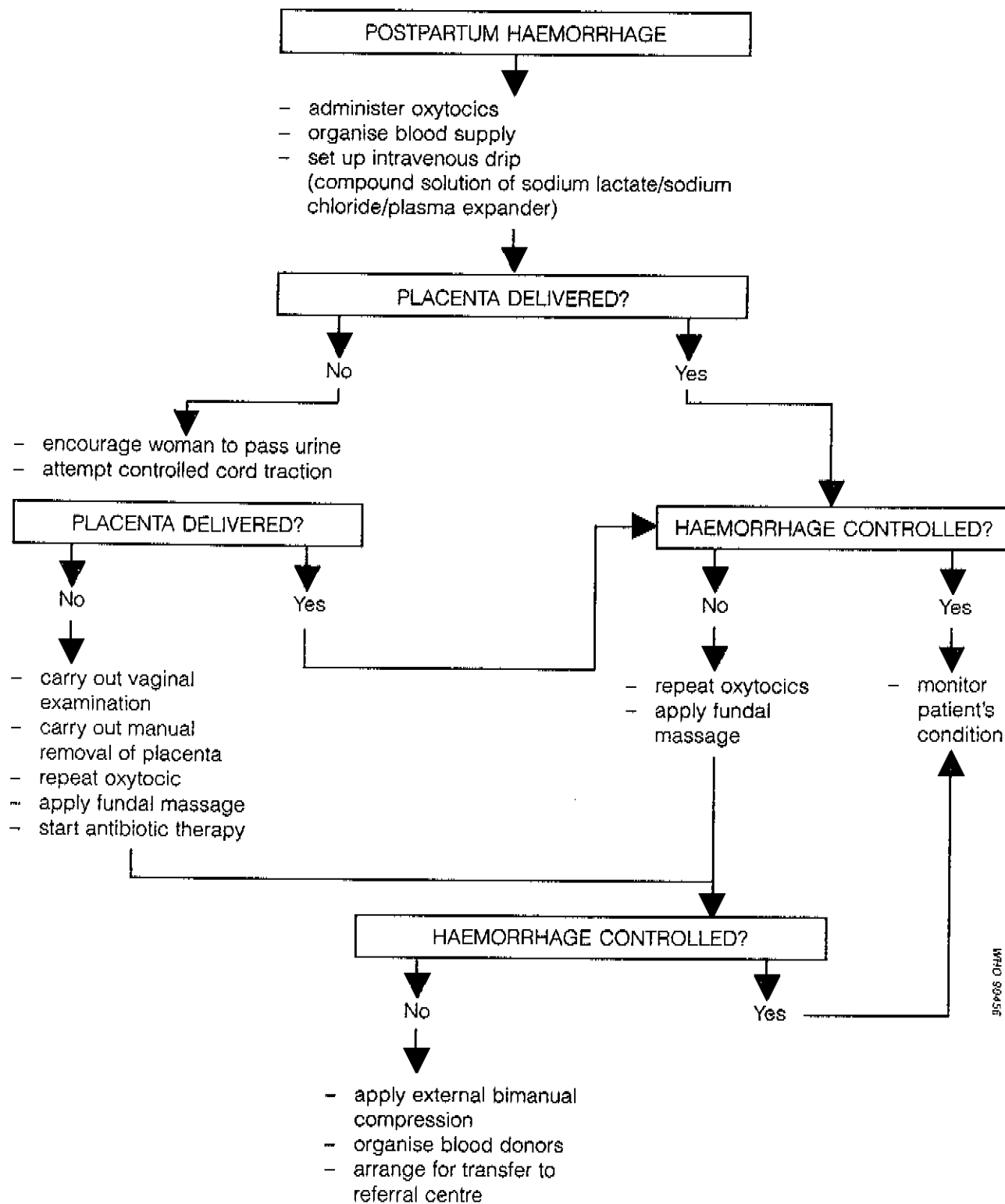
The following approach is then recommended (23).

1. React to excessive bleeding before 500 mls. has been lost.
2. Repeat the oxytocic either intravenously or intramuscularly.
3. Set up an intravenous infusion, preferably with normal saline. If oxytocin is available, put 40 units in 1 litre and run at 40 drops per minute. At this time the woman should be transferred as soon as possible to hospital.

If the placenta has not been delivered

4. Encourage the mother to pass urine, and then repeat controlled cord traction. If successful, examine the placenta to ensure it is complete. Keep the uterus contracted by massage of the fundus.
5. If controlled cord traction is not successful, if the cord breaks, or if part of the placenta has been retained, a gentle vaginal examination should be performed. If the placenta can be felt protruding through the cervix, it should be grasped with the fingers and steadily withdrawn from the uterus, which should be supported through the abdominal wall by the other hand.

