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DEPARTMENT OF NURSING AND MIDWIFERY
UNIVERSITY OF SURREY

AN ANALYSIS OF CHARACTERISTICS OF LABOUR
AND OUTCOME BEFORE AND AFTER
THE INTRODUCTION OF THE PARTOGRAPH
IN A HOSPITAL IN GHANA



SEPTEMBER, 1994

UNIVERSITY OF SURREY
AND
THE ROYAL COLLEGE OF MIDWIVES TRUST

THESIS SUBMITTED FOR THE AWARD OF MASTER OF SCIENCE
IN ADVANCED MIDWIFERY PRACTICE



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TO
ELSHADAI,
THE GOD OF HOSTS.



ACKNOWLEDGEMENTS

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ABSTRACT

The main purpose of this retrospective comparative study of randomly selected women was to assess the partograph as an aid to parturition and to provide further information to support more widespread use of this instrument and identify any areas where improvement could be made.

Two groups of women expecting their first babies were studied. The pre-partograph group comprised 65 women who delivered in 1988 before the partograph programme was introduced in Ghana. The post-partograph group composed of 76 women who had their babies in 1991, two years after the inception of the programme.

There was a statistically significant difference between the two groups which showed that more women in the post-partograph group were given sedatives and tranquillisers in labour ($P < 0.01$). There appeared to be trends showing a decreased incidence of delivery by caesarean section, an increase in the event of post-partum haemorrhage and a decrease in the post-natal antibiotic requirement in the post-partograph group, although, statistically significant differences were not reached.

The discrepancies between the two groups were not statistically significant for any other of the parameters tested.

The findings endorsed the value of the partograph as a simple, low-cost and efficient tool as an aid to confinement. However, questions are raised about the use of the admission time as the basis for the calculation of the duration of labour, since the short duration so estimated is not a representation of the woman's own experience of labour. The admission time approach suggested by Hendricks et al (1970) under estimates the mothers diagnosis/experience of labour, [Wilcoxon matched-pairs signed rank test, $P < 0.05$.] By contrast, the cervical dilatation time-scale approach of calculation does provide a more similar value to the mother's estimation/experience, [Wilcoxon matched-pairs signed rank test; $P < 0.01$,] than that of Hendricks et al (1970).

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CHAPTER ONE**1.1 INTRODUCTION**

This dissertation is in partial fulfilment of the Master of Science Degree in Advanced Midwifery Practice, jointly offered by the Royal College of Midwives Trust and the University of Surrey, Guildford.

The purpose is two fold. Firstly, to provide technical information about the formal commencement of the partograph programme in Ghana; and secondly, to present information which will contribute to the general evaluation of the partograph as an aid to child birth.

A clear understanding of the process of labour is necessary in order to appreciate the advantages and disadvantages of the partograph. A synopsis of the physiology of labour is, therefore, provided in appendices IA, IB and IC of this thesis.

The partograph is a graphical representation of the progress of labour produced by plotting the dilatation of the cervix, as well as other characteristics of labour against time. The cervicograph displays a sigmoid or S-shaped curve in normal progress of labour and variations in the shape are used to alert Practitioners to potential risks or abnormalities. The complete partograph chart (see Figure I.1) includes records of all maternal and fetal

parameters measured as well as drugs, intravenous fluids administered and urine eliminated and tested. Further details are described in chapter two.

Designed by Philpott in 1970, [PHILPOTT AND CASTLE, 1972:163.] the partograph was rigorously introduced into Ghana in April 1989. Under the initiative of the Head of Department of Obstetrics and Gynaecology of a teaching hospital in Accra, a series of workshops were organised by Doctor Barbara Kwast, then Consultant from the World Health Organisation. An earlier less well co-ordinated attempt to introduce the partograph was not successful. The author of this thesis was a member of the staff development programme into the use of the partograph.

This study was designed to evaluate the partograph in the management of the labours of normal primiparous women who had no complications of pregnancy. The group of women who constitute the subjects of this study were selected from a larger group of women who delivered in the hospital in Accra, Ghana, in July, August and September 1991, that is twenty- six, twenty- seven and twenty- eight months after the introduction of the programme. The study compares the outcomes and other features of their labours with those of a similar group of women who had their babies in July, August and September 1988, before the partograph programme. In this report the two groups are designated as the pre-partograph and the post-partograph groups.

The study was undertaken because the partograph has been acclaimed in both developed and developing countries as a cheap, practical and effective aid to the management of labour [W.H.O./M.C.H./88:3:2]. There is evidence that the partograph programmes in Malawi and Zimbabwe produced reductions in the durations of labours, drops in caesarean section rates and contributed to lowered perinatal deaths [W.H.O./M.C.H./88:3:3].

The researchers in those countries recommended that more of such studies should be conducted elsewhere to confirm the values of the partograph.

The following section contains an example of a partograph record (Figure 1.1) and some definitions of the concepts used in the management of labour with the partograph.

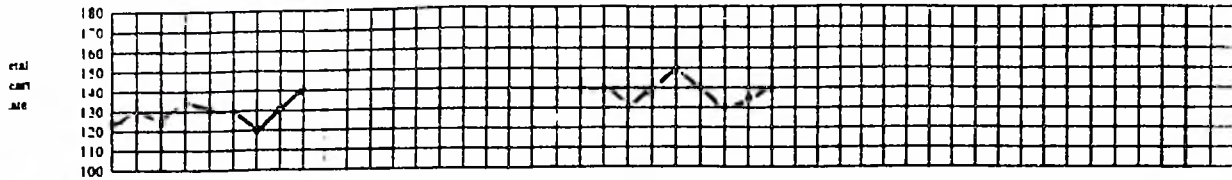


WHO PARTOGRAPH

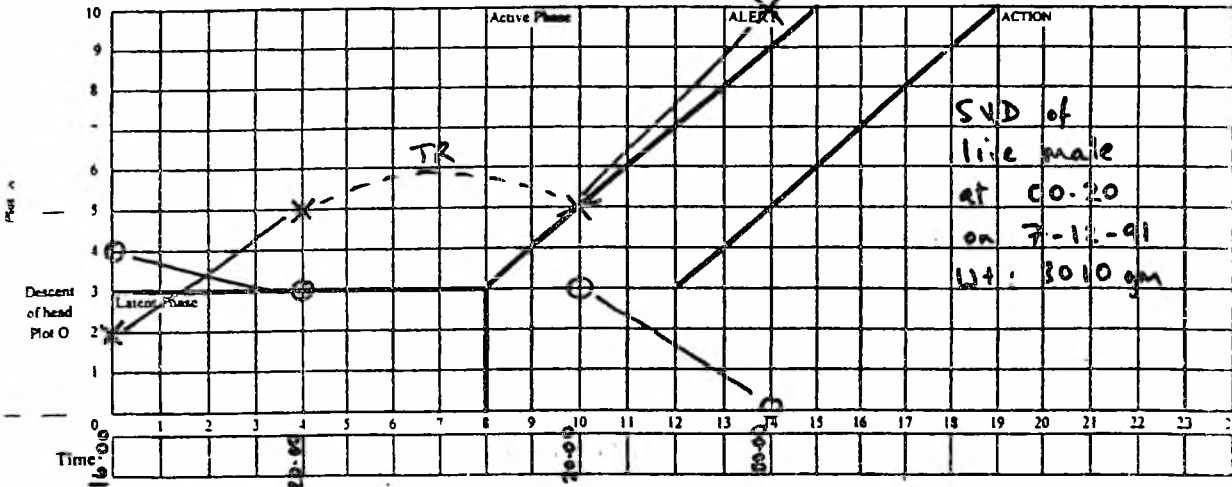


Name Mrs L
 Gravida 1 Para 0
 Admission date Time 16:00

Hospital number
 Ruptured membranes 2 hrs

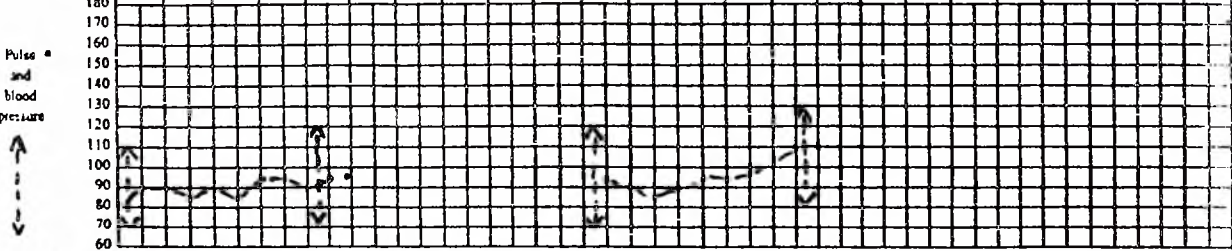


Liquor	C	C	C	C
Moulding	0	0	0	0



U/L				
op/min				

Drugs given and fluids				
------------------------	--	--	--	--



Temp °C	36°	37°	37°	37°
---------	-----	-----	-----	-----

Urine Protein	-	-	-	-
Acetone	-	-	-	-
Volume	200	100	100	60

FIGURE 1.1
 NORMAL LABOUR ON W.H.O. PARTOGRAPH.

1.2 DEFINITIONS OF CONCEPTS USED IN THE MANAGEMENT OF LABOUR WITH THE PARTOGRAPH

ALERT LINE:

A straight line drawn on the cervicograph beginning at one centimetre dilatation initially at zero time progressing one centimetre an hour to full dilatation at nine hours from admission. [PHILPOTT AND CASTLE, 1972:596]. On the W.H.O. partograph, the alert line begins from three centimetre dilatation at zero hour and ends at ten centimetres at fifteen hours time scale on the cervicograph. [W.H.O./M.C.H./88,3:8]. It separates the eighty per cent of normal labour from the abnormal, that is the slowest twenty per cent of labour clients. It serves as an indicator to the Birth Attendant to transfer the parturient women from a Peripheral Unit to a Central Hospital where resources for operative interventions are available. The cervical dilatation is assessed every two hours after the cervicograph has crossed the alert line. [PHILPOTT, 1972:164]. [PHILPOTT AND CASTLE, 1972:595]. [W.H.O./M.C.H./88.4:20] (see Figure 1.1).

ACTION LINE:

A straight line drawn four hours parallel and to the right of the alert line on the cervicograph. When the cervicograph crosses the action line, it indicates that inefficient uterine action exists. Measures of augmentation are employed to aid the possible

assisted or instrumental vaginal delivery in mild and moderate cephalo-pelvic disproportion. Usually that results in ten per cent of clients whose cervicographs cross the action line. If fetal distress occurs and persists in spite of nursing the client on her left, administration of oxygen and intravenous fluids, caesarean section is performed. [PHILPOTT AND CASTLE, 1972:600]. [W.H.O./M.C.H./88.4:20].

CERVICOGRAPH:

The central part and the most important feature of the partograph. It is the area of the graph that illustrates the exact rate of progress of labour. It runs for a twenty-four hour period, and it is plotted by an "x" for cervical dilatation and an "o" for fetal head descent [STUDD, 1973:453].

LATENT PHASE OF LABOUR:

This is a period of six to eight hours before the onset of appreciable cervical dilatation. It is during this period that the contractions of the myometrium become oriented and the cervix goes through preparatory changes such as softening and effacement in order to dilate to two to two point five centimetres [FRIEDMAN 1955:570] [W.H.O./M.C.H./88:4.1]. Prolongation over eight hours may be predictive of instrumental delivery and a low Apgar score [STUDD ET AL. 1982:69].

ACTIVE PHASE OF LABOUR:

This is the accelerated period which is associated with a fast change in the slope of the curve of the dilatation of the cervix from three centimetres to nine to ten centimetres. The maximum allowable duration is eleven hours forty two minutes [FRIEDMAN 1955:571] [HENDRICKS ET AL., 1970:1076]. It is sixteen hours according to the W.H.O. partograph [W.H.O./M.C.H./88:3.8].

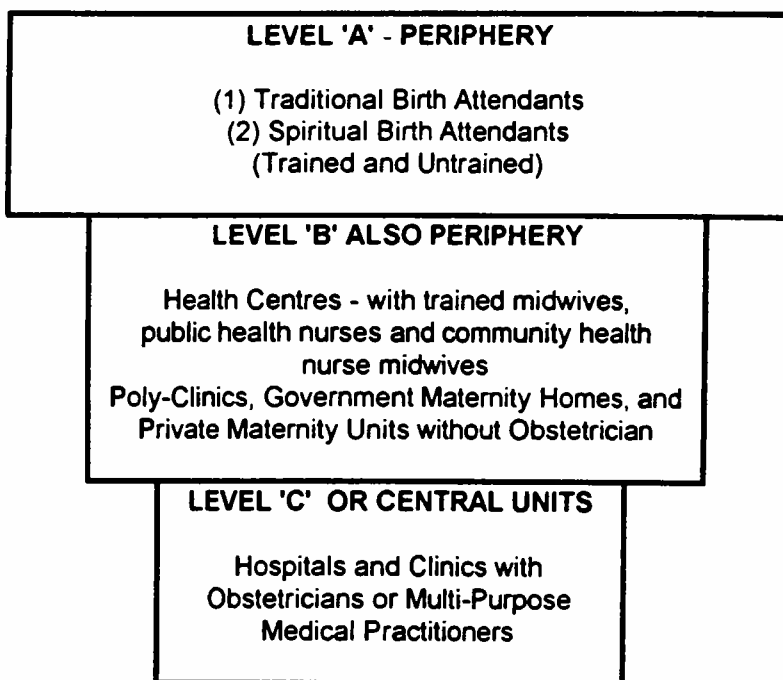
1.3 INTRODUCTION OF THE PARTOGRAPH INTO GHANA

Ghana, a West African country, has an area of two hundred and thirty-eight thousand and five hundred and thirty-seven kilometres². In 1971 there were one hundred and twenty hospitals, ten urban health centres, thirty-nine rural health centres, one hundred and twenty health posts and one hundred and sixty-one private maternity units [RIVERS, 1976:180].

Currently the population is fifteen million. There are ten midwifery training schools, the first of which was established in 1930. There are two medical schools, one with a masters programme in obstetrics, and in 1970 a pilot program for the training of Traditional Birth Attendants (T.B.A.s) (S.B.A) was initiated [YABRUNDI, 1994:146]. Eighty-three per cent of pregnant women are provided with antenatal care by trained practitioners but only thirty-seven per cent of the women are delivered by trained personnel. Sixty-three per cent of deliveries

are managed by T.B.A.s/S.B.A.s [ASSAN ET AL, 1992:1]. The latest maternal mortality ratio is between five hundred and one thousand and five hundred per one hundred thousand live births [YABRUNDI, 1994:146]. Maternal and child health care is provided by the institutions shown ~~overleaf~~.

Table 1.1 Showing Levels of Maternity Care Provision



Source :

Writer

Ghana's maternal and child health services are some of the major concerns of the Government, which has embraced the concepts of primary health care and safe motherhood.

Safe motherhood includes the use of the partograph which dates back to 1954 [FRIEDMAN, 1954:1572, 1955:569], [STUDD ET AL. 1982:61]. Uganda adapted Friedman's "graphic statistical analysis" [FRIEDMAN, 1954 and 1955] in 1968 for the teaching of medical students. The protocol at the Makerere University Medical College, Kampala, in East Africa proved valuable in early detection of obstructed labour allowing quick intervention. The positive outcome of the scheme encouraged the researchers to recommend the use of the partograph in the education of obstetrics and midwifery students elsewhere [GLICK AND TRUSSEL, 1970:1003].

However, it was not until November, 1988, that Ghana attempted to implement the innovation formally. This initial attempt failed due to lack of adequate preparation of the staff. Personal resistance to change is a common response to the anxiety that innovation produces [ENGLISH NATIONAL BOARD 1988:8]. Such anxiety may stem from lack of confidence relating to knowledge and skills of the components of the change, or how to implement it, or from loss of influence and power, resentment of implied criticism of present practice and perceived increase in workload. ROGERS [1967:305] suggests that the antecedent of a programme, the procedure itself and the outcome may affect the process of adoption positively or negatively.

This means that in every adoption programme a training scheme to create the required awareness and equip the users with the appropriate skills in order to ascertain confidence is essential.

It is conceivable that the reasons behind Ghana's unwillingness to adopt the partograph on a national scale, for twenty years, were partly due to lack of information dissemination, non-confidence in the programme, economic constraint or lack of committed support.

Fortunately the World Health Organisation, the World Bank and the United Nations Fund for population activities held a conference on safe motherhood in Nairobi, Kenya in February, 1987 which concluded with a "call to action" [W.H.O./M.C.H./88:3]

"This call demands that health workers involved in the care of mothers and children to take positive action now to reduce maternal mortality and morbidity. Among the actions called for, is the need to ensure that all pregnant women are screened by supervised and appropriately trained non-physician health workers where appropriate, with relevant technology including partographs as needed, to identify those at risk, and to provide prenatal care and care during labour as, expeditiously as possible".

This "call to action" is to reduce the high rate of maternal deaths from four hundred and fifty per one hundred thousand live births

in the developing countries, to half that rate by the year two thousand [W.H.O./M.C.H./88:3:2].

This mission statement was instrumental in the action by the Obstetrician, Gynaecologist In charge of the hospital in Accra to make a second attempt to instigate adoption of the partograph.

The success of a change agent in introducing an innovation is positively related to the extent of his/her effort; or orientation to the needs of the users; the compatibility of the change that the change agent wishes to introduce with the needs and values of the users; his/her empathy with the users; his/her credibility in the eyes of users; the efforts he/she puts in to increase users ability to evaluate the innovation and the provision of guidance on the monitoring of the change [E.N.B. 1988:11].

The consultant's efforts to increase users ability to use and assess the partograph, included the initiation of the sponsorship of Doctor Barbara Kwast in April 1989. After the innovation training, a local co-ordinator was identified to continue with the scheme. A senior nurse-midwifery officer with public health nursing background, currently in charge of the two labour wards which manage nine hundred to one thousand deliveries every month in the hospital, undertook this role of responsibility.

