



The Partograph

A MANAGERIAL TOOL FOR THE
PREVENTION OF PROLONGED LABOUR

SECTION IV
Guidelines for operations research on the
application of the partograph



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THE PARTOGRAPH

SECTION IV

GUIDELINES FOR OPERATIONS RESEARCH ON THE
 APPLICATION OF THE PARTOGRAPH IN THE
 MANAGEMENT OF LABOUR, WITHIN THE SAFE MOTHERHOOD INITIATIVE

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GUIDELINES FOR OPERATIONS RESEARCH ON THE
APPLICATION OF THE PARTOGRAPH IN THE
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A. Introduction

The tragedies of obstructed labour and rupture of the uterus comprise one of the five major causes of maternal mortality and morbidity in developing countries.

The number of maternal deaths due to rupture of the uterus and/or obstructed labour varies between 4% and 70% of all maternal deaths, amounting to a maternal mortality rate of as high as 410/100,000 live births. The phenomena of obstructed labour and rupture of the uterus have been described extensively since the early 1950's. The literature suggests that in many countries maternal mortality due to these causes is almost as severe in the 1980's as it was thirty years ago. In addition, significant maternal morbidity is associated with prolonged labour, post-partum haemorrhage and infection both being more common than among women with short labours.

The major constraint to the prevention of prolonged and obstructed labour is the accurate and early recognition of possible cephalo-pelvic disproportion (CPD) either before or during labour. Particularly in the developing world, all labours should be considered a trial of labour, as cephalo-pelvic disproportion is the most common reason for intervention in the course of labour. In many societies, in the majority of primigravidae the fetal head is not engaged at the onset of labour even though the pelvis is adequate. For this reason all labours should be monitored closely in order to identify delay at an early stage.

The partograph acts as an "early warning system" in the early detection of CPD and may be used to assist:

- referral decisions in rural maternity centres
- intervention decisions in hospitals
- ongoing evaluation of the effect of interventions

The partograph has been in use for some years in a number of countries, and used extensively in several, with a positive feedback that it is an inexpensive, effective, adaptable and visual method of assessing progress (or lack of it) in labour, and in detecting early prolonged or obstructed labour.

It is therefore advocated as a tool to assist in the management of labour in the maternity services of a country.

B. Background to Operations Research

Although a considerable amount of experience and information on the use of the partograph has been accumulated in the past 15-20 years, it is not in use in a great many countries and there are significant gaps in our knowledge. In particular, there has been little published evidence of the practical application of the partograph in peripheral centres where it is thought it may be a particularly useful tool. This operations research protocol offers guidelines on how to introduce the partograph and how to evaluate its impact on labour management and outcome. It should be read in conjunction with the Manual on the Use of the Partograph produced by WHO. (WHO/MCH/88.3, WHO/MCH/88.4, WHO/MCH/89.1)

The partograph described in the Manual has been designed by a WHO working group and is based on pooled experience. It represents the simplest possible compromise based on research in different parts of the world on partographs in use to date. Although this partograph is recommended (and can be supplied by WHO), any centre undertaking Operations

Research on the partograph is free to adapt the WHO partograph or use a pre-existing partograph and to evaluate it as appropriate to that setting.

It should, however, be noted that operations research is not concerned with the construction of nomograms for a particular population, but in the practical application of the knowledge of partographs gained worldwide to date.

C. Appropriate Centres for Operations Research

The partograph can be used by any person trained in midwifery who can perform accurate vaginal examinations to assess cervical dilatation in labour and can then accurately plot that dilatation on the partograph. It can therefore be used by specialist obstetricians, general medical officers, nurses, midwives, or medical assistants or nurse aides with training in midwifery. It can be used in peripheral or central health institutions but cannot be used by birth attendants who cannot perform vaginal examinations or plot the course of labour graphically.

It is recommended that centres wishing to undertake Operations Research conduct a minimum of 500 deliveries per year. At least 1000 deliveries are likely to be necessary to accumulate meaningful results and the research should not be undertaken over a period longer than 2 years. However, smaller centres conducting fewer deliveries are encouraged to participate and their results may be pooled. For example 5 health centres each conducting 200 deliveries per year might feed referrals into a district hospital conducting 1000 deliveries per year. Under these circumstances, the partograph is probably best introduced into the hospital first and then its use expanded into health centre. This is described in more detail under Methodology below.