Figure 2
Health centre
(nurse/midwife: limited operative facilities)

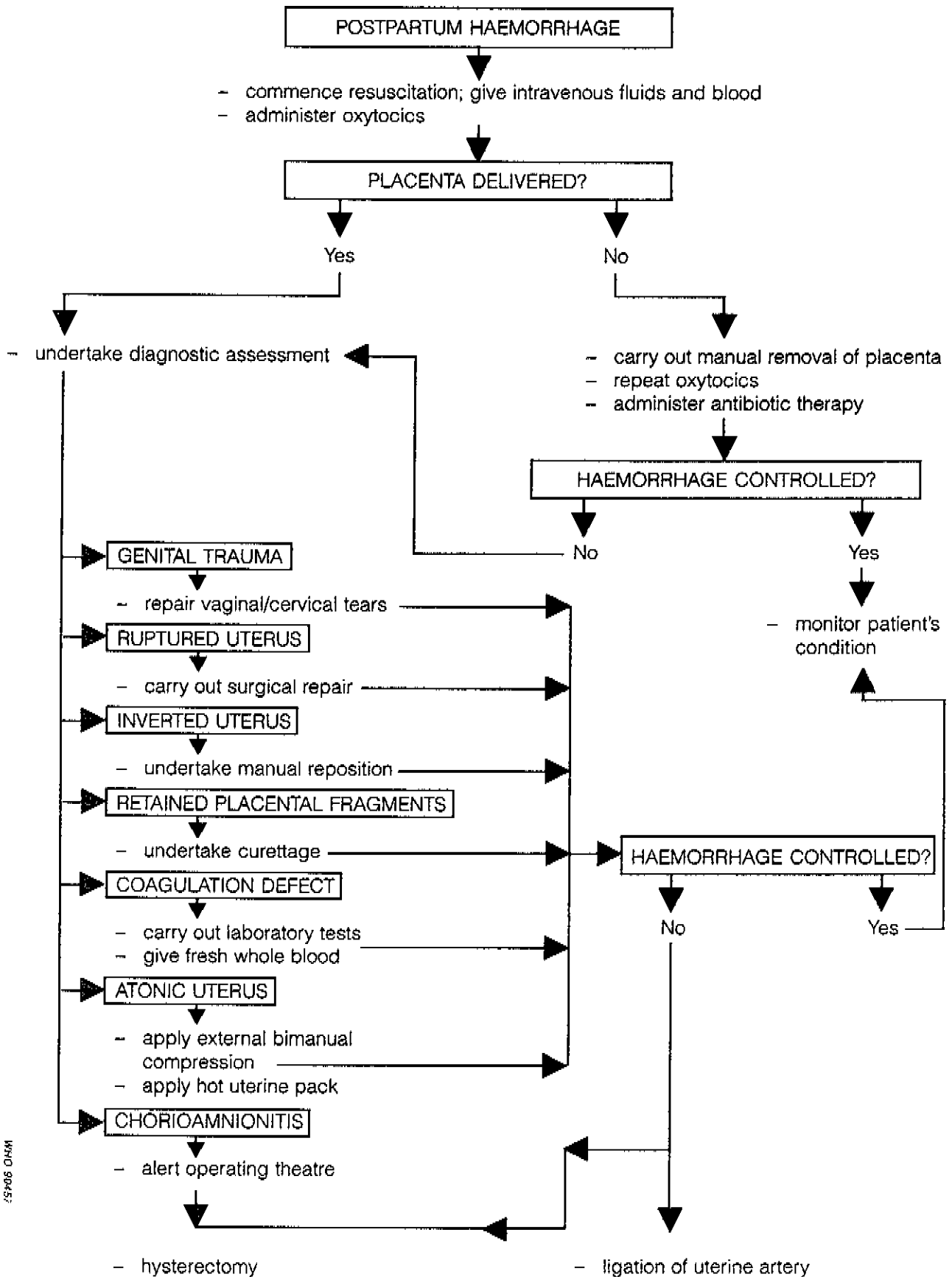


6. If the placenta cannot be removed in this way and there is still excessive bleeding, manual removal of the placenta should be done. It may be necessary to give an intravenous analgesic and/or sedative before undertaking this. After it has been carried out, a third dose of oxytocic should be given and the uterus massaged. Following manual removal the woman should be given a course of antibiotics.