2.1 THE PARTOGRAPH

The cervicograph was developed following the pioneering work of Friedman (1954:1568). After reviewing over half a century of literature which sought a better approach to the monitoring, interpretation and intervention of the various characteristics of labour, Friedman produced a graphic display of variations in dilatation of the cervix with time [FRIEDMAN, 1954:1568].

The results showed varying degrees of slopes but near - identical S or sigmoid curves. The change in the slope was more marked after the cervix had dilated three to four centimetres, and alterations in the curve were identified in the presence of cervical dystocia and uterine inertia - both primary and secondary. Friedman adopted rectal examinations every half an hour for precipitate labours and every one hour for the others in the determination of cervical dilatation.

In thin and very soft cervixes, sterile vaginal examinations were carried out every one hour ostensibly to increase accuracy of result; where there was doubt in the results of rectal examinations.

For uniformity and to enhance reliability, cervical dilatation's were determined in centimetres and nearly all the examinations on one

labouring woman were performed by the same attendant. The frequency of the examinations depended on the progress of the labour [FRIEDMAN 1954:1570]. Following the detailed study of one hundred labours in America, Friedman concluded that the onset of labour should be estimated from the latent phase (or first phase) of his four phases of curve of cervical dilatation. He demonstrated that this latent phase which is flat, is very sensitive to interference, being prolonged by heavy sedation and shortened by stimulation. Friedman believed that including the latent phase (mean seven hours eighteen minutes) in calculating labour duration gave a far clearer perception of the duration of labour in the primigravidae in the study than ignoring the latent phase [FRIEDMAN, 1954:1574].

In the writer's view, it would be more realistic to employ the time scale on the graph which correlates with the cervical dilatation as the most objective approach to the calculation of the duration of labour. Since Friedman suggested that

"a labour was noted to be a function of the duration and number of contractions necessary for its evolution"

and also

"more accurate observation of the resistance of the cervix (and the pelvic floor) as well as a more accurate determination of the effectiveness of the labour pains will

University of Ghana <http://ogspace.ug.edu.gh>
be necessary in order to analyse the causes for the extreme variations in the lengths of labour so commonly encountered" [FRIEDMAN, 1954:1566].

Without good uterine contractions cervical dilatation cannot occur. In effect Friedman agrees that uterine activity is as important as the dilatation of the cervix in the assessment of the progress of labour, contrary to claims by others that cervical dilatation alone is the most important indicator for progress assessment in labour [STUDD, 1982:61].

This may be because of cervical dystocia which occurs in spite of good uterine contractions - a circumstance which Friedman associated with cephalo-pelvic disproportion, rather than uterine dysfunction [FRIEDMAN, 1969:777] Friedman observed that lack of progress in the third and fourth phases denoted uterine inertia and that cervical retraction and full dilatation occurred with fetal head descent . He further asserted that after the fourth phase deceleration was encountered, especially in the face of cephalo-pelvic disproportion [FRIEDMAN, 1954:1574].

The second stage of labour was not included in Friedman's pioneer study as he viewed the second stage as greatly dependant on a number of varying factors:

the capacity of the pelvis;

the relationship of the head to the pelvis;

the contractility of the uterus and its effectiveness in the

process;

mother's voluntary and involuntary efforts; and

the opinions of the birth attendant regarding the mode for the accomplishment.

In Friedman's study it was noteworthy that the delivery modes and maternal and perinatal outcomes were recorded as follows:

twenty-nine spontaneous deliveries;

sixty-four prophylactic low forceps;

four mid-cavity forceps deliveries;

one caesarean section;

one frank breach delivery without complication; and

one multiple pregnancy.

(the first delivered as vertex presentation and the second was extracted by the breech).

There was no maternal deaths but one perinatal death (occurred on the first day post delivery due to subdural haematoma after a precipitate labour).

The indications for the modes of deliveries were cephalo-pelvic disproportion, secondary uterine inertia, transverse arrest and fetal distress in the mid-forceps deliveries, lack of progress after prolonged trial of labour, including three hours of the second

stage, was the indication for the caesarean section [FRIEDMAN, 1954:1569]. The one per cent caesarean section rate was very remarkable, but the sixty-four per cent so called prophylactic low forceps is unexpected. In all the accouchements of one hundred clients, there were three primary inertias (see Figure 2.1) and seven secondary uterine inertias (see Figure 2.2).

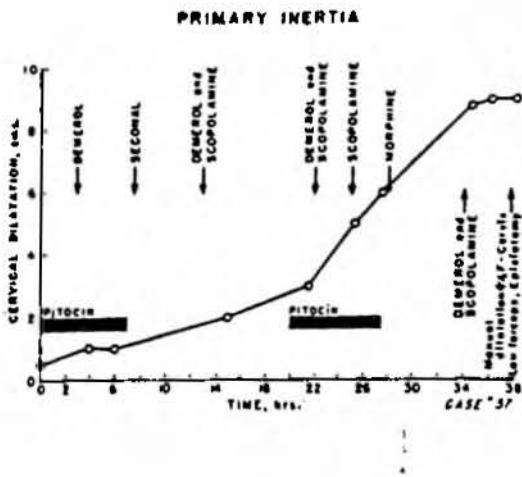
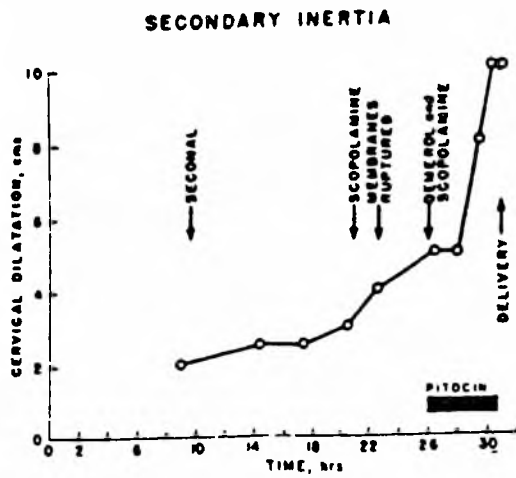


Figure 2.2 - Friedman's Pioneer Cervicograph 1954:1573



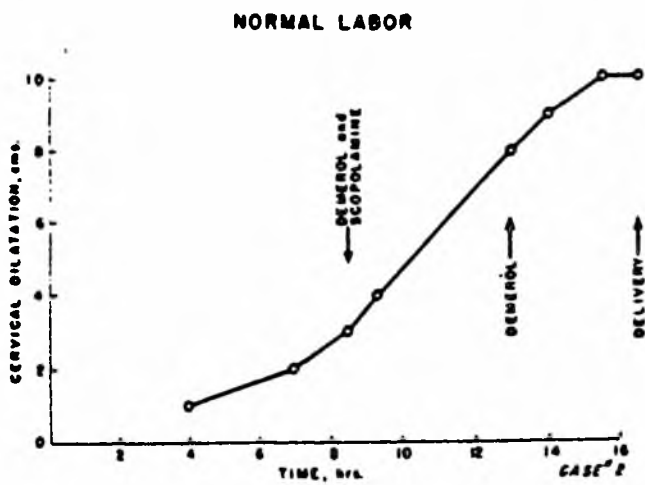
The regime for the management of the inertias was amniotomy, pitocin infusion and sedatives [FRIEDMAN, 1954:1569].

In the programme, all medications administered, procedures carried out and the time of membranes rupture were recorded with special emphasis laid on vaginal examinations and when they were due next. The sigmoid curve pictorially displayed aberration characteristics that included flattening of the curve; a significant feature that demanded investigation for identification. The most common causes were, cephalo-pelvic disproportion, cervical dystocia, inertia, heavy medication, maternal exhaustion or a combination of circumstances for the appropriate interventions. The mean duration of normal labour was sixteen hours; primary inertia prolonged labour to thirty-eight hours; and secondary inertia produced thirty-hour labour graphs.

Friedman devised the method of plotting cervical dilatation against time scale for the assessment of the progress of labour and an objective manner of labour management. He designated it the graphic analysis of labour or cervicograph and recommended that it should be adopted for the study of the progress of individual labours [FRIEDMAN, 1954:1575]. See Figure 2.3.

In 1955, Friedman reported another study involving six hundred and twenty-two primigravidae in America. One hundred and twenty two were excluded from the study because they arrived in the unit when they were too advanced in labour. In effect the study method favoured prolonged labours. However, Friedman believed that the variable differences

Figure 2.3 - Friedman's Pioneer Labour Slope 1954:1572



between the durations of the labours, some prolonged and others very short made up for each other even though a degree of bias could not be completely ruled out.

This second study using the newly established cervicograph disclosed a mean latent phase of eight hours, thirty minutes active phase of four hours, fifty -four minutes, a maximum allowable duration being eleven hours fifty -four minutes [FRIEDMAN, 1955:570]. The maximum duration of the first stage in normal labour was twenty -eight hours thirty minutes and two hours thirty minutes for the second stage. The minimum figure of hourly dilatation of the cervix was one centimeter and two millimeters. Friedman maintained that deceleration occurred after full dilatation but the phase was prolonged more than two hours, in the presence of uterine inertia and cephalo - pelvic disproportion [FRIEDMAN, 1955:576].

It appears likely that it was the prolongation of the said phase which provoked Hendricks challenge that deceleration does not exist after full dilatation of the os uteri in normal labour and, therefore, should not be expected. He endorsed the point that deceleration was a feature of aberration in labour [HENDRICKS ET AL 1970:1076].

The modes of deliveries were two hundred and two spontaneous deliveries, (40.4%) two hundred and fifty-six low forceps (51.2%) nineteen mid forceps (3.8%) nine caesareans sections (1.8%) others were breech and twin deliveries..

The indications for the modes of deliveries were uterine inertias, cephalo-pelvic disproportion, cervical dystocia, fetal distress and occipito-posterior positions.

The management of the fifteen inertias was "test of pitocin". ten of the mothers delivered spontaneously but three were delivered by mid forceps and two by caesarean section. The study proved that if pitocin is used with caution it can overcome moderate degrees of cephalo-pelvic disproportion [FRIEDMAN, 1955:580]. Clinical pelvimetry identified thirty-nine clients with cephalo-pelvic disproportion and the labours were managed as appropriate [FRIEDMAN, 1955:581].

If clinical pelvimetry could be carried out more extensively in developing countries where there is lack of high technology equipment such as ultrasonography, early detection of contracted pelvis and prediction of cephalo-pelvic disproportion in pregnancy would allow clients to be booked initially for central unit management to avoid obstructed labour.

There were four perinatal deaths but no maternal death [FRIEDMAN, 1955:569]. Friedman disclosed further that emotional stability, intellectual level, financial security, confidence, personal support and re-assurance shorten the duration of labour [FRIEDMAN, 1955:585]. This finding corroborates with reports by Haddad and Morris (1985:77).

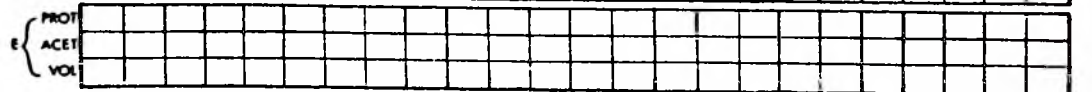
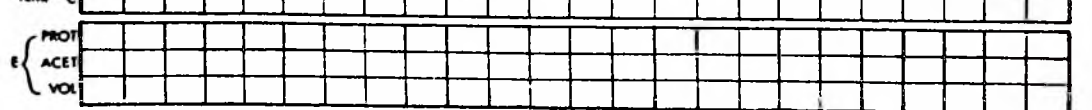
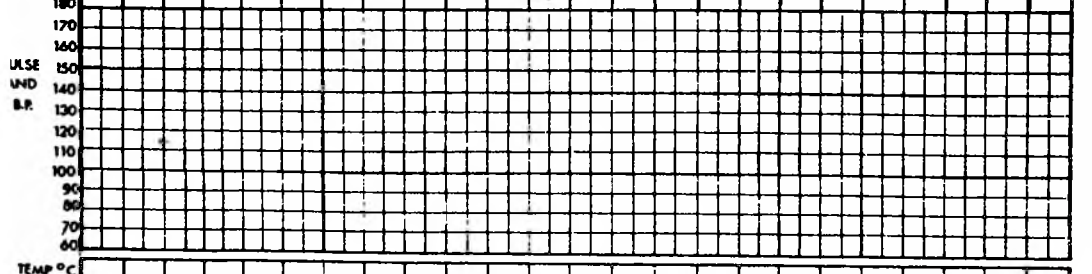
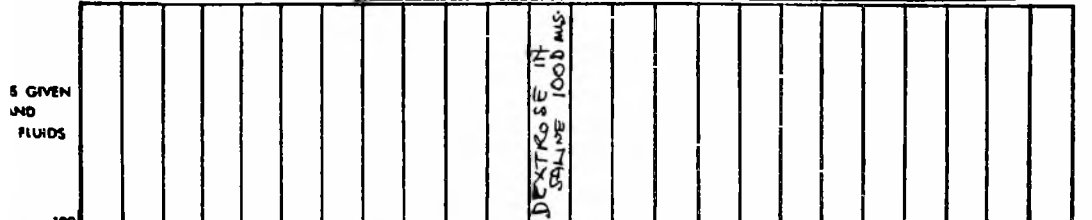
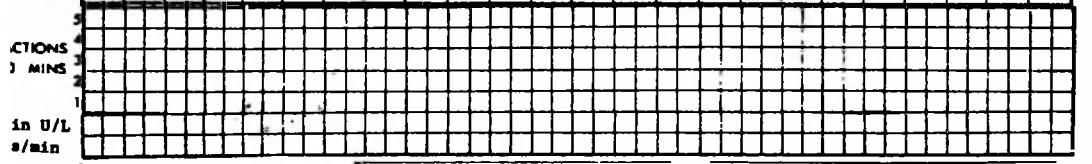
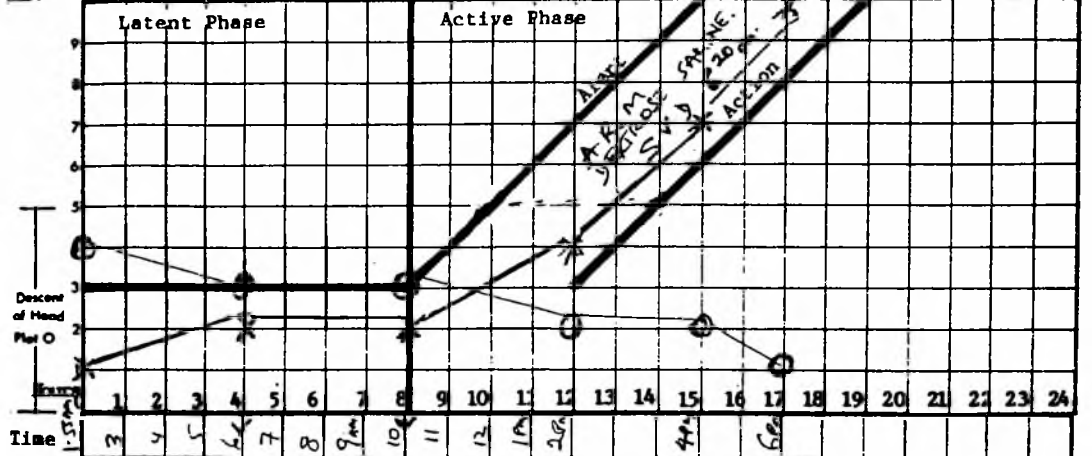
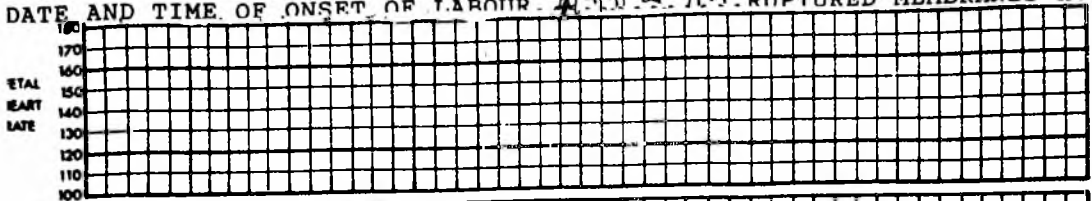
In the present writer's culture, there is a belief that a guilt feeling held by the parturient woman produces lengthened labour. Therefore, should the process of confinement be prolonged, the woman is interrogated for any wrongful acts against people especially against her husband. If she is guilty of any unsociable act including adultery/fornication, appeasement would be sought in order to enhance the successful accomplishment of labour. This indicates that, in the traditional system, observations have been made that emotional disturbance could prolong labour.

On the whole, the results of Friedman's second, more detailed study in 1955, correlated to a large degree with those of the earlier study observed in 1954.

In a retrospective study of one thousand one hundred and ninety-four labours, Friedman and his colleagues demonstrated that perinatal mortality and morbidity increased when labour exceeded twenty hours and that there were twice as many babies with Apgar scores of 4/10 in one minute in the labours that showed abnormal slope in the cervicograph than in babies born in labours with a normal curve in the graph. The major causes of the cervimetric abnormalities were uterine inertias and cervical dystocia [FRIEDMAN ET AL, 1969:780]. The study confirmed the results of HELLMAN and PRYSTOWSKY,[1952:1223] that perinatal mortality and the development of neurological abnormality is high when labour is prolonged for over twenty to twenty-four hours

PROPOSED PARTOGRAPH

NAME Mrs M. AGE 19 GRAVIDA I PARA 0
 HOUSE ADDRESS C. 24/11, ADABRAKA
 HOSPITAL NO. 001/31 DATE OF ADMISSION 8/9/91 TIME OF ADMISSION 11:55 am
 DATE AND TIME OF ONSET OF LABOUR 8/9/91 at 9 am RUPTURED MEMBRANES HOURS 1



CERVICOGRAPH CROSSED ALERT LINE, A.R.M. PERFORMED AND DEXTROSE SALINE WAS GIVEN, CLIENT DELIVERED SPONTANEOUSLY.
 FIGURE : 2; 4

in the first stage and over two hours in the second stage
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[FRIEDMAN, 1969:776].