Operations research conducted in the situation described above is particularly encouraged as information on the value of the partograph in making decisions about transferring labouring women is particularly lacking. However, any centre wishing to introduce the partograph is encouraged to do so, adapting it as they feel appropriate to their local needs.

The WHO manual on the use of the partograph does not offer specific guidelines on the management of labour once the action line on the partograph is reached or crossed, although broad options are suggested. If managed appropriately, by this point all such cases should be in a hospital with expertise and facilities available to augment labour and/or conduct Caesarean Section. Precise management will vary from place to place, and research into various possible lines of management can, of course, be carried out in conjunction with that described in this protocol.

D. Protocol Objectives

1. To assess whether an education programme for health workers will result in correct application of the partograph.
2. To determine what effect introduction of the partograph in rural health centres has on the rate of referral of women in prolonged or obstructed labour.
3. To determine the effect of the introduction of the partograph on the incidence of prolonged labour, of augmented labour, and of operative delivery.
4. To determine whether appropriate interventions based on the partograph will reduce maternal and perinatal complications.

E. Hypotheses behind Operations Research Protocol

1. Nurse-midwives can learn to use the partograph and its correct application in practice.
2. The use of the partograph will result in an appropriate level of referral from health centre to hospital.
3. The use of the partograph in hospital will correctly identify women whose progress in labour is abnormal and who require appropriate intervention.
4. Appropriate referral and correct recognition of abnormal progress in labour will decrease maternal and perinatal complication.

F. Methodology of Operations Research

There are six phases of the operations research:

1. Collection of data prior to the introduction of the partograph
2. Introduction of the partograph by means of a training programme
3. Evaluation of the training programme
4. Collection of data after the introduction of the partograph
5. Analysis of data both before and after introduction of partograph
6. Dissemination of results and discussion of implications

G. Detailed Methodology

1. Collection of data prior to introduction of partograph

(a) Method of data collection

This data may be collected retrospectively or prospectively as soon as a centre is identified for operations research but before the partograph is introduced. The data available retrospectively may be limited and will vary from centre to centre.

The use of retrospective data is open to two criticisms. Firstly that it may not be accurate and secondly that it cannot be contrasted with prospective data as factors other than the introduction of the labourgraph may have changed in the timescale involved and contributed to any change in outcome endpoints. However, it is proposed that the minimum data collected retrospectively should be of such a nature that gross inaccuracies are unlikely. Where doubts exist about the accuracy of retrospective data or none is available, prospective data accumulated before the introduction of partograph should be used. If this is necessary, the period studied should not run for more than 1 year prior to introducing the partograph to allow the total study to be completed within 2 years, and to achieve comparable numbers in each group.

In most rural health centres or hospitals in the developing world, other substantive changes in labour management over this timescale are unlikely.

b) Inclusion/exclusion data

Those cases to be included for data collection are:

1. Spontaneous labour
2. Singleton pregnancy
3. Gestation at least 37 completed weeks
4. Vertex presentation
5. No additional complications

Women with the following complications should be excluded:

1. Antepartum haemorrhage
2. Breech presentation
3. Multiple pregnancy
4. Premature delivery (before 37 weeks)
5. Pre-eclampsia and eclampsia
6. Elective Caesarean Section
7. Induced Labour

c) Data to be collected

The minimum acceptable data to be collected retrospectively is:

1. Total no of deliveries in institution and no of deliveries fulfilling inclusion criteria
2. Total no. of cases transferred from a lower on to a higher level of care and no of transfers fulfilling inclusion criteria

For each case fulfilling the inclusion criteria (above), the following information should be collected:

1. Parity
2. Mode of delivery
3. Labour obstructed (suggested definition: no cervical dilatation over 4 hours despite good uterine activity)
4. Ruptured uterus
5. Crude neonatal outcome (perinatal mortality)
6. Post-partum haemorrhage (to be defined by investigator)
7. Whether case was transferred or not

Additional data which should be collected retrospectively if possible from cases fulfilling inclusion criteria.

8. Detailed neonatal outcome (perinatal mortality, Apgar scores at 1 minute and at 5 minutes, intensive care requirements)
9. Incidence of genital tract infection requiring antibiotics within 7 days of delivery)
10. Duration of first and of second stages of labour (in institution)
11. Cervical dilatation on admission
12. Number of vaginal examinations in labour
13. Augmentation of labour.

In some circumstances it may be possible to construct hypothetical retrospective partographs for subsequent analysis.