If the placenta has been expelled/delivered

7. Continue to massage the uterine fundus to develop a sustained contraction.
8. Review the nature of the labour. If contractions were weak at the time of full dilatation, bleeding is probably due to a hypotonic uterus. If the baby's head was excessively moulded, the bleeding may well be traumatic in origin.
9. Re-examine the placenta to ensure that a cotyledon is not retained.
10. If bleeding persists, place the woman in the lithotomy position and with the aid of good light examine the vulva and vagina for lacerations which are bleeding. Pressure on each bleeding point will establish whether this is the chief source of haemorrhage.
11. Should a visible bleeding laceration prove to be the chief source of haemorrhage, it should be sutured immediately under local anaesthesia.
12. If there is no local source of bleeding in the vulva or vagina, bleeding should be controlled by bimanual compression. This is achieved by placing a rolled-up sterile sanitary pad inside the vagina, followed by a gloved fist. The other hand is then used to apply pressure to the fundus of the uterus so compressing the uterus between the hands. This method should effectively control haemorrhage from cervical and high vaginal tears and uterine rupture, as well as from an atonic uterus.
13. If bleeding persists, the patient should then be transferred as quickly as possible to hospital. When the transport is ready, the health worker should remove her or his fist and the pad from the vagina and observe whether bleeding has eased. If heavy bleeding recommences, bimanual compression of the uterus should be continued during transport and into the operating theatre of the hospital.
14. Every effort should be made to maintain the woman's general condition and correct shock. If it is available, a plasma expander should be given if shock is severe. If intravenous fluids are not available, oral rehydration fluid, coconut water or a similar fluid should be given by mouth to try to correct fluid loss. The woman should be kept warm.
15. Relatives prepared to give blood should be identified and accompany the mother to the hospital.

Figure 3
Referral centre
(doctor/obstetrician)



6.3 Management of PPH at first referral level

The management of PPH in a hospital is essentially the same as that described for the health centre, and is summarised in Figure 3. However, at a hospital there are extra skills and facilities available for managing severe or difficult cases.

1. When PPH has been diagnosed, blood should be taken for cross matching and preparation of blood for transfusion should be made early rather than delayed.
2. If the placenta has been removed and the uterus appears to be contracted but bleeding persists, an examination under anaesthetic for cervical and high vaginal tears should be made, and any necessary repair performed.
3. If the problem is a persistent atonic uterus, and bimanual compression has not controlled the bleeding, the woman may be given a general anaesthetic and a hot intrauterine pack put in place. This should only be attempted once.
4. If the hot pack does not arrest the bleeding, two surgical procedures are recommended for use at the first referral level. The first is mass ligation of the uterine arteries (24). The alternative is hysterectomy. Performing a subtotal hysterectomy may be faster.
5. If at any stage a coagulation defect is suspected and can be demonstrated, fresh whole blood should be given.
6. The Group also noted that in facilities where prostaglandins are available, an intramyometrial injection of Prostaglandin F₂ should be tried at the time when surgery is being contemplated. Alternatively Prostaglandin F₂ or Prostaglandin E₂ may be given intravenously. This has been shown to be effective. (25), (26), (27)

7. PREVENTION AND MANAGEMENT OF ASSOCIATED CONDITIONS

7.1 Retained Placenta Prevention

There is no certain way of preventing retained placenta, but some points can be made. It is possible that repeated uterine infection or radical iatrogenic curettage may increase the risk of a pathologically adherent placenta and consequently preventive measures can be inferred.

Retained placenta is less hazardous if it occurs in a referral centre where the skill to perform manual removal is available. Mothers who have had previous third stage complications should therefore be identified antenatally and sent to a maternity waiting home at the referral centre prior to the onset of labour. The Group noted the difficulty of obtaining a reliable history of the third stage of labour and recommended the wider use of the home-based mother's record in which details of successive pregnancies and deliveries are documented.

No method of third stage management has been shown to reduce retained placenta, and there is no evidence to support the contention that active management of the third stage increases the risk of it occurring. However, use of one of the standard methods to deliver the placenta (see section 5.1) by a skilled attendant is presumed to be superior to inactivity or the attentions of an unskilled person. This at least reduces the length of the third stage and the period of increased risk of a PPH while the placenta is in the uterus. During placental delivery, excessive cord traction should be avoided because of the danger of cord rupture and subsequent retention of the placenta.

Provided there is no bleeding, an hour should be allowed to elapse before the diagnosis of retained placenta is made. This reduces the number of manual removals which are needed. If an anaesthetic is to be given in order to do a manual removal of the placenta, a final attempt at delivery by cord traction should be made just prior to the induction of anaesthesia. This can be successful and avoids the dangers of manual removal and those associated with general anaesthesia.

Management

There is a danger of precipitating severe haemorrhage both by attempting a manual removal of the placenta, and by the process of transferring the mother. The Group agreed that if a woman has a retained placenta without accompanying haemorrhage, and it is possible to transfer her to the referral centre within six hours, then she should be transferred. However if transfer will take longer, then the midwife or health worker should attempt a manual removal of the placenta.