Friedman ET AL, stressed the efficiency of diagnosing abnormal labour by the use of the graphic analysis of cervical dilatation time scale in correlation with fetal head descent and emphasised the effect of misdiagnosis of aberation of labour on the outcome of delivery [FRIEDMAN ET AL, 1969:776].

In practice babies born after prolonged labours had features of intra-cranial haemorrhage, of shrill cry and twitching episodes within hours or days after delivery and died if Injection vitamin K was not administered. Controversy over vitamin K injections currently exists as there is belief that they may be carcinogenic (see Appendix seven) hence the prevention of prolonged labour is of immense importance.

Hendricks and his colleagues studied three hundred and three pregnant women to redefine and quantify the relationship between time and cervical dilatation as a follow up to Friedman's analysis of cervical dilatation against time. To improve reliability one of the researchers carried out all the vaginal examinations to determine changes in the cervix four weeks before labour - a period designated pre-labour. The results showed that there was acceleration in cervical dilatation rate sometimes from thirty weeks gestation in thirty-eight per cent of subjects. [HENDRICKS ET AL, 1970:1072]. The Acceleration was more

prominent three days before labour started. By the start of confinement the nulliparous cervix was seventy per cent effaced and one point eight centimetres dilated while the multiparous cervix was sixty -one per cent effaced and two point two centimetres dilated.

When the active phase of labour was reached, in both the nulliparous and multiparous women, there was constant acceleration without deceleration as Friedman claimed. However, Hendricks ET AL recognised Friedman's contribution to the provision of maternity care in the development of an important tool for graphic portrayal of labour characteristics [HENDRICKS ET AL, 1970:65].

Since labour is perceived as "pain plus progress" with expected uterine contractions occurring at least twice in ten minutes, Hendricks ET AL did not acknowledge the latent phase of Friedman's and suggested that labour duration should, therefore, be calculated from the beginning of the active phase; or from time of admission. They asserted that human labour was usually shorter than generally accepted [HENDRICKS ET AL, 1970:1076] . They also indicated that they were not aware of any empirical evidence that the fetus benefited from passing through the birth passage [HENDRICKS ET AL, 1970:1077].

Further development of labour graph was reported by Philpott, Professor of Obstetrics and Gynaecology in the Harare Maternity

Hospital in 1972. Designed by Philpott, the partograph was first used in the management of eight thousand labours within one year, and was proved to be particularly useful in the management of individual labours [PHILPOTT, 1972:163].

Philpott further asserted that the partograph, based on Friedman's cervicograph [PHILPOTT AND CASTLE, 1972:592] was simpler and more efficient than lengthy written notes. The partograph displayed all the essential characteristics of labour pictorially alerting the care providers about deviations from normal at a glance and Philpott claimed it had been introduced into several British hospitals with success [PHILPOTT, 1972:163].

Philpott and Castle added an alert line to the cervicograph/partograph to aid midwives and maternity assistants who worked in the peripheral units to identify labour abnormalities, essentially, the uterine inertias which flattened or caused deceleration in the slopes [FRIEDMAN, 1954:1573]. If the graph crossed the alert line, referral of that particular parturient to hospital was indicated. This was to screen for cephalo-pelvic disproportion which is prevalent in the area .[PHILPOTT andCASTLE ,1973;529]and to prevent complications such as obstetrical fistulae which are not uncommon. (in 1970, eighty-one new patients with fistulae were treated [PHILPOTT AND CASTLE, 1973:592]).

In 1972 Philpott and Castle reported that an action line had been included in the partograph. The objective was to differentiate clients who required caesarean section for cephalo-pelvic disproportion and incorrecible uterine inertia from those who could be aided with vaginal deliveries. If the graph crossed the action line the approach adopted included:

- (1) Transfer from peripheral unit to central unit or to the intensive care unit
- (2) Continuous epidural with Bupivacaine
- (3) Pelvic assessment
- (4) Adequate fluids and carbohydrate intravenously
- (5) Oxytocin stimulation with two point five units in one litre of dextrose in water, ten drops per minute and increased by ten drops every thirty minutes until three uterine contractions in ten minutes, each lasting sixty seconds were observed. This regime was continued for six hours in the absence of fetal distress. If the mother did not deliver within six hours caesarean section was performed.

If fetal distress was identified by persistent fetal heart deceleration with prolonged lag phase in spite of the administration of oxygen and Intravenous fluids and the nursing of the mother on her left side, caesarean section was performed immediately.

This approach above reduced the rates of prolonged labour and caesarean section. In a study of five hundred and twenty four primigravid clients, sixty-eight (11%) crossed the action line with the narrated protocol, thirty-five had vacuum extraction's, nineteen delivered spontaneously and fourteen were delivered by caesarean section [PHILPOTT AND CASTLE, 1972:599-600]. The Apgar scores of all the babies were between 8/10 and 10/10. (Philpott and Castle,1972;601] In 1972 O'Driscoll indicated that active management based on Friedman's graph had been deployed in the Dublin experience to assure first time mothers of their confinement within twelve hours. In a prospective study of one thousand primigravidae, using the partograph, every client had a personal midwife and every labour was controlled. Spontaneous labours were accomplished in eight hours and caesarean section by twelve hours [O'DRISCOLL, ET AL., 1973:136]. Rectal examinations were employed in that it reduced the risk of puerperal infection [O'DRISCOLL, 1973:137]. In an African setting, however, rectal examinations are not acceptable to the clients. O'Driscoll's method of prevention of prolonged labour has been criticised by some clients as "obstetric rape" (verbal communication in class, 1993). Like Hendricks ET AL., (1970:1068) and Philpott and Castle (1972:593) time of admission was deployed as onset of labour [O'DRISCOLL ET AL., 1973:136]. When the clients diagnosis of labour was ignored in the scheme, forty-two of the rejected clients returned to have their babies within twenty-four hours [O'DRISCOLL ET AL., 1973:135 - CHALMERS ET AL., 1988:951]. The lesson in this situation is that pregnant women are not sick

people, they are generally young and are individuals whose views should be taken seriously. In the series of one thousand labours, there were one hundred and ninety-five forceps deliveries (19.5%) no vacuum extraction but eighteen caesarean sections. Indications for caesarean sections were fetal distress in nine, prolonged labour in seven and cephalo-pelvic disproportion in two. There were no maternal deaths but twenty-five perinatal deaths (2.5%) were recorded.

The low rate of cephalo-pelvic disproportion (two in one thousand) clients as against thirty-nine in five hundred clients of Friedman's subjects [FRIEDMAN, 1954:581] is worthy of note. O'Driscoll indicated that active management with the use of the partograph demanded constant attention and the birth attendant should be with the client all the time, an approach which limits its use to institutionalised environment only, that is it is unsuitable for home confinements [O'DRISCOLL ET AL. 1969:480].

In an earlier study of one thousand primigravidae in 1969, one client laboured for twenty-four hours and another for twenty-eight hours after admission. Artificial rupture of membranes was performed to accelerate labour in one hundred and nineteen clients, ninety-four including thirty-five clients who had syntocinon drips delivered within six - eighteen hours. twenty-five perinatal deaths were recorded, two due to inhalation of meconium, revealed by post-mortem examinations. This correlates with Bennet and Brown (1993:388) that inhalation of meconium

could cause pneumonia. Four babies suffered residual damage to the brain. Indications for twelve caesarean sections in labour were five cephalo-pelvic disproportion, three fetal distress, one brow presentation, one cord prolapse, one breech and one abruption placenta [O'DRISCOLL ET AL, 1969:478]. It is likely that O'Driscoll and colleagues' policy of active management of labour arose from the experience of the unacceptable perinatal mortality and morbidity observed in this series. Unfortunately many of the women entered into the twelve hour compulsory delivery scheme are not happy about it.

The point about unsuitability of the use of the partograph in community midwifery was raised at the second conference of action for safe motherhood (U.K.) in April, 1994. However, in Ghana where community midwifery is institutionalised that is the client has her baby in the home of the midwife because of the cultural beliefs and convenience for the midwives, modification in the monitoring scheme would suffice. For example, after the initial internal assessment to obtain a baseline picture of the labour, if the woman is in the latent phase, the next vaginal examination could be withheld until six hours later when it should then be performed to evaluate the progress and exclude primary uterine inertia. If there is progress then in a peripheral unit monitoring could be done one hourly, while in the midwife's home the assessment could be performed every two hours, to afford the woman the "feel" of a physiological event.

In 1973, Studd disclosed that a modified format of Philpott's partograph had been utilised in the management of fifteen thousand primigravid confinements, in the Birmingham Maternity Hospital. The instrument was capable of distinguishing normal labours from those in which instrumental deliveries were predicted and those in which babies were delivered with low Apgar scores. He recommended its use for specialist and general practitioner units. However, the alert and action lines were not accepted in the United Kingdom. on the basis that the four hour waiting period before oxytocin stimulation may be too late [STUDD, 1973:451].

Duignan and his associates studied one thousand three hundred and six African/Caribbean, Asian and Caucasian parturient women in the Birmingham Maternity Hospital to determine cervical dilatation - time curves. The study revealed no significant differences in the progress of labour according to cervical dilatation using the partograph. Also the admission fetal head in both African/Caribbean and Caucasians was similar; that is three-fifths or more above the brim.[DUIGNAN ET AL,1975;593]. This data corroborated positively with [FRIEDMAN AND SACHTEL BEN 1965:522; HELLMAN AND PRYSTOWSKY, 1952:1225].

Also slight deceleration was recognised after full dilatation. That was in correlation with Friedman (1954) and in contrast with Hendricks ET AL (1970) who suggested that no deceleration occurred after full dilation [DUIGNAN ET AL, 1975:600].

The implication is that the partograph is a useful tool for labour management on an international level [PHILPOTT, 1972:164].

In Yaounde, Cameroon in West Africa, a retrospective study of six hundred and eighty-six clients following the introduction of the partograph and a prospective study of one thousand and forty-five including four hundred and fifty-eight Nulliparous women was conducted using the partograph. Subjects whose cervixes were more than five centimetres dilated or who delivered on arrival at the institution were excluded. The results from both studies were similar. In the prospective study of one thousand and forty-five subjects there were eight hundred and twenty spontaneous deliveries (78.5%) and two hundred and twenty-five (21.5%) labours that were intervened including twenty-seven 'test of oxytocin', instrumental vaginal deliveries and caesarean section. two maternal deaths and thirteen perinatal deaths were recorded.

It was asserted that before the deployment of Philpott's partograph programme thirty-six incidences of ruptured uteri out of a total of seventy incidences of ruptured uteri were encountered in the maternity services but the incidence of ruptured uterus has become an event of the past, since the introduction of the partograph. Also perinatal mortality decreased from forty-one point three per one thousand to thirty-one point two per one thousand births between 1974 and 1975, but no change occurred in the perinatal death rates in the other

institutions which did not use the partograph [DROUIN ET AL, 1979:744]. The researchers proposed that due to the lack of doctors in developing countries, midwives and midwife assistants should be exposed to unsophisticated, cheap, reliable and accurate means of detecting labour aberration and the partograph meets the challenge.

A prospective study carried out in Nigeria disclosed that the mean duration of labour in both primipara and multipara was eleven point seventy-nine hours [AYANGADE, 1983:253]. That finding was in agreement with Friedman's allowable duration of the first stage of eleven point seven hours [FRIEDMAN, 1955:571].

Ayangade suggests that one hourly vaginal assessment should be the norm in a regular partograph approach since this procedure has not proved scientifically risky in terms of sepsis [AYANGADE, 1983:259]. However, there is a need to study the psychological and emotional effects of this suggested protocol.

The study further showed that assisted vaginal deliveries, especially vacuum extraction was associated with low Apgar scoring and poorer outcome of babies [AYANGADE, 1983:253]. That disclosure correlates with O'Driscoll and Meagher's result that revealed that babies who suffered from traumatic intra cranial haemorrhages were delivered by forceps [O'DRISCOLL AND MEAGHER, 1989:189; HELLMAN AND PRYSTOWSKY, 1952:1233].

One cannot discuss the partograph without brief mention of instrumental deliveries. The reason is that when the alert line has separated the twenty per cent of the slowest labours [PHILPOTT AND CASTLE, 1972:599] [STUDD, 1973:451] the next approach is augmentation which results in spontaneous delivery, assisted vaginal or abdominal delivery [PHILPOTT AND CASTLE, 1972:599].

Since difficult assisted vaginal deliveries carry higher perinatal morbidity and mortality [APGAR AND JAMES, 1962:426], [AYANGADE, 1983:253] [O'DRISCOLL AND MEAGHER, 1989:189 and VACCA AND KEIRSE, 1989:1231] it should not be performed without caution. For apart from the risk to the baby, the mother is usually left with an episiotomy scar which may contribute to marital disharmony and post natal depression [BALL, 1987:21] with, in extreme cases, possible consequential suicide [COX, 1989:327].

In moderate cephalo-pelvic disproportion, caesarean section is frequently the best alternative [VACCA AND KIERSC, 1989:231]. While the maternal mortality rate due to caesarean section is higher, that is forty point nine per one hundred thousand births and higher still in elective caesarean section than all vaginal deliveries - nine point eight per one hundred thousand births [ENKIN, 1989:1201], studies have shown that there is no benefits to the baby through vaginal delivery [HENDRICKS ET AL., 1970:1077]. According to O'Driscoll, with cautious administration of anaesthesia both mother and baby stand a better chance with

caesarean section after labour has started spontaneously, than with a difficult assisted vaginal delivery [O'DRISCOLL AND MEAGHER, 1989:5, 38 & 58].

In institutions where decrease in the rate of caesarean section has been observed, after the adoption of the partograph, there has been a corresponding increase in assisted vaginal deliveries [FRIEDMAN, 1955:568]. But difficult assisted vaginal deliveries are associated with poorer outcome of babies disclosed by Ayangade [AYANGADE, 1983:253 ;and O'DRISCOLL AND MEAGHER, 1989:58].

In order to minimise assisted/instrumental vaginal deliveries, consideration should be given to the training of midwives and other trained paramedical birth attendants, in developing countries, in the performance of internal pelvimetry. This would assist early identification and referral of mothers with small pelves for possible induction of labour before 40 weeks gestation, and also before the onset of labour; for a pre-determined plan of delivery. It is also suggested that mothers hostels should be built in the close vicinity of central units for the rural dwelling mothers, as part of the safe motherhood programme. This would enable the potential "instrumental delivery mothers" to move into such hostels at thirty-seven weeks gestation, have their babies in the hospitals and return to the village. This suggested protocol would support the main aim of the partograph as an aid to childbirth in the reduction of maternal deaths.

2.2 CHARACTERISTICS OF THE PARTOGRAPH

The following features are components of the partograph; as illustrated in Figure 1.1

1. CLIENTS IDENTIFICATION

The clients name, parity, hospital number, date of admission and time of admission are recorded. However, the address of the client is lacking. For the purpose of retrospective studies which may require contacting the client at future dates the inclusion of her address would be appropriate and the partograph could then be retained in the hospital. Other missing valuable records are birth weight and Apgar score. In developed countries parturient women are allowed to carry their folders home because their information is held on computers. Women in developing countries should also have the opportunity to take their folders home as well as their ante-natal cards which they already have access to. Apart from providing record for possible follow up of the baby, it would also be a useful data for maternity care providers in the clients subsequent childbirths

2. THE HOURS OF RUPTURE OF MEMBRANES

Should be stated.

3. PARAMETER FOR RECKONING DURATION OF LABOUR

Time of admission is referred to as beginning of labour. The actual time of onset of labour is not included. Hendricks (1970), Philpott and Castle (1972) and O'Driscoll ET AL (1973) believe that the women's diagnosis of labour is not sufficiently reliable. Yet by O'Driscoll ET AL (1073:135) in a study which ignored women's claims of being in labour forty-two out of one thousand women (4.2%) who were sent home returned to deliver within twenty-four hours [O'DRISCOLL ET AL, 1973:135; CHALMERS ET AL, 1989:951]. Therefore, it would seem that taking into account the women's own diagnosis of the commencement of labour could aid in the early recognition of prolonged latent phase.

4. FETAL HEART RATE

This is recorded graphically

5. LIQUOR

Information about the presence or absence of the membranes and the colour of the liquor amnii are recorded.

6. MOULDING

Should be recorded as +, ++ or +++.

7. THE CERVICOGRAPH

This forms the central part and the most important feature of the partograph because that is the area of the graph that portrays the exact rate of progress of labour. It runs for a twenty-four hour period and the cervical dilatation is plotted by an "X"..

8. THE ALERT LINE

Within the cervicograph (refer definition of concept).

9. THE ACTION LINE

Within the cervicograph (refer definitions of concepts).