2. Introduction of the Partograph by means of a training programme

a) Background

It is assumed that those who will use the partograph have already been trained in midwifery and in the conduct of labour. These personnel include specialist obstetricians, general medical officers responsible for labour wards, medical assistants trained in midwifery, nurses, midwives and those MCH aides who have been trained appropriately. Basic abilities necessary to use the partograph include the accurate assessment of cervical dilatation by vaginal examination and a sufficient degree of literacy to graphically record that dilatation at an appropriate place on the partograph.

The principles of the partograph and a detailed instruction manual on its use are produced by WHO (WHO/MCH/88.3, WHO/MCH/88.4). A Facilitator's Guide is also available (WHO/MCH/89.1). Different centres may wish to use or adapt their own partograph but the one produced by WHO and described in their manual is recommended.

In a centre without facilities or personnel to perform a Caesarean Section, the manual indicates clear guidelines for the timing of transfer of women with delay in labour to a centre with such facilities (moving to right of the alert line). In centres with such facilities, possible courses of action in cases of delayed labour (reaching or crossing the action line). No attempt is, however, made to dictate definite courses of action. Each centre should formulate its own policy in such cases.

Similarly this research protocol is not intended to give guidelines on research into different methods of managing prolonged labour once it has crossed the action line. Individual centres may wish to conduct their own research into management at this juncture.

b) Training

The introduction of the partograph should follow an intensive period of training in its use, preferably involving tutors who have used it elsewhere. The training should be theoretical followed by practical examples (as in the WHO manual). It should probably then be introduced to the labour ward on a trial basis with close supervision so that initial difficulties can be cleared up before adopting it for routine use and research analysis. The use of drawn or modelled circles of cervical dilatation in the labour ward is highly recommended to increase the accuracy of assessment of cervical dilatation.

Ideally, the partograph should first be introduced in a larger centre with at least a 1000 deliveries per year and facilities and personnel to carry out Caesarean Sections.

Midwives (or other appropriate personnel) from peripheral centres may then be brought into the larger centre to undergo training in its use before returning to their smaller centre. It must, of course, be made clear that their role in peripheral centres is to use the partograph to identify women who are at risk of prolonged labour (moving to the right of the alert line) rather than manage prolonged labour (reached or crossed the action line) as in the larger centre.

c) Supervision

This period of training must be followed by a period of supervision of those using the partograph by the person responsible in each area for the conduct of the operations research. This should involve regular visits to those centres using the partograph to discuss problems, check on collection of data, etc.

3. Evaluation of training

This is perhaps the most difficult part of the operations research as much of the evaluations may be subjective. In the end, the best evaluation of the training may be in the hard data on the results of the outcome of labour (described later).

Aspects of training which could or should be evaluated include:

- a) Accuracy of assessment of cervical dilatation
- b) Accuracy of plotting of information on cervicograph
- c) Whether appropriate action was taken when indicated from the partograph
- d) Reaction of health workers to the use of the partograph

Points b) and c) above can be objectively evaluated and a sample of the partographs from each centre should be examined in detail to look for inaccuracies or inappropriate management. The reaction of health workers to the partograph can be assessed by formal or informal questionnaires in addition to asking them to fill in sample partographs as in the WHO manual.

The accuracy of vaginal examination is the most difficult parameter to assess. All health personnel using the partograph should already have been trained in vaginal examination in labour. During the period of training in the use of the partograph vaginal examinations should ideally be carried out with a competent supervisor until the trainee is judged to be able to accurately assess cervical dilatation.

4. Collection of data after introduction of the Partograph

This data should be collected prospectively. Ideally individual results forms should be completed for each woman eligible for inclusion in the study. This avoids later (and often inadequate) retrieval of data from case records, delivery registers, etc. A sample form is attached for duplication locally. A significant sample of actual partographs should also be collected for critical examination.

Cases to be included are described in section G1 (b) above in collection of retrospective data

Data collected should include the following:

1. Total number of deliveries in institution during study period and number of those deliveries fulfilling inclusion criteria
2. Total number of cases with labour related problem transferred in to or out of institution and number of those transfers fulfilling inclusion criteria

For each individual case fulfilling inclusion criteria, the following should be recorded:

1. Place of delivery (peripheral or central)
2. Parity
3. Maternal Height
4. Dilatation of cervix on admission
5. Level of head (fifths palpable abdominally on admission)
6. Duration of ruptured membranes on admission
7. Number of vaginal examinations
8. Length of time in latent phase
9. Whether moved to right of alert line
10. Dilatation when moved to right of alert line
11. Level of head (fifths) when moved to right of alert line
12. Whether crossed or reached action line
13. Dilatation when crossed or reached action line
14. Level of head (fifths) when moved to right of action line
15. Augmentation of labour and at what stage of labour in relation to latent phase, alert line, or action line
16. Duration of first and second stages of labour (in institution)
17. Action taken (if any) when moved to right of alert line or reached or crossed action line
18. Mode of delivery
19. Labour obstructed
20. Uterus ruptured
21. Position on partograph at delivery - in latent phase
 - to left of or on alert line
 - between alert and action lines
 - on or to right of action line
22. Neonatal outcome
 - perinatal death
 - 1 and 5 minute Apgar scores
 - intensive care
23. Postpartum haemorrhage
24. Genital tract infection requiring antibiotics within 7 days of delivery
25. For transferred cases
 - time in labour before and after transfer
 - time between decision to transfer and transfer
 - time in transfer
 - cx dilatation on transfer
 - no of vaginal examinations before and after transfer

5. Data Analysis

This may be done locally or centrally (WHO may be able to assist). The data collected both before and after the introduction of the partograph should be presented in such a way that a clear comparison can be made between the outcome of labour before and after the partograph's introduction. Particularly critical comparisons can be made between

1. Neonatal outcome
2. Maternal morbidity (obstructed labour, ruptured uterus, post-partum haemorrhage, sepsis)
3. Length of time in labour
4. Rates of operative deliveries
5. Proportion of women transferred in labour from a peripheral to a central unit, and the length of time in labour and number of vaginal examinations undertaken in these cases.

In addition, the adequacy of the partograph themselves and of the training programme must be analysed.

A suitable sample of partograph must be critically examined for the accuracy of their completion. In particular, it should be noted whether appropriate action was taken when cervical dilatation moved to the right of either the alert or the action line. Partographs of all cases transferred from a peripheral to a central unit must be examined to see if the transfer was appropriate. Sample tables showing how these results may be presented are attached.

Additional useful information may also be available for analysis depending on the completeness and quality of the data collected. It may, for example, be possible to correlate poor progress in labour with slow descent of the fetal head by abdominal palpation, thus creating the basis for a crude partograph for use by traditional birth attendants who cannot perform vaginal examinations.

Endpoints

At the end of the Operations Research it should be possible to state whether or not:

1. Midwives and other health personnel can be trained in the use of the partograph and its correct application
2. Prolonged labour is reduced by the use of the partograph
3. Operative delivery rates are affected by the partograph
4. Maternal morbidity and perinatal morbidity and mortality are reduced by the use of the partograph
5. Transfers of labouring women based on an abnormal partograph are appropriate.

Data to be collected if possible:

- 8. Cervical dilatation on admissioncm
 - 9. No of vaginal examinations in labour
 - 10. Duration of first stage of labour (in institution)hrs
 - 11. Duration of second stage of labour hrs
 - 12. Total time in labour in institution hrs
 - 13. Labour augmented with syntocinon
Yes
No
 - 14. Post-partum genital tract infection
Yes
No
 - 15. Neonatal outcome - Apgar score
1 min
5 min
- admission to intensive care Yes
No

SAMPLE RESULTS TABLES FOR OPERATIONS RESEARCH
ON THE USE OF THE PARTOGRAPH

(These tables are by no means exhaustive and give guidelines only on the presentation of some key issues)

I. Evaluation of Training

Grade of labour attendant	Midwife	Nurse	MCH Aide
No of labours attended			
No (%) with Partograph completed			
No (%) with faults in partograph construction			
No (%) with inappropriate action on basis of partograph			

II. Evaluation of partograph as a management tool for labour

(analyse separately for nullipara and multipara and for transferred cases)

Components of management	Progress in labour			
	No progress beyond latent phase	Normal active phase	Moved between alert & action line	Reached or crossed action line
Total cases				
Delivery - Caesarean Section - Operative vaginal delivery - SVD				
Augmented labour				
No. of vaginal examinations				
1-2				
3-4				
>-4				

III. Evaluation of impact of partograph on complications of labour and sequelae

(analyse separately for nullipara and multipara)

	Before introduction of partograph	After introduction of partograph
Total cases (n)		
Length of labour <12h 12-24h >24h		
Transferred in labour		
Delivery - SVD - Operative vaginal - Caesarean section		
Obstructed labour		
Uterine rupture		
PPH		
Genital sepsis		
Perinatal mortality		
Neonatal asphyxia		

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