In the case of transfer the following steps should be taken:

- genital injuries should be repaired;
- intramuscular ergometrine should be given;
- an intravenous drip should be set up with normal saline containing oxytocin if available;
- antibiotics should be started;
- potential blood donors should be selected to go with the woman;
- the health worker should accompany the patient.

The available evidence suggests that the injection of oxytocic into the umbilical vein is of no value in the management of retained placenta (28).

The Group affirmed the importance of training midwives in performing manual removal of the placenta, especially if they are going to work in remote situations.

7.2 Secondary PPH

Definition

This is defined as bleeding from the genital tract between 24 hours and six weeks after delivery of the baby. There is no agreement about how much blood loss constitutes a secondary PPH

Prevention

Preventive measures must be directed at the two causes of secondary PPH, which are endometritis and retained products of conception. Infection should be avoided by clean techniques during delivery and prophylactic antibiotics should be employed in cases of rupture of the membranes for more than 12 hours during labour, prolonged labour, instrumental delivery and manual removal of the placenta. Vaginal examination of a woman with pre-term or premature rupture of the membranes should be avoided unless it is intended that labour be induced.

The placenta should always be examined carefully immediately after delivery to ensure that it is complete. Any retained tissue should be removed under a general anaesthetic before bleeding occurs.

Management

Immediate management in a maternity or health centre should consist of an intramuscular injection of ergometrine and the treatment of shock. If there is evidence, from the history of the third stage (or because of the subsequent passage of tissue-like material) that there are retained products, or if bleeding has been excessive, the woman should be transferred to hospital with an intravenous infusion in place and antibiotics having been started. If there is no evidence of retained products and bleeding is not sufficient to cause shock, the woman should be treated with antibiotics alone. If a second distinct haemorrhage occurs, or if the woman's condition has not settled within 48 hours, she should be transferred.

In hospital, examination of the uterus under anaesthesia should be carried out in cases where it is suspected that there are retained products. However the Group emphasised that before this is undertaken it is important that the woman's condition is stable, and recommended 24 hours of antibiotics and, if necessary, a blood transfusion before carrying this out.

7.3 PPH after caesarean section

Prevention

The increased probability of a PPH occurring after a caesarean section should be recognised in patients who have an antepartum haemorrhage during the pregnancy, particularly if this is due to placenta praevia, and in women who have had a previous caesarean section. Caesarean section should therefore be performed by the most experienced operator available.

In all cases careful exploration of the uterine cavity before closure, and careful suturing of the angles before closure of the rest of the wound is recommended.

The oxytocic generally recommended at caesarean section is oxytocin in order to reduce the risk of vomiting. However some people prefer ergometrine despite the increased risk of vomiting due to its quicker mode of action. In caesarean deliveries carried out for obstructed labour where PPH is more likely, the case for the use of ergometrine is stronger. In all cases where there are any prior risk factors for PPH, a solution of 20 units of oxytocin in a litre of normal saline should be administered intravenously at a rate of 20 drips per minute as soon as the baby has been delivered.

Because of other factors, observation of the patient for PPH after caesarean section may be less than optimal. The highest risk is within the first half hour and observation should be continuous during this period.

Management

Management consists of the immediate injection of ergometrine intravenously or intramuscularly. An intravenous infusion with 40 units of oxytocin in one litre should be run in at 40 drops per minute to ensure contraction of the uterus.

PPH after caesarean section is particularly dangerous and the most important principle in this situation is to take the woman back to theatre early rather than late.

7.4 Acute inversion of the uterus

Prevention

Not all cases of acute inversion can be prevented, but correct management of the third stage of labour minimises the risk that it will be caused by incorrect cord traction by the attendant.

Management

Acute inversion of the uterus is a rare condition, but midwives and other health workers trained in obstetrics should be aware of it. They should not only be able to recognise a complete inversion visible at the vulva, but should know that it may present as a cause of haemorrhage and shock when "incomplete" and still in the vagina. If the inversion is recognised in the acute phase (less than five minutes after inversion), replacement should be attempted immediately, possibly after giving a parenteral analgesic. The uterus should be replaced by pressure at the sides rather than the apex. After replacement, ergometrine should be given, an infusion set up, and antibiotics started. There is disagreement about whether an adherent placenta should be removed before or after replacement of the uterus as the presence of the placenta may make replacement difficult.