10. DESCENT OF FETAL HEAD (see figure 2:4)

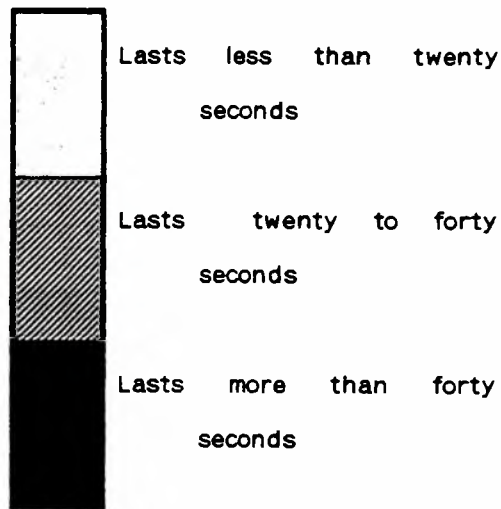
This is the level of the fetal head in relation to the maternal pelvic brim as the number of "fifths" of the fetal head still above the pelvic brim. It is plotted with an "O" on the cervicograph. It is thought to be a better parameter for describing the descent of the head through the pelvis than the head being related to the ischial spines [CRICHTON

CITED IN PHILPOTT, 1972:164]. It is the second important characteristic on the cervicograph

11 CONTRACTIONS

These are plotted directly below the cervicograph according to a key. The contractions which are the third important feature of the graph portray the variety of uterine efficiency in labour generally and as well as during oxytocin stimulation

Key for recording of contractions



12 DRUGS AND INTRAVENOUS FLUIDS

Drugs including oxytocin and intravenous fluids are recorded below the contractions graph.

13 VITAL SIGNS

Below the drug chart is a graph for the monitoring and recording of the maternal blood pressure, pulse and temperature.

14 CHARACTERISTICS OF URINE

The lowest portion of the graph is used to record urinary output and composition. This is important because of the anti diuretic effect of oxytocin, and the need to test the urine for sugar, protein and acetone [PHILPOTT, 1972, 163-165; STUDD, 1973, 451-453; and W.H.O./M.C.H.,/88.3.8]. (See Figure 1.1).

2.3 MODALITIES OF THE PARTOGRAPH

The following provide guidelines for the use of the partograph.

1. THE CLIENT IDENTIFICATION

Is for the persons identity.

2. THE HOURS OF MEMBRANES RUPTURE

The client is interviewed to enquire about the state of the membranes. If they have ruptured before the clients admission, the duration of the rupture is recorded so that antibiotics could be given prophylactically after a high vaginal swab has been taken. In order to prevent genital tract infection of mother and congenital pneumonitis in the fetus, if the duration of rupture is more than 24 hours [BENNETT AND BROWN, 1993:400] [ENKIN ET AL., IN; CHALMERS ET AL. 1989,1246].

3. TIME OF RECKONING LABOUR DURATION

This is from the time of admission. No allowance is given for the performance of the uterus before admission. This approach gives an erroneous impression of short duration of labour. For example, if a woman arrives in labour with a cervical dilatation of five centimetres at eleven hours; the cervicograph would be plotted on the alert line corresponding to ten hours on the time-scale of the graph. If the client deliveries five hours later, dilating at one centimetre per hour, the five hours places her at the top line of the cervicograph, correlating with fifteen hours on the time-scale of the graph. The duration of labour should be recorded as fifteen hours and not five hours since empirical studies have found that active labour means "pain plus progress" [HENDRICKS ET AL., 1970:1076] "Onset of

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labour onset of appreciable cervical dilatation designated
latent phase" [FRIEDMAN, 1954:1570]. "Efficiency of the
uterus can only be measured in terms of the results
achieved" [O'DRISCOLL AND MEAGHER, 1989:48].

All these quotations indicate that the uterus performs some activity before progress in cervical dilatation is achieved, therefore, it is highly incongruous for a five centimetre dilated cervix on admission to be diagnosed as the onset of labour. The more objective approach would be the correlation of the cervical dilation with the time-scale on the partograph; and that would be fifteen hours.

4. FETAL HEART RATE

The normal baseline is between one hundred and twenty and one hundred and sixty beats per minute. It may increase by five beats during contraction but return to normal soon after contraction. Fetal bradycardia and tachycardia are signs of hypoxia. Fetal heart deceleration either early deceleration or late deceleration and prolongation of time-lag are indications for referral of the client to a central unit or for the summoning of a doctor. Fetal heart rate may be checked before contraction, during contraction and after contraction with simple fetal stethoscope with a high degree of accuracy.

Fetal heart rate should be checked with the client in the lateral position. If in distress the mother should be given oxygen and intravenous fluid.

5. LIQUOR AMNII

If membranes are intact it is recorded as "I", if liquor is clear it is recorded as "C", "M" for meconium strained liquor; light green or muddy colour indicates former distress and deep green suggests fresh distress. Whether the presentation is cephalic or breech, meconium straining is indicative of hypoxia. Meconium inhalation and pneumonitis or even perinatal death may ensue from meconium strained liquor [BENNETT AND BROWN, 1993:388; O'DRISCOLL ET AL., 1969;478]. If an oxytocin drip is in situ it should be stopped and a doctor called at once. In a peripheral unit, the client should be transferred as soon as possible to the central unit. Absence of liquor is recorded as "A".

6. MOULDING

If present, it is an indication of cephalo-pelvic disproportion. It is recorded beneath the character of the liquor as follows:

- (i) Sutures can be felt easily = 0
- (ii) Vault bones touch each other at sutures =+

- (iii) Bones are overlapping but can be moved apart =++
- (iv) Bones are overlapped and cannot be separated +++

Severe caput can mask moulding. The client should be transferred if moulding is present.

7. CERVICOGRAPH

Vaginal examinations are carried out every four hours and plotted with an "X", the time scale should be marked with an arrow to indicate when the next internal examination is due. The initial vaginal examination is a very important event which should explore the pelvic cavity for adequacy as well as make accurate record of dilatation to provide baseline information.

It should, therefore, be performed by a competent trained senior birth attendant [O'DRISCOLL AND MEASHER, 1989:41; PHILPOTT AND CASTLE, 1972:600]. Error in the first examination can lead to perinatal death when the client is given sedatives for pain relief especially pethidine even though the cervix has advanced in dilatation, or the client is in transition phase. The baby then may be born in a depressed state. Lack of progress for 6 hours in latent phase 3 hours in active phase and 2 hours in the second stage are evidences of uterine inertia. If the client progresses to 3 centimetres or more in the latent phase the

recordings are transferred into the appropriate column in the active phase of the graph. The transfer is marked by broken lines and "TR" written at the top of the broken lines (see Figure 1.1).

8. THE ALERT LINE

When labour is progressing effectively at one point two centimetres per hour, the plotting of cervical dilatation remains on the alert line or to the left of it. A flattening of the slope is indicative of uterine dysfunction-inertia. It demands two hourly monitoring and referral to a central unit or augmentation.[see figure 2;4]

9. THE ACTION LINE

When the action line is reached, active management is initiated as follows:[see figure 2;5]

- (i) Sedation
- (ii) Further pelvic assessments
- (iii) Administration of intravenous fluids
- (iv) Oxytocin stimulation for six hours trial of oxytocin
- (v) Hope for spontaneous delivery, but plan for caesarean section if further complications, such as fetal distress arises; assisted vaginal delivery may be feasible or caesarean section may be necessary in fetal distress.

If there is a major disproportion operations can be carried out earlier than it would have been possible prior to the introduction of the partograph thus reducing the risk of maternal and fetal infection, and post partum haemorrhage.

10. DESCENT OF FETAL HEAD

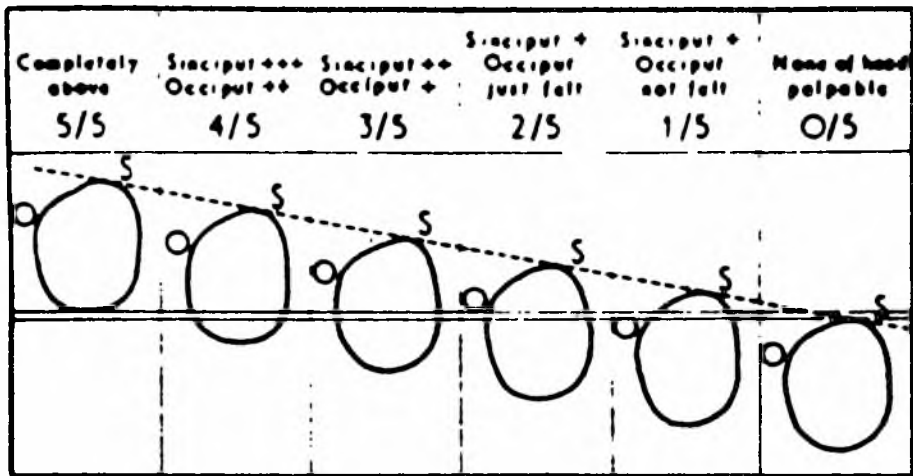
This is the amount of head palpable in "fifths" per abdomen. It is plotted as an "O". Progressive descent is evidence of normality (see Figure 2.6).

11. UTERINE CONTRACTIONS

In active labour these should occur at least three times in ten minutes and each contraction should last more than 40 seconds. They are charted according to the key. Monitoring should be done in the last ten minutes of every half hour. (see key on page ⁴²38).

12. DRUGS AND INTRAVENOUS FLUIDS

Drugs and intravenous fluids for stimulation and nutritional purposes should all be recorded accurately with dose and time of administration and volume of fluids.



—Descent of head measured by abdominal palpation and expressed in terms of fifths above brim (Crichton; diagram modified by Lasbrey).

13 GENERAL MATERNAL CONDITION

The temperature and blood pressure should be recorded every four hours. If the levels are abnormal, they should be monitored every two hours. The pulse should be checked every one or two hours then half hourly as labour advances, that is when uterine contractions are occurring three times in ten minutes and each lasting sixty seconds.

14. URINE

The volume of urine passed should be accurately recorded especially if oxytocin is being administered because of its antidiuretic property [PHILPOTT AND CASTLE, 1972:594, 599; STUDD, 1973:451; W.H.O./M.C.H./88.411].

Urinalysis for proteins, acetone and sugar should be carried out for identification, interpretation and intervention. Although the presence of ketones may be physiological, large amounts may be due to starvation or maternal distress [BENNETT AND BROWN, 1993:173]].

The world Health Organisation has embraced the concept of the partograph and has constructed a partograph proposed for universal use. As part of the safe motherhood programme, the World Health Organisation has employed a

strategy called "Operations Research". The aim of Operations Research is the practicability of the use of the partographs in maternity units, and evaluative studies to monitor the programme [W.H.O./M.C.H./89.1:2].

From the literature search so far the potential value of the partograph has been recognised in a number of countries. However, like any human endeavour there are advantages, disadvantages and challenges to the programme as accounted in the next pages.

2.4 THE STRENGTHS OF THE PARTOGRAPH

The advantages of the partograph are that;

- (i) It has a universal application [FRIEDMAN, 1965; PHILPOTT AND CASTLE, 1972; STUDD, 1973; DUIGAN ET AL., 1979].
- (ii) It is an efficient, practical and cheap approach to the early identification of aberration of labour for timely intervention [FRIEDMAN, 1954, 1955; PHILPOTT AND CASTLE, 1972; DUIGNAN ET AL., 1975; STUDD, 1973; MPANDA, 1993].
- (iii) It reduces the risk of obstructed labour, ruptured uterus and obstetric fistulae [PHILPOTT AND CASTLE, 1972; DROUIN ET AL., 1979].

- (iv) It is associated with a reduction in perinatal mortality and morbidity [FRIEDMAN, 1969; O'DRISCOLL AND MEAGHER, 1989; DROUIN ET AL., 1979; MPANDA, 1993].
- (v) It is simpler than lengthy written notes and the pictorial display of labour parameters provided by the partograph affords assessment of progress of labour at a glance [PHILPOTT AND CASTLE, 1972; STUDD, 1973].
- (vi) It has an important value in the training of both medical students and midwives [GLICK ET AL., 1970; STUDD, 1973; DROUIN ET AL., 1979; AYANGADE, 1983].

2.5 THE LIMITATIONS OF THE PARTOGRAPH

The limitations of the partograph are that;

- (i) (a) It is a contributory factor in the medical model of labour management
- (b) It is not necessarily associated with a reduction in operative intervention [MPANDA, 1993:45].
- (ii) It favours the educated maternity care providers only. The traditional birth attendants are not able to make use of it (verbal communication at the Second Conference of Action

for Safe Motherhood, U.K branch, 30:4:94) and therefore it is an inappropriate tool for use in many rural communities.

- (iii) Requires at least three weeks of training for the midwife to be competent in the monitoring and interpretation of the parameters involved (as observed by the writer in the past).
- (iv) The requirement for half hourly monitoring of labour progress increases workload of midwives who have to cater for many parturient women in developing countries [MPANDA, 1993:45].

2.6 THE CHALLENGES OF THE PARTOGRAPH PROGRAMME

The prime objective in the use of the partograph is early identification of aberrations in labour. However, pregnancy precedes labour and the question arises that it would be advantageous to establish a machinery for the early detection of possible cephalo-pelvic disproportion in pregnancy. This would allow the client with potential uterine dysfunction to be managed straight away in central units without an initial admission into the peripheral institution, and could prevent obstructed labour, ruptured uterus, fistulae and maternal and perinatal losses, which might arise due to lack of adequate transportation and

communication at a later stage. Clinical pelvimetry is a possible technique which might meet this need [FAWDRY, 1994:4].

A more objective method of calculation of the duration of labour is required. The current perception of the duration of labour is from the time of admission in labour to the time of delivery [HENDRICKS ET AL., 1970:1076; PHILPOTT AND CASTLE, 1972,593; STUDD, 1973:451; O'DRISCOLL AND MEAGHER 1989:20] but is not realistic since apart from precipitate labour which is abnormal, the cervix can not get to five centimetres dilated without first going through the latent phase of at least eight hours [FRIEDMAN, 1955:571].

Equally important is the observation that the four hour waiting period between the alert line and the action line is not necessary in a central institution with the services of an obstetrician. In hospital the client should not be made to wait for four hours before stimulation of labour if the cervicograph crosses the alert line. As stated by Studd, the client who develops uterine dysfunction after she has been admitted with a cervical dilation of five centimetres or more would wait for too long, that is four hours, before the absence of progress would be identified during the next due vaginal assessment [STUDD, 1973:451].

The author feels that this is where a history and communication with the mother about the labour and the nature of uterine contractions before admission would be of help. In the active

phase, the client would be expected to have uterine contractions that occur at least three times in ten minutes and each lasting forty seconds or more. Lack of these expected characteristics with the mother's confirmation that the pains had diminished in frequency and intensity should then alert the care providers that a variation in uterine function exists as. The condition of the fetus through the nature of the fetal heart rate, either bradycardia or tachycardia could also raise alarm before four hours.

Is the frequency of vaginal examination necessary?

In the Dublin experience, that is O'Driscoll's active management of labour with the use of the partograph, internal assessment is carried out on admission, then once every one hour for the next three hours. Subsequent examinations depend on the care providers' discretion. At least five pelvic assessments are carried out on one client [O'DRISCOLL AND MEAGHER, 1989:40].

In the hospital where the study was carried out, the client who reported in early latent phase was certain to go through more than three internal assessments.

In Europe and America rectal examinations are conducted to minimise the risk of infection. In most African society, however, rectal examination is not acceptable. It is asserted that women in

general prefer vaginal examination [O'DRISCOLL, 1989:34] however, the number should be decreased.

Labour is a normally occurring event, therefore, it seems unreasonable that the parturient woman should be subjected to an intensive care approach with strict half hourly monitoring and hourly vaginal examination from the latent phase of the first stage, unless some abnormality is detected.

The following study is an evaluation of the potential advantages and disadvantages of the use of the partograph in a hospital in Ghana. It was designed to provide further information to support more widespread use of this instrument, and to identify any factors where improvements could be made.

CHAPTER THREE

3.1 METHODOLOGY

AIM:

The main aim of the study was to evaluate the use of the partograph by identifying any differences in the characteristics and outcomes of the labours of pre and post partograph groups of women which could be attributed to the partograph programme.

OBJECTIVES:

The objectives were to test the following hypotheses:

The introduction of the partograph contributes to:

- (1) Early detection of uterine dysfunction in labour
- (2) Avoidance of prolonged labour
- (3) Reduction in:
 - (a) caesarean section
 - (b) maternal morbidity and mortality
 - (c) Perinatal morbidity and mortality

3.2 STUDY DESIGN

A retrospective, comparative randomised design was chosen to compare the records of the characteristics of labour and its outcome for two groups of women; designated the pre-partograph and post-partograph groups. Conventional management of labour was provided to the first group prior to the introduction of the partograph. The partograph was used as a tool to assist the management of labour in the second group. Details relating to the selection of subjects in each group are provided later in this chapter. The recorded characteristics of labour (dependent variable) were coded from the hospital obstetric records by two research assistants and correlated with the use of partograph (the independent variable).

3.3 PARAMETERS FOR INVESTIGATION

The characteristics studied were the following:

- (1) The age range in relation to delivery mode.
- (2) The number of internal examinations that were carried out on each client.
- (3) The type of sedatives/tranquillisers given if any.

- (4) The number of cervicographs that crossed the alert line.
- (5) The number of cervicographs that crossed the action line.
- (6) The modes of deliveries.
- (7) The indications for assisted and abdominal deliveries.
- (8) The amount of blood loss in relation to the duration of labour.
- (9) The use of oxytocic agents in the control of third stage blood loss.
- (10) The total duration of labour.
- (11) The need for antibiotic therapy within ten days post natal.
- (12) The number of clients who returned for post natal check-ups.
- (13) The outcome of the baby
 - (a) The Apgar score in the first one minute of life.
 - (b) The number of babies that required intensive care management.

(c) The number of babies that were alive seven days postnatal.

3.4 DURATION OF LABOUR

A further random sample of 20 was selected from the post partograph group in order to compare the duration of labour using Hendricks approach, the cervical dilation time-scale and the mothers own estimation of labour duration. Cervicographic plottings were initiated on the basis of the following information from the data collecting schedules:

- (1) Date of admission in labour.
- (2) Time of admission in labour.
- (3) Dilatation of the cervix on admission.
- (4) Time of full dilatation of cervical os.
- (5) Date of delivery
- (6) Time of delivery of baby and placenta.

Thus the total duration of labour was computed, calculating the hours according to the cervical dilation time-scale the result was compared with the Hendricks ET AL approach of admission time to the time of delivery and also to that of the mothers own diagnosis of labour onset through to the time of delivery.

3.5 ETHICAL CONSIDERATIONS

Ethics refers to the general area of rights and wrongs in theory and practice of human behaviour [THOMPSON, ET AL, 1988:1].

To meet the ethical considerations presented by the research study permission was sought from the obstetrician and principal nurse/midwife in charge of the Department of Obstetrics and Gynaecology of the hospital in Accra (see appendix 4a). Submission to a full ethical committee review was not required as the data to be collected was available in existing documents [POLIT AND HUNGLER, 1991:4].

Apart from the fulfilment of ethical issues of respecting the integrity of the officers in charge, the permission afforded access to the institution and to the materials required. Since this was a retrospective study based on hospital records, patient consent could not be obtained. However, confidentiality was maintained by using numbers to identify records in place of names.

Instructions were given to the research assistants to keep the files under lock and key. The senior nurse-midwifery officer, in charge of the unit provided a complete room for the purpose of the sampling and collection of data within the department. The files were returned as soon as possible.

3.6 ADVANTAGES OF RETROSPECTIVE STUDIES

The strengths of the utilisation of available records are that they are recorded during the events and they are unbiased, as the recordist had no idea that the records would be used for research purposes; and recall at a later date is not required because coding is done simultaneously.

Such information gathering is inexpensive because all the data can be collected at the same time and the investigator can obtain the information without obtrusive means [TREECE AND TREECE, 1982:265]. In this study the data were collected on behalf of the investigator by two research assistants after detailed directions, since limited financial resources made it impossible for her to travel abroad.

DISADVANTAGES

The limitation in the deployment of existing records and files for information gathering can be problematic in that success rates of availability has been found to be between seventy-two per cent and ninety per cent only [THOMSON, 1991:141]. Non-existence of the required information affects the reliability and validity of the data.

In this study seventy-five per cent of the documents required was available and approximately ninety-five per cent of the information being sought was obtained.

CONSTRAINTS

The major problem was access to the files. Non co-operation by the hospital records officer despite permission having been granted by the appropriate authorities caused repeated delays. Considerable efforts on the parts of the research assistants, Head of Department and others were required to eventually obtain the files. Communication difficulties were compounded by the fact that the researcher was resident in another country.

PILOTING

The pre-coded data collection tool (Appendix 3) was piloted amongst midwives in Ghana and question five on the inclusion/exclusion criteria was then changed to avoid ambiguity, to read: Did labour start spontaneously?

3.7 METHODS OF DATA COLLECTION: PREPARATION OF THE RESEARCH ASSISTANTS

Two research assistants were employed in this study. The first was a nurse-midwife, former midwifery tutor, currently a third

year under-graduate student in the Department of Nursing in the University of Ghana, and the second a graduate in economics and statistics from the University of Ghana, who had previous experience of research techniques. The latter, was oriented on the techniques of the partograph and the terminology's used in midwifery and obstetrics by the midwifery tutor.

Both assistants were given orientation in randomisation process by a senior research fellow of the Institute of Statistical, Social and Economic Research (I.S.S.E.R.) in the University of Ghana. He also provided local close supervision together with the official local supervisor (see Appendix 4D).

Detailed written instructions were provided by the investigator to direct and ensure the consistency of the data collection (see Appendix 4C). Data collection started in October, 1993 and was completed in January, 1994.

3.8 POPULATION AND SAMPLING

The study setting was a national hospital in Ghana. The population comprised of all the parturient women who reported for delivery in 1988 for the pre-partograph group, four thousand eight hundred and one in all, and all those who had their confinements in 1991 for the post-partograph group, ten thousand, four hundred and one in all. [see table 4:1].

population was four hundred and fifty-one. One hundred subjects were selected from each group.

Unfortunately, only seventy-two of the pre-partograph sample files were located and seven were later excluded because the subject arrived in advanced labour and delivery occurred within five minutes to one hour of arrival. In the post-partograph group sixteen folders could not be located and eight were excluded on similar grounds. Thus the final sample was sixty-five for the pre-partograph and seventy-six for the post-partograph women. Friedman (1955:568) and Drouin ET AL (1970:741) used similar exclusion exercises to eliminate clients whose cervicographs were over five centimetres dilated on admission. The approach meant that the sampling favoured the clients with prolonged labours, although some of the subjects delivered in a period as short as one hour and others laboured for as long as twenty-six hours.

3.10 RELIABILITY

Treese and Treese (1982:119) described reliability as the proportion of accuracy in measurement i.e. the ability of the data collecting device to obtain consistent results. The data collection tool was carefully designed to fulfil its aim of identifying the total duration of labour, the modes of deliveries as well as other characteristics of labour and the outcome of mother and baby.

It is recognised that the reliability of the data recorded in the files cannot be measured and was provided by a variety of different maternity care personnel. However, the data were clearly recorded and defined and, therefore, there was little risk of error or misinterpretation during the coding. Nevertheless, a sample of the coding was re-checked by the midwifery tutor.

3.11 DATA COLLECTION

The data collection and the information gathering schedule for the study may be located in Appendix 2 and 3 respectively.

3.12 DATA CODING AND ENTRY

The information gathered was re-coded onto spread sheets and entered into a computer using the statistical package for the social scientist and personal computer (SPSS/PC+) for analysis.

CHAPTER FOUR

4.1 RESULTS

The obstetric records/notes of normal primigravid women who presented at the hospital during pregnancy and for their labours in 1988 for the pre-partograph group and in 1991 for the post-partograph group were systematically reviewed to identify those who fulfilled the inclusion/exclusion criteria. Table 4.1 illustrates the selection process of the two groups.

Table 4.1 - Subject Selection

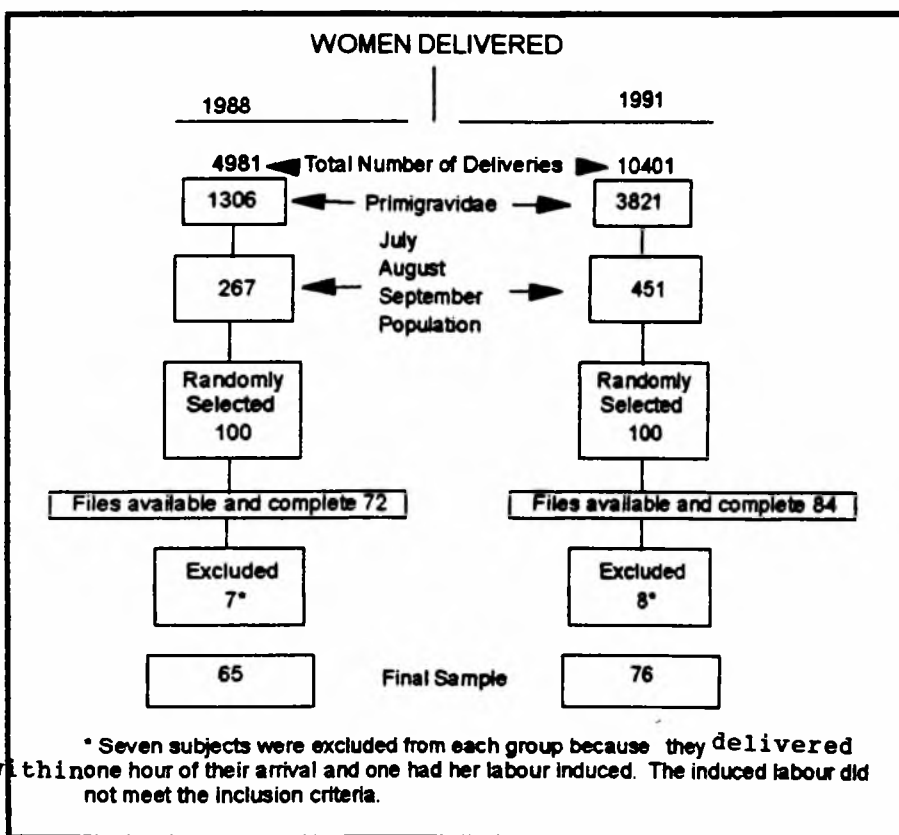


Table 4.2 Study Period and the Distribution of the (Deliveries)**Samples**

STUDY GROUP		
1988		1991
18	July	27
17	August	23
30	September	26
65	Total	76

4.2 DATA ANALYSIS

In the data analysis all the relevant information was listed onto a spread sheet created in the statistical package for the Social Sciences (SPSS/PC+). The package was opted for because of its versatility and accuracy in analysing data and calculating results If the correct information is provided [NORUSIS, 1988:3].

Frequency tables were used to provide a descriptive analysis of the data and the chi-square test, the Wilcoxon matched-pairs rank

test and the Fishers exact test were tests of statistical significance used. The significance level to accept or reject the hypotheses (restated below) was set at a probability level of less than or equal to 0.05 ($P < 0.05$).

4.3 THE HYPOTHESES

The partograph contributes to:

- (1) Early detection of uterine dysfunction in labour
- (2) Prevention of prolonged labour
- (3) Reduction in:
 - (a) Caesarean section deliveries
 - (b) Maternal morbidity and mortality
 - (c) Perinatal morbidity and mortality

4.4 PARAMETERS MEASURED

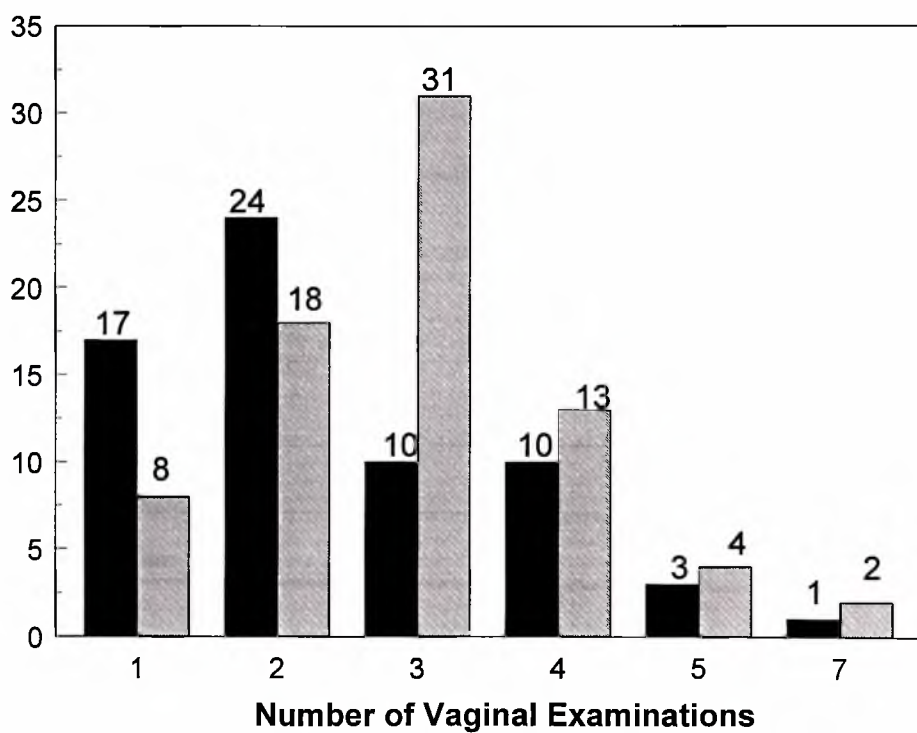
The parameters of labour which were studied have been presented in the methodology section and will be dealt with in turn:

Table 4.3 comparative table showing age and delivery mode distribution

Age Range	PRE-PARTOGRAPH n = 65				POST-PARTOGRAPH n = 76		
	Spont Del	Caesa Section	Vacuum Extract	Forceps Del	Spont Del	Caesa Section	Vacuum Extract
15 - 19	15	2	1	0	18	1	0
20 - 24	12	5	4	0	26	8	1
25 - 29	12	6	2	1	7	2	3
30 - 34	2	1	0	0	6	2	1
35 - 39	0	2	0	0	0	0	0
40 - 44	-	-	-	-	-	-	-

Figure 4.1 - Bar Chart Showing the Number of Clients in Both Groups in Relation to the Number of Vaginal Examinations Received

**NUMBER OF
CLIENTS**



Pre-Partograph Group N = 65



Post-Partograph Group N = 76



Table 4.4 comparative table showing frequency and types of sedatives/tranquilliser employed for the relief of pain and anxiety in the management of labour

INTRA-MUSCULAR MEDICATION	PRE-PARTOGRAPH n = 65		POST-PARTOGRAPH n = 76	
	Frequency	%	Frequency	%
Pethidine 50 - 100 mg	24	36.5	30	40
Sosegon	0	0	8	11
Pethidine and Phenergan	0	0	4	5
Pethine and Sosegon	0	0	3	4
Pethidine and Valium	0	0	2	3
Pethidine, Sosegon and Phenergan	0	0	1	1.3
Valium	1	1.5	1	1.3
No Medication	40	62	27	35

Table 4.5 <http://syspartograph.cii> Comparative table of the postpartograph clients whose cervicographs crossed the Alert line and those that crossed the action line, the interventions offered and the modes of deliveries

VARIABLES	CROSSED ALERT LINE n = 24		CROSS ACTION LINE n = 20	
	Frequency	%	Frequency	%
Artificial rupture of membranes (only)	2	8	0	0
Artificial rupture of membranes, sedation and dextrose saline	4	17	2	10
Sedation and dextrose saline	2	8	13	65
Artificial rupture of membranes and dextrose saline	3	13	1	5
Dextrose saline only	6	26	0	0
Sedation only	2	8	2	10
Artificial rupture of membranes and sedation	2	8	0	0
Artificial rupture of membranes, sedation and syntoclonon	1	4	2	10
Syntoclonon, dextrose saline and sedation (membranes ruptured spontaneously)	1	4	0	0
Nothing was given or done	1	4	0	0
DISTRIBUTION OF DELIVERY MODES				
Spontaneous delivery	20	84	8	40
Caesarean section	4	16	9	45
Vacuum extraction	0	0	3	15

Figure 4.2 Bar Chart Showing the Delivery Modes in Relation to the Cervicographic Behaviour of the Post-Partograph Clients

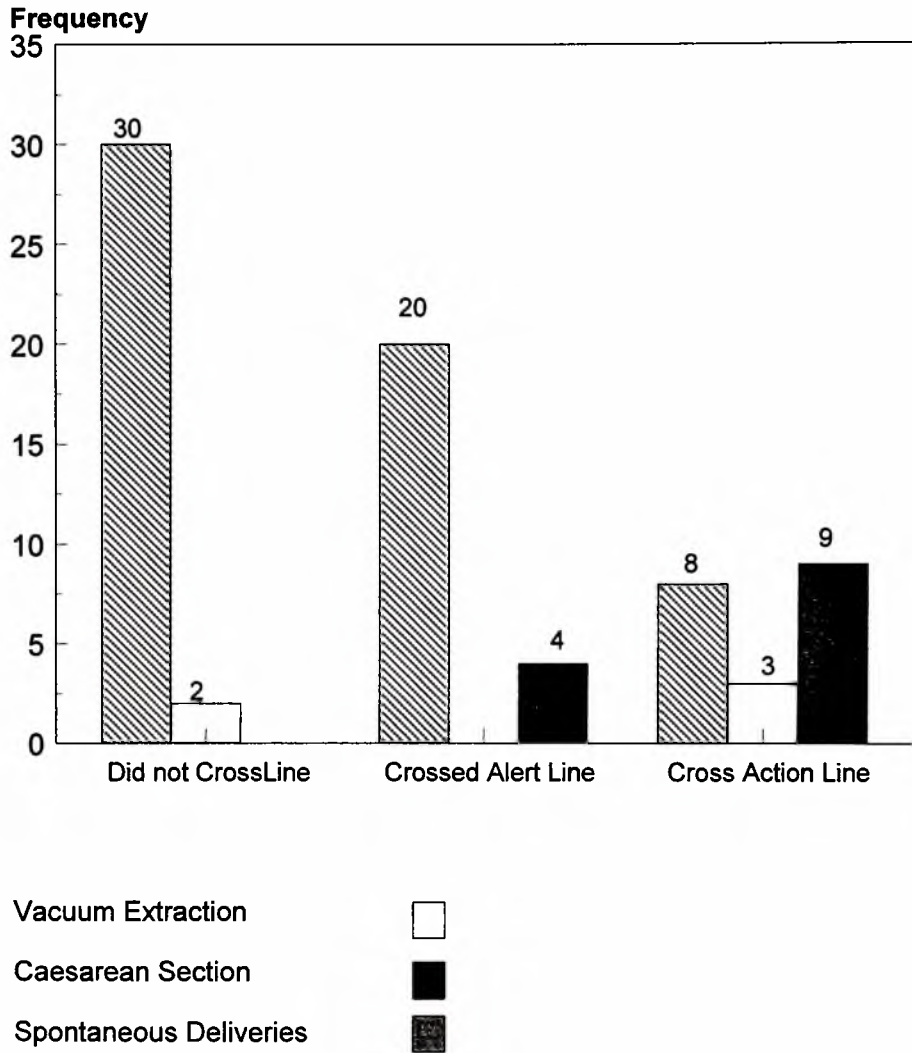


Table 4.6 comparative table showing modes of deliveries

No significant difference in numbers of caesarean section, vacuum extraction or forceps delivery after the Introduction of Partograph

(Fishers Exact Test)

	Spontaneous Delivery	Caesarean Section	Vacuum Extraction	Forceps Delivery
PRE-PARTOGRAPH N = 65	41	16	7	1
POST-PARTOGRAPH N = 76	58	13	5	0