If the inversion has been present for much more than five minutes in a patient who has delivered at a health centre, the patient should be transferred to hospital with a drip and antibiotics. In hospital, two possibilities are available for management. The first is O'Sullivan's method using hydrostatic pressure (29). The second, employing a tocolytic to relax the cervical ring, may also be successful (30). This method is as follows. Give an intravenous bolus of a tocolytic drug. This takes less than one minute to produce uterine relaxation. Replace the inversion and keep the hand inside the uterus until it contracts. This may be achieved using ergometrine or oxytocin or preferably, if available, by the intramyometrial injection of a prostaglandin, given through the abdominal wall. General anaesthetic is not always necessary for this method.

8. MANAGEMENT OF HYPOVOLAEMIC SHOCK

All trained health workers should be capable of managing shock from acute haemorrhage by giving intravenous fluids. Compound solution of sodium lactate is considered the fluid of first choice, and normal saline (sodium chloride) if this is not available.

These fluids should be available at all maternity and health centres. The Group considered that plasma expanders (polygeline and dextran 70) should also be made available at the health centre level. Polygeline is to be preferred because dextran may make the subsequent cross-matching of blood difficult.

9. EMERGENCY TRANSFER

When a mother who has delivered at home has a PPH, she needs the assistance of a midwife or obstetrically trained health worker urgently. There are two alternative ways of receiving assistance. The mother can be transported directly to the health centre or hospital by her attendant and relatives. Alternatively, using the 'flying squad' principle, a suitably equipped midwife can go to the woman and give the necessary resuscitation and emergency treatment at her home before transferring her. Speed of intervention and avoidance of the danger of travel while still untreated are the main considerations. Local circumstances will dictate which has to be given more weight and which method is chosen. Where feasible the 'flying squad' approach has many advantages, principally that of avoiding the possible exacerbation of the haemorrhage during transportation of the mother to the health facility. To be effective in this situation the midwife needs to have the skill to perform a manual removal of placenta and have a supply of a parenteral oxytocic, intravenous fluids and an intravenous administration set.

In many situations in the developing world the 'flying squad' system cannot be instituted for a variety of reasons, and there commonly are immense difficulties in arranging urgent transfer of obstetric emergencies. The reasons for this are multifactorial and not easily overcome. The Group therefore would like to emphasise the importance of planning and strengthening referral and transfer (alert and transport) systems. Agreements must be reached on how peripheral health workers and TBAs will communicate with the referral centre. Alternative communication systems should be planned in case of failure of one method. Where communications are a problem, the assistance of agencies like the police, or other radio or telephone systems should be formally arranged by the health administration of the area. Transport also should be planned in anticipation of emergencies. Communities might be encouraged to identify their transport resources and agree on how costs could be borne.

10. RECOMMENDATIONS FOR RESEARCH

10.1 Introduction

The types of future research required may be divided into the following categories - audit of PPH, audit of management of the third stage of labour and of PPH, pharmacological studies, clinical trials and operational field trials.

10.2 Audit of PPH

There is a need to collect accurate and reliable data concerning PPH as present knowledge of the characteristics and circumstances surrounding PPH in developing countries is inadequate. It is clear that this must include all cases whether occurring in hospital or the community. The Group suggested that the following are priorities:

Studies to document:

- precise causes and associated factors;
- the proportion of cases and fatalities occurring in women delivering in hospital, in women attended at home and those unattended at home.

Maternal mortality due to PPH:

- types of PPH associated with maternal mortality;
- how these differ from non-fatal PPH;
- avoidable factors associated with these cases.

This information may best be gathered by selective but representative enquiries in several different third world settings, e.g. countries; cities; hospitals; homes.

10.3 Audit of management

By this is meant information on what methods actually are in use both for managing the third stage of labour and for the management of PPH. This will be particularly important in the case of TBAs as it is important to establish what TBAs are doing and are capable of doing.

10.4 Pharmacological studies

Stability of oxytocic drugs

Information has established that many drugs, including ergometrine, have reduced potency after they have been exposed to the high ambient temperatures and strong light that may be involved in transportation from the source of manufacture to their destination in developing countries. For this reason a study is being supported by WHO to assess the potency of four oxytocic drugs exposed to a series of environmental variables. The Group supported the idea of this research.

Alternative drug delivery systems

There is at present no established method of preventing or treating PPH at the domiciliary/traditional birth attendant level. The Group therefore felt that WHO should give high priority to any research proposals that set out to investigate the effectiveness of formulations of different oxytocic drugs suitable for oral, rectal or vaginal delivery. Such formulations would have significant advantages over those for parenteral administration currently available, which are only suitable for use by extensively trained attendants.