**Table 4.7 Comparative table showing indications for
assisted and abdominal deliveries**

CAESAREAN SECTIONS	PRE-PARTOGRAM N = 16		POST-PARTOGRAM N = 13	
	Frequency	%	Frequency	%
Cephalo-pelvic disproportion	7	43.75	4	32
Cephalo-pelvic disproportion with fetal distress	2	12.5	3	23
Fetal distress	3	18.75	0	0
Cephalo-pelvic disproportion with cervical dystocia	1	6.25	2	15
Cephalo-pelvic disproportion - failed vacuum extraction	1	6.25	1	7.5
Persistent occipito-posterior position with no progress	0	0	1	7.5
Sickle cell disease	1	6.25	0	0
Bad obstetric history/elderly Primigravida	1	6.25	2	15
VACUUM EXTRACTION				
Maternal exhaustion	5	72	4	80
Delayed second stage	2	28	1	20
FORCEPS DELIVERY				
Delayed decent of the fetal head	1	100	0	0

Table 4.8 Tables showing blood loss in relation to duration of labour

Fisher's Exact Test P0.09 not significant

PRE-PARTOGRAPH

DURATION OF LABOUR	BLOOD LOSS		TOTAL
	LESS THAN 500 MLS	OVER 500 MLS	
Less than 24 Hours	61	2	-
Over 24 Hours	1	1	-
Total Number of Clients	62	3	65

Table 4.9 Fisher's Exact Text P0.86 - not significant

POST-PARTOGRAPH

DURATION OF LABOUR	BLOOD LOSS		TOTAL
	LESS THAN 500 MLS	OVER 500 MLS	
Less than 24 Hours	65	10	-
Over 24 Hours	1	0	-
Total Number of Clients	66	10	76

Pie graphs showing:
Types and percentage of Oxytocic Agents administered for control of third stage haemorrhage

Figure 4.3 Pre-Partograph Group N = 76

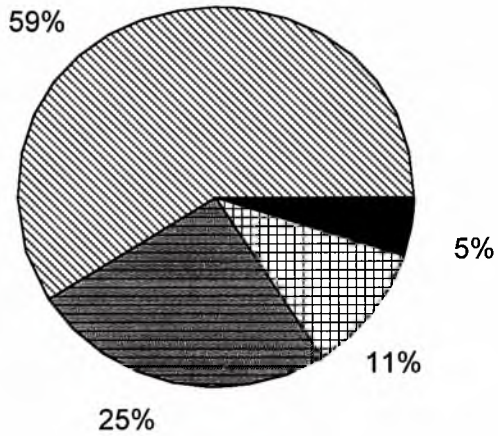
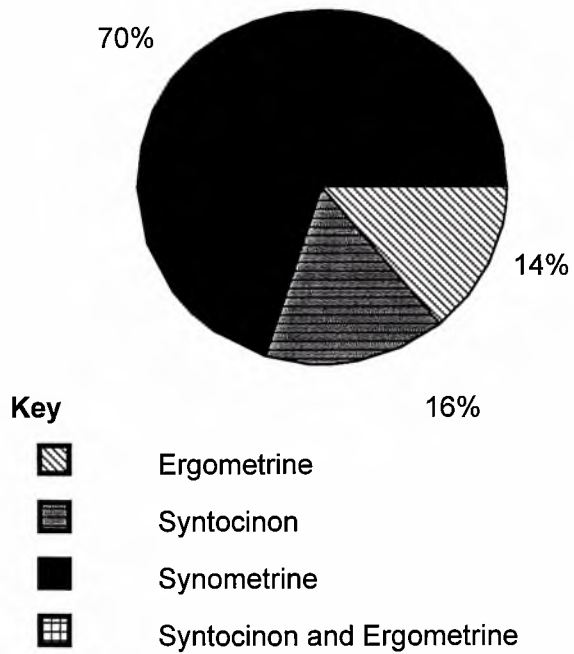


Figure 4.4 Post-Partograph Group N = 76



	LESS THAN 24 HOURS	OVER 24 HOURS
PRE-PARTOGRAPH N = 65	63	2
POST-PARTOGRAPH N = 76	75	1

Table 4.11 Table of comparison, mean duration of labour,
 Hendricks approach and mothers diagnosis of labour

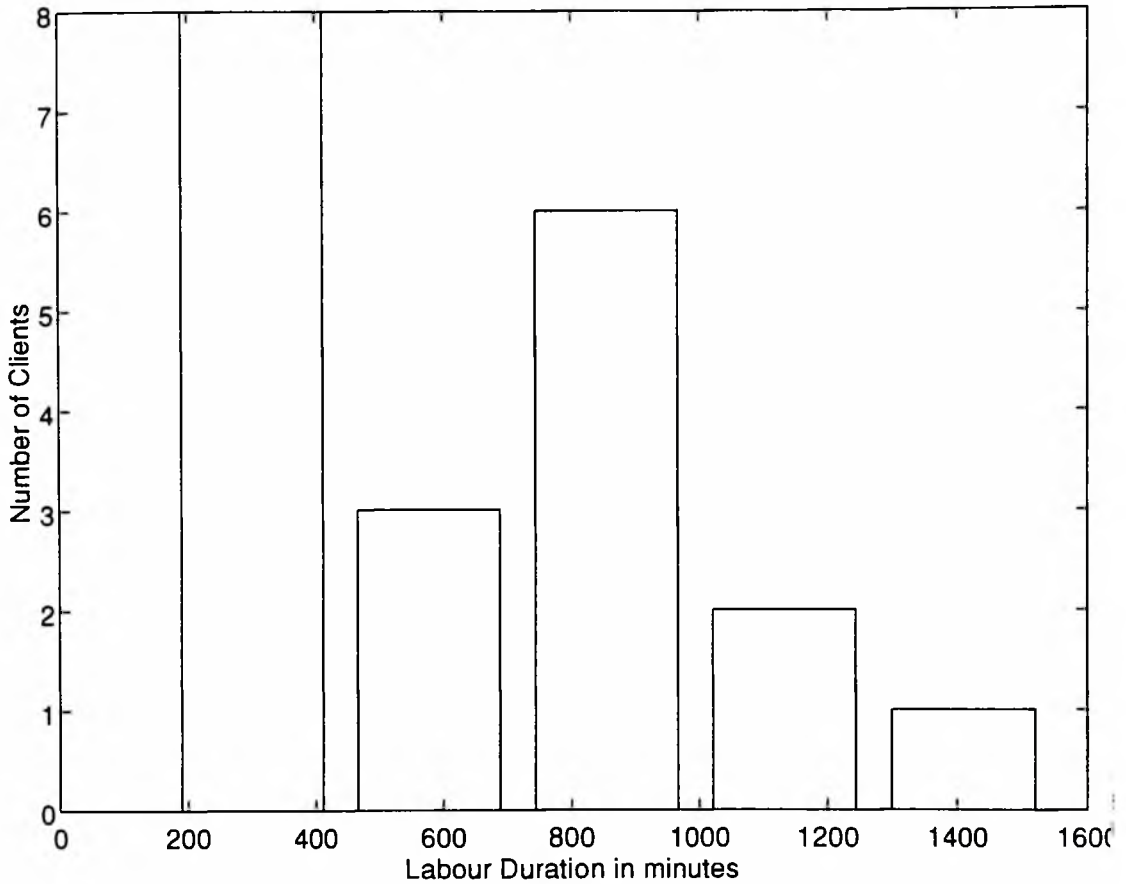
	PRE-PARTOGRAPH N = 65	POST- PARTOGRAPH N = 76
Mean Value Hendricks Admission Time Approach	7 Hours	9 Hours
Mean Value Mother's Own Diagnosis	15 Hours	13 Hours
COMPARISON OF RANDOMLY SELECTED 20 SAMPLE MEAN VALUES		
	Hendricks	10 Hours
	mothers	13.7 Hours
	cervical dilation time-scale	15.6 Hours

The comparison of the mean duration of labour using Hendricks approach and the mothers experience of labour duration produced a result which was significant at the $P < 0.05$ level, using Wilcoxon matched-pairs signed ranks test ($N = 16$, $T = 1$, one-tailed H_1). Therefore, the null hypothesis that the Hendrick's approach of admission time to time of delivery estimation of the duration of labour does not underestimate the duration of labour based on the mothers own diagnosis was rejected.

Also while the mothers diagnosis showed a normal distribution on a bell graph, Hendricks approach produced a skewed graph, as well as under valuing on a scattergraph (see Figures 4:5 & 6).

The second test was labour duration by cervical dilation time-scale approach and Hendricks admission time method. The null hypothesis was: The cervical dilation time-scale approach of calculating labour duration does not provide a higher value than that of Hendricks method. The result was significant at the $P < 0.01$ level, using the Wilcoxon test ($N = 15$, $T = 0$, one-tailed H_1). The null hypothesis was, therefore, rejected and it was concluded that the cervical dilation time-scale approach does provide a higher value than that of Hendricks. Also the cervical dilation time-scale produced a normal distribution on a bell graph; as against the skewed distribution displayed by Hendricks' values obtained (see Figure 4.7). There is a correlation co-efficient of 0.73 and a standard error of forty-three point three per cent between Hendricks and cervical dilation time-scale approaches.

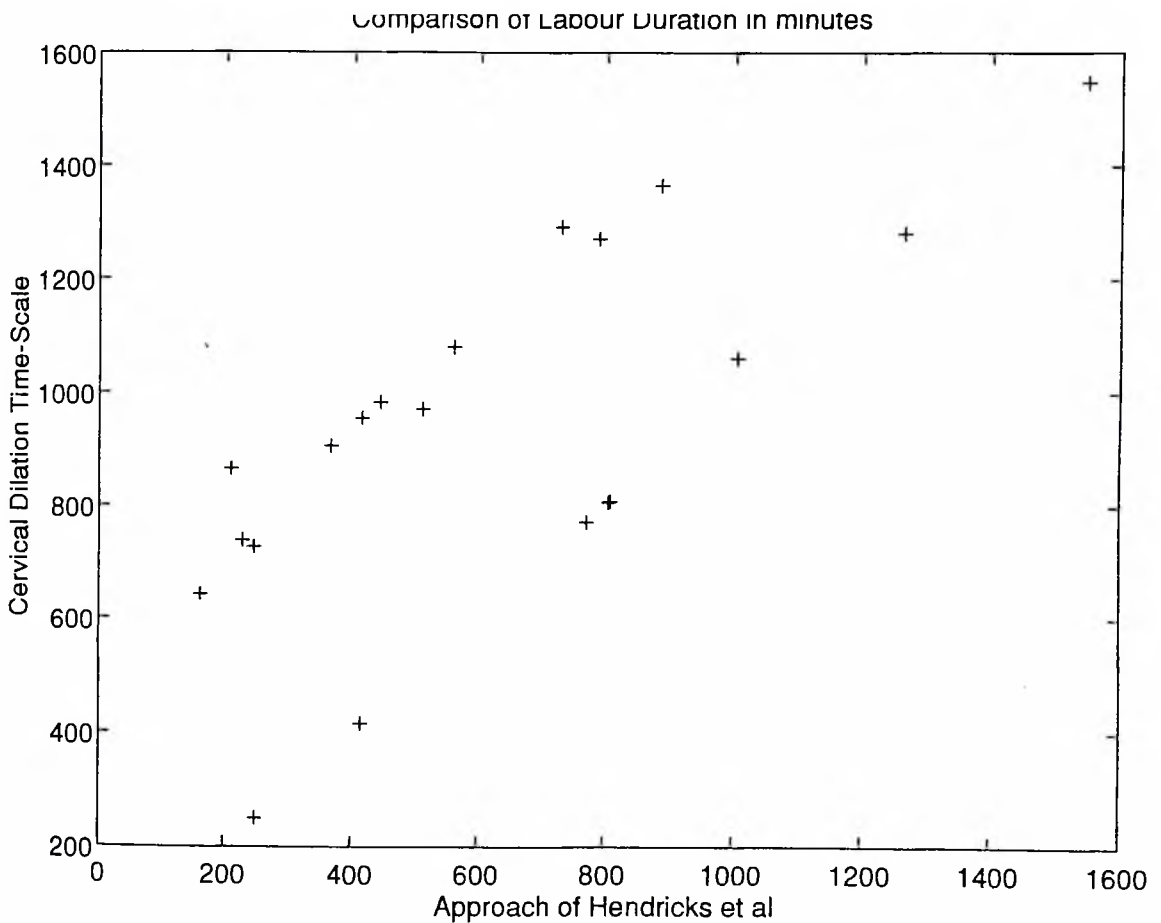
Test three was labour duration by cervical dilation time-scale approach and the mothers own diagnosis/experience of labour duration. The null hypothesis was: There is no difference between these methods of estimating labour duration. The result was ($N = 19$, $T = 61\frac{1}{2}$). This value of T was not significant. The conclusion was that the data confirms that there is no significant difference between mothers estimate of labour duration and that derived from the cervical dilation time scale approach. The histogram produced by the values of mothers diagnosis of labour duration is identical with that derived from the cervical dilation time-scale (see Figure 4.8). A correlation co-efficient of 0.60 and a standard error of thirty-two point four per cent exist between the clients own diagnosis of labour duration and that of the cervical dilation time-scale.

Figure 4.5 - Histogram of Labour Duration: Hendricks et al Method

A SKEWED GRAPH ,UNDERVALUEING MOTHER,S EXPERIENCE OF LABOUR.
PRODUCT OF DURATION OF LABOUR CALCULATION FROM TIME OF
ADMISSION TO TIME OF DELIVERY.(HENDRICK,S ET. AL.1970.1068)
MEAN=618 minutes(10.3hours) MODE=288 minutes (4.8hours)
MEDIAN= 534minutes (8.9hours) S.DEV.=362minutes(6.2hrs)

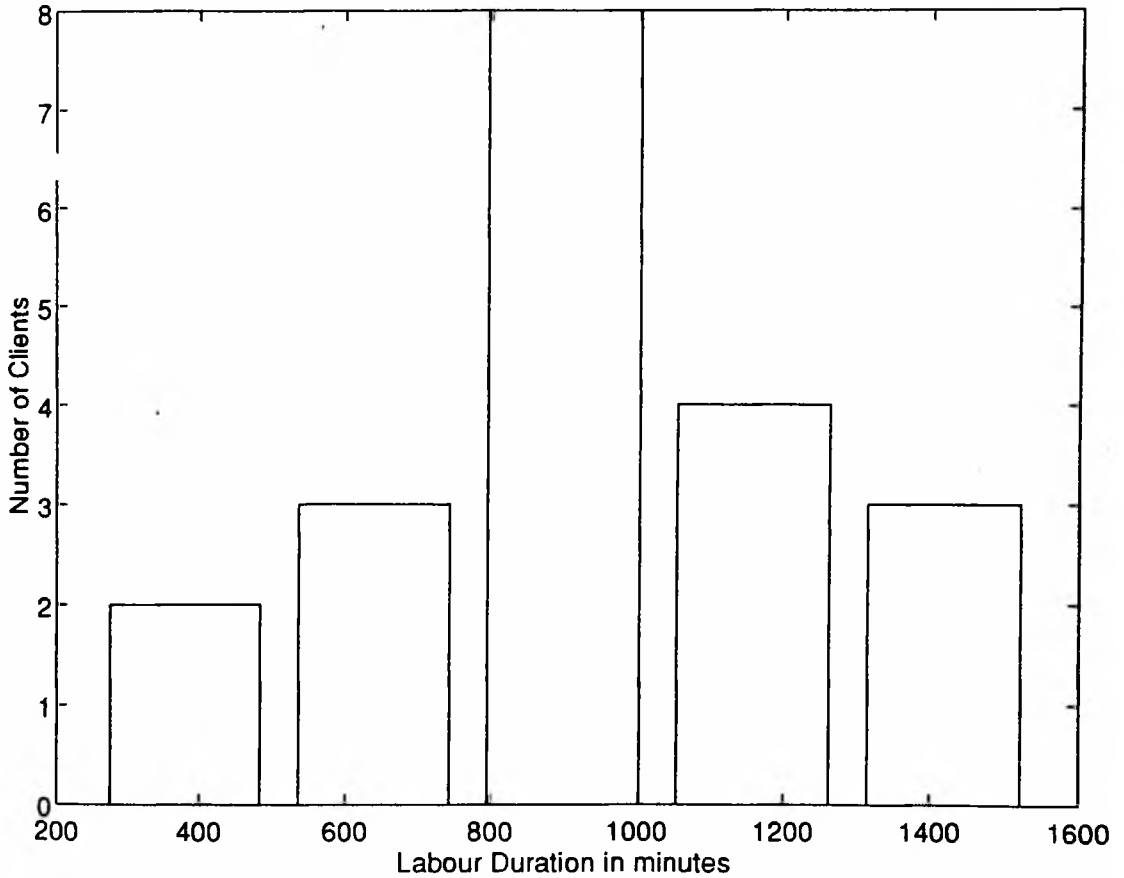
FIGURE 4.5

Figure 4.6 Scattergram showing less than perfect associations [clegg, 1990:124] between labour duration estimated according to Hendricks, ET AL method and that of cervical dilation time-scale approach.



This graph shows a normal dist.

Figure 4.7 histogram of labour duration : cervical dilation time-
scale method



SUGGESTED APPROACH FOR ESTIMATING LABOUR DURATION, THAT IS
CERVICAL DILATATION- TIME, SCALE, SHOWING NORMAL
DISTRIBUTION.