An oral preparation of ergometrine is already available. The Group felt that research into the effectiveness of this preparation is needed in terms of speed of absorption, etc. Three components of research concerned with an alternative delivery system were identified. Firstly, pharmacological research is needed to establish its absorption in the immediate postpartum period and feasibility for use. Thereafter clinical trials would be needed to assess its efficacy, safety, reliability and acceptability. Lastly operational studies at TBA level in a developing country would be vital. These should be carried out both in an isolated rural setting and in urban areas.

New drug delivery systems which can be envisaged are:

- buccal or sub-lingual tablet;
- vaginal pessary;
- rectal suppository;
- nasal spray;
- single dose, pre-packed, disposable sterile injection.

In this case there would be a need in each case for pharmacological evaluation of the new preparations, clinical trials, and operational studies in developing countries at TBA level.

Of these new drug delivery systems, that of rectal suppositories appears to offer the most promise. This is because:

- the accoucheur may easily place one in the rectum after delivery;
- it is less likely to cause vomiting than an oral preparation;
- if vomiting does occur it will not expel the drug;
- the potential absorption problems in the stomach during the immediate postpartum period are avoided;
- the dose can be exact, unlike with a nasal spray;
- limited potential for abuse;
- no risk of needle stick injuries;
- cheap and easily transportable;
- no need to be sterile.

The Group recommended that attempts to prepare and evaluate rectal suppositories of ergometrine and oxytocin should begin as soon as possible.

10.5 Clinical trials

Nipple stimulation

Nipple stimulation, antenatally and in the puerperium, is known to increase uterine contractility, but this has not been studied in the immediate postpartum period. If it produces a similar response at that time it might be more effective in decreasing PPH than immediate breast suckling. A study was proposed in which uterine contractility could be assessed by the measurement of placental venous pressure, recorded via an intraumbilical vein catheter, in the immediate postpartum period. This could be a controlled study of the effect of nipple stimulation versus no oxytocic versus oxytocin plus ergometrine injection. The Group recommended that such research be supported, although it questioned the ability of the technique to reflect intrauterine pressure. This aspect will require careful monitoring.

It was also suggested that, if possible, the findings should be correlated with serum oxytocin levels, as described by Burd et al. (31), using phenanthroline and edetic acid to inhibit the placental enzyme oxytocinase.

Cord clamping study

There has been a considerable amount of work concerned with investigating the effect of different timing of cord clamping upon the amount and rate of placento-fetal transfusion. There is agreement that delayed cord clamping allows a larger placento-fetal transfusion. However differences between the studies, and their small size, mean that confident conclusions cannot be drawn concerning the effects of early or delayed clamping on neonatal or maternal outcomes, including that of PPH (32). If a large randomized controlled trial (vide infra) were to be mounted to compare oxytocics as part of the active management of the third stage, a study design should be used which would allow assessment of the effects of cord clamping.

Oxytocin versus ergometrine as a prophylactic

It has already been stated that ergometrine is the cheapest and most widely available oxytocic in the third world. However there are more complications and risks associated with the use of ergometrine than with oxytocin. The Group therefore considered that a randomized controlled trial of oxytocin versus ergometrine where both would be used as part of the active management of the third stage should be supported. Such a study should be undertaken in at least two centres, one of which should be in the third world, where the population would be less prepared to withstand a PPH. The effect of severe anaemia upon PPH and the effectiveness of oxytocin versus ergometrine in anaemic patients are important questions which could be answered by such a study. The threshold for excluding patients with raised blood pressure or other signs of preeclampsia would need careful consideration in an African setting. It was also suggested that a third study arm could be added to the trial so that oxytocin could be tried in dosages of both 5 and 10 units.

Active versus physiological management of the third stage of labour

The Bristol Third Stage Trial (7) has shown that use of a prophylactic oxytocic with an active approach to third stage management results in less PPH than physiological management without an oxytocic. However, the report of the trial noted that the Bristol midwives and obstetricians were unfamiliar with the policy of physiological management before the start of the trial, and that this could have been a factor in mediating the results. The authors concluded that the trial should be replicated in a setting in which physiological management is the norm. It is recommended that this be done. The Netherlands might be a suitable place for such a trial as one third of all deliveries are conducted by trained midwives who practice non-intervention. Also in hospital practice there is a wide variation in management protocols. These include active management only in cases in which there is an increased risk of third stage complications, as well as a method in which signs of placental separation are awaited, after which the placenta is delivered either by maternal effort, Pastor/Calkins or a modified Brandt-Andrews method.

The hypotheses to be tested in such a study should be that active management with oxytocics will reduce:

- amount of blood loss after delivery;
- the need for further therapeutic oxytocics;
- the incidence of PPH;
- the need for blood transfusion;
- the incidence of retained placenta and the need for manual removal.