MEAN=(936minutes) 15.6hours

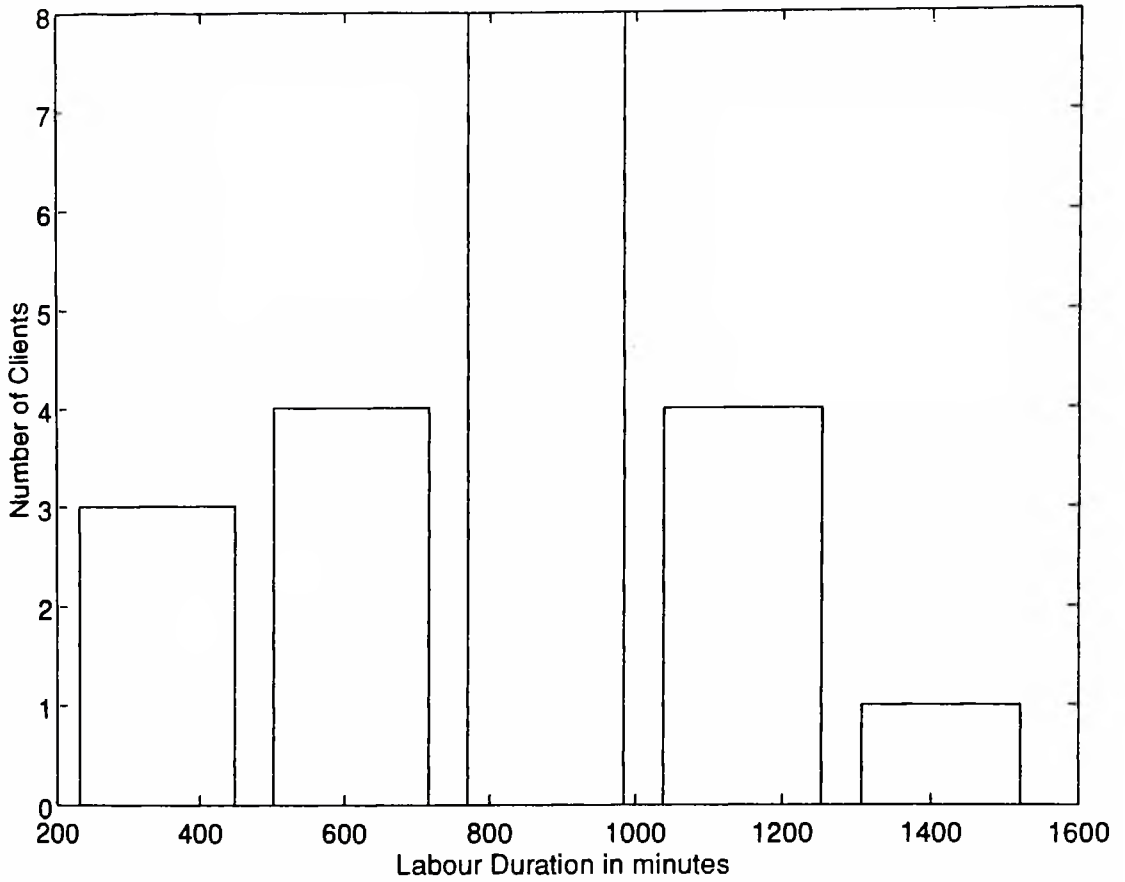
MODE=(900minutes) 15hours.

MEDIAN(930minutes) 15.5hours.

S.DEV.318minutes 5.3hours.

This graph shows a distribution which is closer to normal than the Hendricks method

Figure 4.8 Histogram of Mother's Diagnosis of Labour Duration



MEAN=787 minutes (13.7 hours)
MODE=847 minutes (14.6 hours)
MEDIAN= 845 minutes (14 5 hours)
S.DEV.=304 minutes (5.4 hours)

Table 4.12 Comparative table showing the need for antibiotics
[University of Ghana http://ugspace.ug.edu.gh](http://ugspace.ug.edu.gh)

within 10 days postnatal and the types administered

	Ampicillin	Amoxycillin	Amoxycillin and Ampicillin	Crystalline Penicillin	Ampicillin and Crystalline Penicillin	Amoxycillin and Flagyc	Antibiotic given but not Specified	No Antibiotic Given
Pre-Partograph	<u>29</u>	<u>0</u>	<u>0</u>	<u>1</u>	<u>4</u>	<u>0</u>	<u>2</u>	<u>29</u>
Post-Partograph	<u>7</u>	<u>6</u>	<u>6</u>	<u>2</u>	<u>1</u>	<u>1</u>	<u>8</u>	<u>45</u>

Table 4.13 Antibiotic requirement cumulative table

	HAD ANTIBIOTICS	DID NOT HAVE ANTIBIOTICS
PRE-PARTOGRAPH	36	29
POST-PARTOGRAPH	31	45

Table 4.14 Table Showing Summary of Parameters Investigated, results and statistical significance

LABOUR CHARACTERISTICS	PRE-PARTOGRAPH N = 65			POST-PARTOGRAPH N = 76			STATISTICAL SIGNIFICANCE
		%	Mean Value		%	Mean Value	
Age Range	15-39	-	-	14-34	-	-	
Mean Internal Examinations	-	-	2.4	-	-	2.5	N.S
Number of Clients who did not cross lines	N.A	-	-	32	42	-	
Number crossed Alert line	N.A	-	-	24	32	-	
Number crossed Action line	N.A	-	-	20	26	-	
Number sedated in labour	25	38	-	49	65	-	P<0.01
Spontaneous delivery	41	62	-	58	76	-	-
Caesarean Section	16	24	-	13	17	-	N.S
Vacuum Extraction	7	12	-	5	7	-	N.S
Forceps Delivery	1	2	-	0	0	-	N.S
Prophylactic Oxytocic Agent in third stage	65	100	-	76	100	-	-
Blood Loss less than 500 mls	62	95.5	-	66	87	-	N.S
Blood Loss over 500 mls	3	4.5	-	10	13	-	N.S
Duration of Labour < 24 hrs	63	97	-	75	98.7	-	N.S
Duration of Labour > 24 hrs	2	3	-	1	1.3	-	N.S
* Mean Duration, Hendrick's Approach	-	-	7 hrs	-	-	9 hrs	N.S
Antibiotics requirement within 10 days post natal	36	56	-	31	40	-	N.S
Mothers who attended post natal clinic	55	85	-	67	87	-	N.S
Mothers who defaulted	10	15	-	9	13	-	N.S
N.S = NOT STATISTICALLY SIGNIFICANT							
N.A = NOT APPLICABLE							
20 RANDOMLY SELECTED POST-PARTOGRAPH GROUP						MEAN	
* Duration of labour, Hendricks admission time approach						10	Hrs
Mothers diagnosis of labour -by onset of labour						14	Hrs
** Cervical Dilatation - Time Scale approach						16	Hrs
* The Wilcoxon matched-pairs signed rank test suggests at a significant level of P< 0.05 that Hendricks approach of admission time calculation of labour duration under estimates the actual labour duration experienced by the mother							
** The cervical dilatation time-scale approach of duration of labour provides a higher value at a significant level of 0.01 ie. P< 0.01 Wilcoxon matched-pairs signed rank test.							

score in one minute

PRE-PARTOGRAPH	Spontaneous Delivery	Vacuum Extraction	Forceps Delivery	Caesarean Section
Apgar 7/10 - 10/10	38	6	1	13
Apgar 5/10 - 6/10	2	1	0	2
Apgar 0/10 - 4/10	1	0	0	1

Table 4.16 Table showing modes of deliveries and related Apgar

score in one minute

POST-PARTOGRAPH	Spontaneous Delivery	Vacuum Extraction	Forceps Delivery	Caesarean Section
Apgar 7/10 - 10/10	55	5	0	8
Apgar 5/10 - 6/10	2	0	0	3
Apgar 0/10 - 4/10	1	0	0	2

Table 4.17 . table showing comparison between pre-partograph and post-partograph babies who had to be admitted to the intensive care unit

	Baby admitted to Intensive care	%	Baby not admitted to Intensive care	%
pre-partograph N = 65	4	6	61	94
post-partograph N = 76	4	5	72	95

4.5 EARLY NEONATAL PROFILE

55/65 of the babies in the pre-partograph group were known to be alive on the seventh neonatal day and, 67/76 of the babies in the post-partograph group were known to be alive. However, the outcome of the other babies is unknown as the mothers failed to attend post-natal clinic. Even assuming that, in the worse case, the other babies whose mothers defaulted had not survived, there would be no statistically significant difference between the two groups.

CHAPTER 5

DISCUSSION

5.1 TREND OF PARTURITION AND AGE

In the pre-partograph group, the spread of confinement was between age range fifteen and thirty-nine with assisted and abdominal deliveries occurring in all the age groups. The post-partograph group had their babies between ages fourteen and thirty-four years with similar pattern of delivery modes. The results show a trend towards avoiding the first delivery after thirty-four years.

5.2 COMPARISON OF INTERNAL EXAMINATIONS

It had been thought that too many vaginal examinations are performed in the partograph programme, for example, O'Driscoll's protocol of one hourly internal examination in the first three hours of admission in labour [O'DRISCOLL AND MEAGHER, 1989:41; Ayangade, 1983:259] but this study shows that was not the case in the hospital. It appears that three internal examinations were the most common, and in the present writers opinion, three vaginal examinations in labour is not of clinical concern.

5.3 PAIN AND ANXIETY RELIEF

While the World Health Organisation (W.H.O.) suggests that women should be encouraged to give birth naturally without analgesics and anaesthetic drugs, it endorses the administration for the correction or prevention of complications [WAGNER, 1993:14]. In the pre-partograph group 16/65 (25%) had caesarean sections 7/65 (11%) were delivered by vacuum extraction and 1/65 (2%) by forceps delivery. Thus complications occurred in 24/25 labours, therefore, 95% had the need for sedation as endorsed by W.H.O.

In the post-partograph group, 49/76 (65%) were sedated. 44/76 (56%) crossed the alert and action lines, 38/76 were sedated for intervention. That protocol correlates with Friedman (1954:1569) and Philpott and Castle (1972:600). However, 11/76 (15%) others whose cervicographs did not cross the alert line and whose labours lasted between one and eleven hours by Hendricks estimation were sedated.

It is questionable whether this sedation was really necessary. Sedation was the only statistically significant difference between the two groups of management and the post-partograph group recorded 10/76 (13%) post-partum haemorrhage as against 3/65 (5%) pre-partograph. It should be re-called that when drugs including sedatives are administered in labour the physiology of the third stage is disturbed and more drugs then are required especially oxytocic agents to control third stage blood loss.

5.4 CERVICOGRAPHIC PROFILES

32/76 (42%) cervicographs did not cross the alert line, 44/76 (58%) crossed the alert line. Following the intervening protocol in association with Philpott and Castle (1972:600) (See Table 4.5) 24/76 (32%) delivered within four hours 20/76 (26%) crossed the action line which represents a much higher percentage than Philpotts and Castle's (1972:600) percentage of 68/624 (11%) that crossed the action line. This result could be perceived as a possible indication that there is a higher incidence of cephalo-pelvic disproportion in Ghana.

5.5 THE CASE OF THE ALERT AND ACTION LINES, CEPHALO-PELVIC DISPROPORTION AND CAESAREAN SECTION

Philpott and Castle (1972:599) found that when the cervicograph crossed the action line there was a strong indication that 10% of the clients would require caesarean section for major cephalo-pelvic disproportion. In this study 3/24 (12%) who crossed the alert line and 8/20 (40%) of those who crossed the action line, that is 11/44 (25%) had caesarean section births due to cephalo-pelvic disproportion. This disclosure concurs with Philpott and Castle (1972:602) and supports the claim that the alert and action lines distinguish normal from abnormal progress of labour and recognises those labours that require intervention [LENOX, 1994:APRIL].

5.6 INDICATIONS FOR ASSISTED AND ABDOMINAL DELIVERIES

The indications for the abnormal delivery modes are similar to those with Friedmans [FRIEDMAN, 1954:1569; 1955:573 and AGGARWAL, 1980:148].

5.7 THE PARTOGRAPH AND CAESAREAN SECTION BIRTHS

In this series, 16/65 pre-partograph (25%) and 13/76 post-partographs (17%) births were by caesarean sections. On examination the findings show that the use of partograph was associated with a reduction in caesarean section deliveries. If this trend continued within a larger sample a statistically significant association might be reached.

5.8 BLOOD LOSS AND THE DURATION OF LABOUR

It is of interest to note the relatively few clients who laboured for over twenty-four hours= 2/65 and also the low value of post partum haemorrhage= 3/65 in the pre-partograph group that had less sedation. One is tempted to imply that the 10/76 post-partum haemorrhage encountered in the post-partograph group could be related to the increase in the value of sedation 49/76 in that group. Once one intervention is initiated other interventions are required to put right some of the co-incidental results of the

initial intervention, that is the phenomenon of a "Cascade of Intervention" [INCH, 1985:114].

5.9 THE USE OF OXYTOCIC OR UTERO-TROPIC AGENTS FOR THE CONTROL OF THIRD STAGE HAEMORRHAGE

The disclosure that the third stage of all labour for all the clients in both groups involved the administration of oxytocic administration is worth noting. The protocol is in line with the recommendation of the result of the Bristol third stage trial [PENDVILLE ET AL, 1988:1295] (Appendix IC).

5.10 THE DURATION OF TOTAL LABOUR

The results reveal clearly that the approach of Hendricks ET AL (1970) undervalues the mothers experience of labour duration. The small difference between the mothers diagnosis of labour duration and that estimated by the cervical dilation time-scale approach could be explained by the fact that usually the Braxton-Hicks contractions that increase in intensity and frequency towards the end of pregnancy makes it difficult for the mother to delineate between those contractions and the contractions of true labour. There is the tendency that it takes a little while before the mother becomes aware of the change in the trend, especially when other features like the "show" or rupture of membranes are

observed. Hence the inaccuracy of the mothers diagnosis, but even so, from O'Driscoll's experience [O'DRISCOLL ET AL, 1973:136] and from the results disclosed in this study, the mothers' opinion about labour duration should be respected.

5.11 ANTIBIOTIC REQUIREMENT WITHIN TEN DAYS POST-PARTUM

Since 36/65 (54.5%) in the pre-partograph group required antibiotics as against 31/76 (41%) in the post-partograph group, there is the tendency for one to suspect that the pre-partograph group was exposed to a higher risk of infection in the conventional management of labour, even though the difference was not great enough to be statistically significant. The perception correlates with those findings of Philpott and Castle (1972) that early decision on operative interventions reduces the risk of maternal and perinatal infections [PHILPOTT AND CASTLE, 1972:602].

5.12 GENERAL OUTCOME OF MOTHER

Contrary to the expectation that many statistically significant differences might be disclosed between the pre-partograph and the post-partograph management's, apart from the statistically significant difference between the administration of sedatives/tranquillisers of $P < 0.01$ in the post-partograph group,

the higher number of maternal blood loss 10/76 in the post-partograph and the higher number of antibiotic requirements 36/65 in the pre-partograph group, there was little discernible difference between the other parameters.

The non-compliance at post natal clinics observed alike in both groups does not necessarily mean maternal deaths. The hospital involved in the study is the best equipped in both maternal and human resources in the country, so the pregnant women dwellers (especially primigravidae) in the city are usually advised to make use of the facility before departing to their home towns for recuperation. Hence some of them would not be willing to travel back for post natal review, except those who had abdominal deliveries. They would generally attend well baby clinics if only to "show off" their white background attires and white ornaments which traditionally signifies their triumph over a situation which could have been disastrous, that is, childbirth.

Apart from the reduced need for antibiotics in the post-partograph group, the pictorial display of the progress of labour by the partograph for easy identification of aberation of labours makes it an indispensable, relatively inexpensive tool as an aid to childbirth, especially in developing countries with less sophisticated medical technology. Its inherent medical model of labour management, however, requires appraisal.

5.13 OUTCOME OF BABY

It is pleasing to note that there was no known perinatal deaths in the series studied, and that the Apgar scores correlated favourably with those of Philpotts and Castle (1972:601).

5.14 SUMMARY OF STUDY RESULTS

In relation to the stated hypotheses (Chapter 3.53), this study has provided evidence that the partograph does contribute to early detection of uterine dysfunction in labour and avoidance of prolonged labour. There appeared to be a trend towards a reduction in the rate of caesarean sections associated with the use of the partograph (although a statistically significant level was not reached in this study). Finally, it was not possible to demonstrate any significant difference in either maternal or perinatal morbidity and mortality which was associated with the use of the partograph.

In the light of the results it would seem that the partograph is a valuable adjunct to the care of the woman in labour and that there are no obvious risks to mother or baby associated with its use if the volume of sedation could be used with caution.

5.15 IMPLICATIONS FOR MIDWIFERY PRACTICE

There is need for the midwife to be skilful in the performance of vaginal examination and clinical pelvimetry.

Skill in vaginal examination is required to enable the midwife to make the much needed accurate pelvic and cervical assessment on admission of the labour client in the partograph protocol. A procedure which is usually carried out by midwives since they provide twenty-four hour service, and upon which the subsequent care of the labour client is almost entirely based. Erroneous information could result in the unnecessary administration of sedatives and the delivery of hypoxic babies if, for example, an 8 centimetre cervix is mistaken for 6 centimetres [PHILPOTT AND CASTLE, 1972:600; O'DRISCOLL AND MEAGHER, 1989:41]. Skill in clinical pelvimetry is important so that the midwife would be competent to be able to screen women with small pelves in later pregnancy for referral to level C health units before the onset of labour, to avoid obstructed labour, ruptured uterus and their sequelae. The skill would also be indispensable during the pelvic assessment of the labour client on admission [FAWDRY, 1994:4].

The admission time approach of the calculation of the duration of labour Hendricks ET AL (1970: 1076) does not represent the woman's full experience of the process of labour. Midwives ought to question that practice for a more objective calculation method to be adopted.

When interventions are initiated, midwives should be alert and ready for further interventions, for example, whenever sedatives,

tranquillisers and anaesthetics have been used, oxytocics should be available.

There is no doubt that the partograph is a simple, economical and effective device for the screening of normal labours from the abnormal, for the best management to be provided. But the inherent medical approach from the onset even before aberrations are recognised should be questioned by midwives, so that the half hourly observation could be replaced by two hourly monitoring in community midwifery and hourly observation in hospitals so long as the cervicograph has not crossed the alert line. In this way the partograph could be utilised in community midwifery, ease the workload of hospital midwives and afford the mother some rest. It is unfortunate that the traditional birth attendants cannot as yet benefit from the usefulness of the partograph.