10.6 Technical Research

Present methods of measuring blood loss are inaccurate, and there is a need for new and reliable methods of assessing postpartum blood loss.

10.7 Operational field trials

There is a need for operational field trials when current methods identified as being effective in the prevention and management of PPH in well-resourced centres are transferred to underprivileged areas where there are staff and skill shortages. The aim of these studies would be to assess whether methods developed under different conditions are applicable and effective in those settings. It was agreed that two-stage studies should be carried out in several underprivileged centres:

- audit of current third stage management, including rates of PPH and associated morbidity and mortality;
- a controlled trial of introducing active management.

11. A WHO clinical trials service

In discussing the need for research, the Group came to appreciate the many difficulties and constraints experienced by researchers, particularly those attempting research in third world settings. It was concluded that the establishment of a 'clinical trials service' by WHO could greatly facilitate the performance of quality and appropriate research.

Such a service could ensure firstly, that funded research is both necessary and appropriate to the needs of the third world in particular; and also that funded research does not unnecessarily duplicate research which has already been properly carried out, or is being conducted contemporaneously elsewhere.

Other functions of the service could be:

- to prepare and circulate guidelines which would assist proposers of research to design protocols suitable to answer the questions being addressed;
- to provide a data analysis service for researchers who lack the appropriate facilities or skills;
- to provide a consultative service which could "troubleshoot" and lend support to investigators either by phone, fax, letter or by visiting the research project site.

12. Dissemination of information

As a major cause of both maternal death and morbidity, PPH is the concern of many different groups of people. These would probably include the following: governments; health departments; ministries of health; health administrators; hospitals; obstetricians; midwives; primary care physicians; TBAs; women's groups; journalists.

Many of these would benefit by knowing the conclusions and recommendations of this Working Group, but different styles of reports and information packages will be required for the different groups.

Achieving education on this subject may involve more than simply providing information. This is particularly so for health professionals where other styles of education, like hospital retraining programmes, may be needed. A specific requirement may be a phantom model which can be used in teaching active management of the third stage and manual removal of the placenta.

13. Conclusion

PPH is one of the most common causes of maternal death in developing countries, its relative contribution being greater the less-well developed the maternity services. Reasons for this include the fact that only a small proportion can be anticipated through the mother's previous medical history, and the serious consequences are therefore only rarely preventable by use of the risk approach. Also, the condition may progress rapidly so that the mother is frequently seriously ill or has died before transfer and skilled care can be arranged. PPH will remain a serious problem as long as births at home are attended by relatively unskilled staff, and as long as women are delivered in isolated maternity centres which lack the capability for manual removal of the placenta and blood transfusion.

In some countries flying squads have been used extensively to overcome such problems at a certain stage in the development of the services. Because of economic constraints and underdeveloped transport systems, however, this method is unlikely to be widely applicable in many present day developing countries

To counter these problems the Group believes that, wherever possible, existing technologies for the prevention and control of PPH should be taken as far down the health care system as possible. Managers of obstetric and midwifery services are urged to take action on this recommendation as soon as possible. Existing technologies are not suited for use by auxiliary staff and TBAs. There is, in particular, a pressing need for the development of an effective oxytocic which does not need to be administered parenterally.

The above recommendations are probably the most important made by this Working Group. They and others are listed in the following summary of the Group's recommendations. It is hoped that they will be heeded, and that we can rise to the challenge of defeating PPH and so making childbearing safer for all women.

14. Summary of Recommendations

Epidemiological research should be conducted to identify the causes and associated risk factors of death from PPH, and also of severe cases of PPH where death was averted (Sections 3.7 and 10.2).

Women at high risk of PPH should be identified and referred in the antenatal period to the appropriate level of care (section 4).

Active management of the third stage of labour, which includes the routine use of prophylactic oxytocics, should be employed wherever appropriately trained staff are available (Section 5.1). This method of management should be taken as far down the health care tree as is possible (Section 5.3)

Ergometrine and oxytocin should be stored in the dark and between 2°C and 8°C. In essence, this means that in the tropics they should be refrigerated. (Section 5.5)

In clinical practice, the attendant should react to postpartum bleeding before 500 mls. has been lost. Likewise, when bleeding cannot be controlled arrangements for transfer should be made in good time (section 6).

Midwives should be trained in manual removal of the placenta, especially if they are going to work in remote situations (Section 7.1). A phantom model which can be used in such training is needed (Section 12).

All trained health workers should be capable of managing shock from acute haemorrhage by giving of intravenous fluids (Section 8).

Referral and transfer systems must be planned in advance, and generally strengthened (Section 9).

Pharmacological studies are needed

- to determine the stability of oxytocic drugs under different conditions of temperature and light (section 10.4).
- to develop alternative oxytocic drug delivery systems. Attempts to prepare and evaluate rectal suppositories of ergometrine and oxytocin should be undertaken (10.4)

Research is needed

- to determine the incidence of postpartum haemorrhage and mortality rates and the circumstances leading up to them (epidemiological research);
- to audit third stage management practices;
- to determine the effect of nipple stimulation on oxytocin release and uterine contractility;

- to study the effect of different timing of cord clamping on blood loss and PPH rates;
- to compare the relative value of oxytocin, ergometrine and a combination of the two, when used as part of the active management of labour;
- to replicate a previous study comparing physiological with active management of the third stage of labour in a unit where physiological management is the current routine practice (Section 10.5).

There is need for more reliable methods of assessing postpartum blood loss (section 10.6)

Operational field trials will be required to test methods of control of PPH in under-privileged areas. (Section 10.7)

WHO should consider developing a clinical trial service to facilitate the performance of appropriate research. (Section 11).

As a major cause of maternal death PPH is a concern of many different groups of people. Knowledge about the subject should be disseminated widely. (Section 12).

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WHO TECHNICAL WORKING GROUP ON POSTPARTUM HAEMORRHAGE

GENEVA, ROOM X.10, 3-6 JULY 1989

AGENDA

Monday 3 July

1. Opening and welcome
2. Introduction of Participants
3. Selection of Chairman and Rapporteurs
4. Introduction of agenda and objectives.
- Brief discussion of materials brought by participants
5. Presentation of background paper.
- Discussion and identification of important issues arising out of background paper.
6. Discussion of Objective 1 including: -
incidence, epidemiology and predictability of primary PPH.
7. What can be done antenatally to reduce the incidence and severity of PPH.

Tuesday 4 July

8. Management of the third stage of labour
9. Treatment of established PPH
10. Prevention and management of other conditions relevant to PPH - retained placenta, secondary PPH, PPH after caesarean section, acute inversion of uterus.
11. Discussion of Objective 2.
Issues requiring further clarification - research
 - a) Physiological mechanisms.

Wednesday 5 July

- b) antenatal procedures.
- c) measurement of blood loss (proposal from China).
- d) treatment with drugs.
What is the best drug for prophylactic use?
- e) stability of oxytocic drugs (proposal).
- f) drugs for use by TBAs.
- g) physical methods of management of PPH.

Thursday 6 July 1990

- h) emergency transfer of patients with PPH and retained placenta.
12. Other research issues
13. Recommendations for further action.

SAFE MOTHERHOOD INITIATIVE
Informal Meeting on Prevention and Better Management
of Postpartum Haemorrhage

World Health Organization, Geneva
Room X.10, 3-6 July 1989

List of Participants

- Dr O.O. Adetoro, Department of Obstetrics & Gynaecology, University of Ilorin,
P.M.B. 1515, Ilorin, Nigeria
- Dr Iain Aitken, Postgraduate Coordinator, Department of Community Medicine,
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- Dr Colin H.W. Bullough, South Tyneside Health Authority, South Shields General
Hospital, Harton Lane, South Shields, Tyne & Wear NE34 OPL, United Kingdom
- Dr Mahmoud Fathalla, Dean, School of Medicine, Assiut University,
P.O. Box 30, Assiut, Egypt *
- Mrs Gladys Kusi-Yeboah, Senior Nursing Officer, Labour Ward, Department of
Obstetrics and Gynaecology, Korb-Bu Teaching Hospital, Accra, Ghana
- Dr Walter Prendiville, Department of Obstetrics & Gynaecology, The University
of Western Australia, King Edward Memorial Hospital for Women, Subiaco, W.A.
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- Dr K. Bhasker Rao, Consultant Obstetrician & Gynaecologist, 'I' Block-63,
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- Dr Osborn Viegas, Head, Department of Obstetrics & Gynaecology, National
University Hospital, Lower Kent Ridge Road, Singapore 0511,
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- Dr J. van Roosmalen, Secretary, Consultancy for Maternal Health and Family
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* Only able to attend part of the meeting. Dr Fathalla is currently
Director, WHO's Special Programme of Research, Development and Research
Training in Human Reproduction.

WHO Secretariat

Mrs Carla Abou Zahr, Technical Officer, Maternal and child Health

Dr Hans V. Hogerzeil, Action Programme on Essential Drugs

Dr Barbara Kwast, Scientist, Maternal and Child Health

Dr Gladys Lopez, Health Laboratory Technology and Blood Safety

Mrs Erica Royston, Statistician, Maternal and Child Health

Dr Godfrey Walker, Manager, Safe Motherhood Research,
Maternal and Child Health