5.16 CONCLUSION

There is evidence that half a million women lose their lives through childbirth round the world annually [W.H.O./M.C.H./88.3:2]. But if even the half a million women constitute the twenty per cent of childbearing women within Philpotts slowest group of labouring women who are likely to cross the alert line [PHILPOTT and CASTLE, 1972:599], it means that 2 million women, that is eighty per cent of confinements terminate successfully.

This knowledge has been inferred by the partograph, a universally acclaimed aid to childbirth [FRIEDMAN, 1954:1569; PHILPOTT AND CASTLE 1972:592; DROUIN ET AL. 1979:745]. The instrument screens the eighty per cent normal labours from the slowest twenty per cent which run the risk of obstetric intervention. The partograph displays the features of aberrations of the progress of labours especially uterine inertias and cephalo-pelvic disproportion early for consequential effective management [FRIEDMAN, 1954:1571; FRIEDMAN, 1954:1571; FRIEDMAN ET AL. 1969:782; PHILPOTT AND CASTLE 1972:599-600; STUDD, 1972:451; LENOX, 1994:April].

The assertions were supported by the results of the study presented here, which evaluated the partograph programme in a hospital in Ghana. The study disclosed that 13/76 (17%) of the post-partograph clients had caesarean section and the indication for 11/76 (15%) was cephalo-pelvic disproportion. 3/76 (4%) in

those who crossed the alert line and 8/76 (11%) in those cervicographs that crossed the action line. Also 20/76 (26%) crossed the action line, in comparison with the study of Philpotts and Castle (1972:600), in which 68/624 (11%) crossed the action line.

These results suggest that there may be a higher incidence of cephalo-pelvic disproportion in Ghana. However, in considering that 49/68 (73%) of Philpotts clients who crossed the action line had assisted vaginal and abdominal deliveries compared with 11/20 (55%) who had similar delivery modes due to moderate and major cephalo-pelvic disproportion after crossing the action line, in this study, then the incidence in Ghana takes on a different form, that is, it appears lower. Perhaps a grey area which needs further investigation..

Nevertheless, the 58/76 (75%) spontaneous deliveries in the post-partograph group correlates well with Philpotts assertion that eighty per cent of labours are likely to terminate in normal confinement. This data should be considered carefully by maternity care providers, so that not all labours would be perceived as abnormal from the onset, and women treated like subjects of road traffic accidents, with half hourly regimented monitoring in the present partograph protocol. Such an approach lends itself to a medical model of labour management. The main objective of the inclusion of the alert line on the cervicograph was to aid midwives and other paramedical birth attendants in the

early identification of abnormal progress of labour, for timely referral for the best intervention. According to Philpott and Castle (1972:600) the client was transferred to the intensive care unit only when the cervicograph crossed the action line. Then of course an intensive management should be initiated. Until that occasion arises there is no need for the regimented half hourly observational protocol. In community midwifery, two hourly observation and in hospital one hourly monitoring should suffice. For after all, the cervical dilatation which is said to be the most important indicator of the progress of labour is assessed every four hours [STUDD, 1973:452 ;O'DRISCOLL AND MEAGHER, 1989:30].

The approach suggested above has two valuable contributions to make. Firstly, it would allow the labouring woman to enjoy the "feel" of experiencing a physiological process, which should include the liberty to mobility and freedom of choice of oral nutrition which are restricted in a medical model of management. Secondly, the suggested modification would ease the heavy workload and improve the efficiency of the care providers especially in developing countries where as many as ten deliveries can occur during one night shift with only two midwives in attendance [MPANDA,1993:45] and writers past observations.

Even when the cervicograph crosses the alert line, an indication that the labour falls within the slowest twenty per cent [PHILPOTT AND CASTLE, 1972:599 ;STUDD, 1972:451], since vaginal examinations should be carried out every two hours according to Philpott and

Castle (1972:600) there is no reason why the other labour characteristic observations should not be performed at the same two hourly interval in the periphery and hourly in hospital to afford the parturient woman the rest she desires. Because the period of four hours between the alert and action lines allows for the transfer of the client from a peripheral unit to a central point. This study revealed that intravenous fluids, artificial rupture of membranes and sedation or no intervention at all depending on the clients needs availed spontaneous vaginal deliveries in 26/44 (sixty per cent) of the clients.

The use of symphysis fundal height measurement which is a simple, cheap and efficient approach for the assessment of the gestational age and identification of intra-uterine growth retardation, [QUARANTA ET AL., 1981:115] should replace the obsolete and fallacious traditional practice of assessing gestational age by relating the fundal height to abdominal landmarks [BEAZLEY AND UNDERHILL, 1970:404]. This would avoid the possible preterm labour, in case of labour induction, and also avert the unusual protocol of repeated recording of gestational age as 36 weeks.[see appendix page 21]

The sweeping of the membranes at term would prevent prolongation of labour [ALLOTT AND PALMER, 1993:898] in the client who would require the use of the mothers hostels.[see appendix page 13]

Finally, the calculation of labour duration from admission time or zero time [HENDRICKS ET AL, 1970:1066; PHILPOTT AND CASTLE, 1972:593; O'DRISCOLL ET AL, 1972:135; STUDD, 1973:451; and DUGNAM ET AL, 1975:593] gives an erroneous perception of labour duration which is not a representation of the mothers experience, because it does not account for the active performance of the uterus before the woman admits herself in labour. In this study fourteen of the subjects were excluded because they had their babies within five to sixty minutes of admission. The same was true of the subjects in Friedman's study [FRIEDMAN, 1955:568; and that of [DROUIN AND ASSOCIATES 1979:741; and STUDD ET AL, 1975:594]. Since apart from precipitate labour, it is impossible for the cervix to dilate fully within one hour, to argue that labour lasted for one hour or less in those women would be highly incongruous. If accepting the mothers diagnosis of labour is considered subjective and inaccurate, then the most positive approach would be the utilisation of the cervical dilatation time scale. If it is accepted that the cervix dilates on an average of one to one point two centimetres per one hour, [FRIEDMAN, 1955:571; PHILPOTT, 1972:164; HENDRICK ET AL, 1970:1079] zero point eight centimetre per hour [DROUIN ET AL, 1979:742] centimetre zero point seven five to one centimetre per hour [AYANGADE, 1983:253] and If the cervix must dilate up to ten centimetres for normal confinement to be possible then total duration of labour would be at least ten to fifteen hours, if the latent phase of eight hours is accounted for.

The result of the twenty randomly selected sample of the durations of labours which compared Hendricks approach of calculation with the mothers diagnosis of labour and the estimation according to the cervical dilatation time-scale in this study should be convincing enough to call for a review of the current approach of estimating the duration of labour.

5.17 LIMITATIONS OF THE STUDY

As a retrospective study, there was no way of checking the accuracy of the information gathered, and it was limited to a sample size that conformed to the criteria required.

Fifteen of the selected subjects were excluded because they arrived in labour that was too advanced. It was assumed that any labour client placed on the partograph would have been in early labour, but this was not the case. It would, therefore, have been necessary to include a cervical dilatation limit as part of the inclusion/exclusion criteria. 42/65 pre-partograph clients and 56/76 post-partograph mothers were labelled as being at thirty-six weeks gestation repeatedly. This peculiar approach of a group of the obstetricians made it impracticable to adhere to the initial decision of selecting the sample from the universal term clients, that is, from clients with a gestational age of thirty-seven to forty-one weeks. Other potential limitations were the fact that only a particular group of women who delivered in the year were

selected and there was a gap of two years between the delivery of the clients in the pre-partograph and the post-partograph groups. It is possible that other activities were carried out during the gap period which could have an effect on the results. For example the inclusion on the Obstretic/midwifery teams, of a member who is an advocate of artificial rupture of membranes etc.

The blood loss was an estimation so the accuracy of the results cannot be proved.

In future researches, prospective studies should be undertaken and both multigravidae and primigravidae should be studied alike.

5.18 RECOMMENDATIONS

On the basis of the data presented and the detailed literature review, the following recommendations are made:

- (1) That the calculation of the duration of labour should be based on the cervical dilatation time-scale for a more objective and accurate estimation and to avoid the current illusory short labour duration which is not a representation of the mothers full experience of labour process.
- (2) That caution should be exercised in the administration of analgesic/sedative/tranquilliser by means of including pre-internal examination by a competent practitioner to avert childbirth within one or two hours of the administration of the drug in order to reduce the possible incidence of post-partum haemorrhage.
- (3) That this report should be used as a pilot project for an extensive prospective study in the use of the partograph in the hospital where the investigation was conducted.
- (4) That if the woman presents herself in labour with a cervical dilatation of five centimetres, that it is cervicograph being on the alert line, the next vaginal examination should be carried out two hours later. This vaginal examination is a diagnostic measure for the early identification of arrest in

the progress of labour, so that in the event of arrest, the care providers in the periphery would have the next two hours to transfer the client to hospital in developing countries and in hospitals in both developed and developing Countries augmentation could be initiated without further delay.

- (5) That, since one of the most important features of the partograph is the timely detection of cephalo-pelvic disproportion, for early transfer of the parturient woman to a central hospital capable in operative intervention, it would rather be more useful if the condition would be recognised in late pregnancy for the referral to be effected before the start of labour.
- (6) That for the above reason, clinical pelvimetry which has been abandoned in the developed countries due to the better high medical technology and which has been stopped in developing countries as well (even though sophisticated screening approaches are inadequate or non-existent), should be re-activated [FAWDRY, 1994:4].
- (7) That midwives should be educated and trained in the skills of clinical pelvimetry so that they would be able to screen for cephalo-pelvic disproportion for referral of the clients in pregnancy to avoid obstructed labours, ruptured uteri, loss of maternal and fetal lives and obstetric fistulae.

- (8) That Symphysis Fundal Height (S.F.H.) measurement, another cheap and effective screening tool should replace the fallacious traditional method of relating the gestational age to landmarks on the mothers abdomen, in order to abolish the current peculiar protocol of repeated recording of 36 weeks until mothers confinement, in the hospital where the study was conducted.
- (9) That as part of the safe motherhood programme which includes the use of the partograph, mothers' hostels should be built in close vicinity of levels "C" health institutions for the rural dwelling mothers who may be diagnosed as running the risk of cephalo-pelvic disproportion, (that is primigravidae with small pelves in relation to the sizes of their babies), to move into these accommodations from thirty-seven weeks gestation, to facilitate access to central maternity units.
- (10) That the date and time of onset of labour and the mothers home address should be included on the partograph to aid in the diagnosis of prolonged latent phase and also for the sake of research (see Appendix 6).
- 11) That the record of pregnancy and delivery should be maintained by the mother for reference purposes while the hospital or care institution keeps the completed proposed partograph.

hospital or care institution keeps the completed proposed paragraph.

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APPENDIX 1A

THE PHYSIOLOGY OF THE FIRST STAGE OF LABOUR

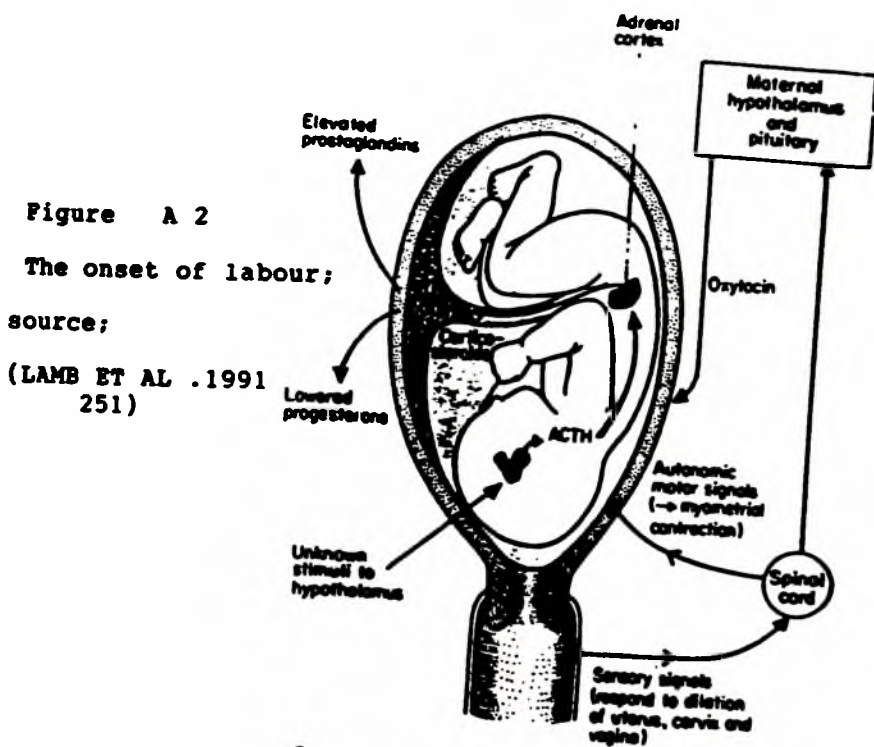
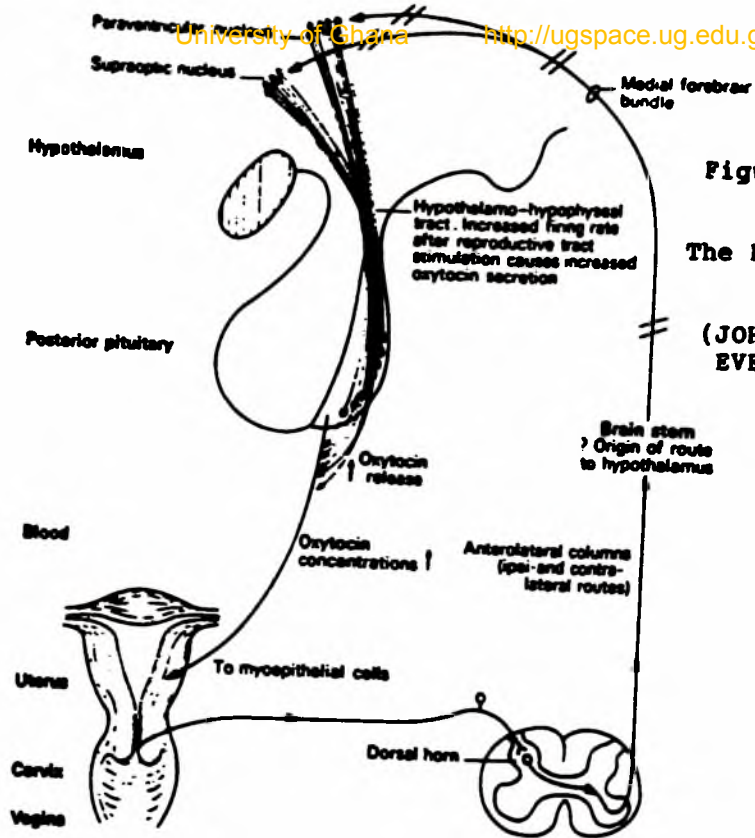
The causes of the initiation of labour in the human is a very complex phenomenon which is still not well understood. However, some proposals are that stimuli possibly including stress, influence the fetal hypothalamus to emit adrenocorticotrophic hormone (A.C.T.H.) from the anterior pituitary gland. The A.C.T.H. then initiates the secretion of corticosteroids from the adrenal glands of the fetus. Corticosteroids decrease the level of progesterone and increase the production of prostaglandins by the placenta, thereby inducing uterine contractions. The contractions so induced are reinforced by the neuro-endocrine reflex which is achieved by the pressure exerted by the contracting uterus on the presenting part and hence on the cervix and upper part of the vagina. This pressure stimulates the nerve endings which transmit the sensation through the spinal cord (the Ferguson's reflex) to the paraventricular and supra optic nuclei in the hypothalamus of the mother.

Hypothalamic stimulation causes the production of oxytocin, which travels through the nerve axon into the maternal posterior pituitary gland from where it is transported through the blood stream to the myometrium to enhance further uterine contractions and the synthesis and release of prostaglandins F₂. Thus the assumption through currently available research is that the timing of the onset of labour in the human is controlled by the fetus but

modulated by the mother through nervous origin [JOHNSON AND EVERITT, 1988:304, LAMB ET AL, 1991:251].

Also the release of oxytocin during labour may further stimulate Corticotrophin Releasing Hormone (C.R.H.) production through the hypothalamic - pituitary - adrenal axis of the fetus and in the placenta, fetal membranes and decidua which further influences positive feedback on the myometrium. Once this positive cascade has been started the contractions and retractions of the uterus do not cease until labour is accomplished [RILEY AND CHALLIS, 1991:15]. See Figures A1 and A2.

When there is prolongation of pregnancy the mechanism so described is usually induced. There are three stages of labour, these are the first, the second and the third stages



THE PHYSIOLOGICAL PHASES OF THE FIRST STAGE OF LABOUR

Effacement of the cervix and dilation of the os uteri are the two prominent physiological features that exist as a result of the contractions and retractions of the muscles of the uterus [SWEET 1989:174].

Other physiological manifestations are the show uterine polarity and fundal dominance, uterine segments and rings, the waters of labour, the general fluid pressure and spontaneous rupture of the membranes.

CONTRACTIONS AND RETRACTIONS OF THE MUSCLE FIBRES OF THE UTERUS

The intensity of the Braxton-Hicks contraction during the last four weeks of pregnancy become more pronounced, the contractions occur regularly about every fifteen to twenty minutes with about thirty second duration. These weaker labour pains generate into stronger and more frequent uterine contractions, persisting for fifty to sixty seconds and recurring every two to three minutes towards the end of the first stage of labour. In between uterine contractions, the muscle fibres do not return to their pre-contraction state, but remain taut and thicker as the contractions increase in intensity. The taut state is designated as muscle retraction and its function is to aid the gradual shortening and

Figure AA 33 ,UTERINE MUSCLE IN RELAXED STATE.



FIGURE A 4 ,uterine muscle in retracted state.

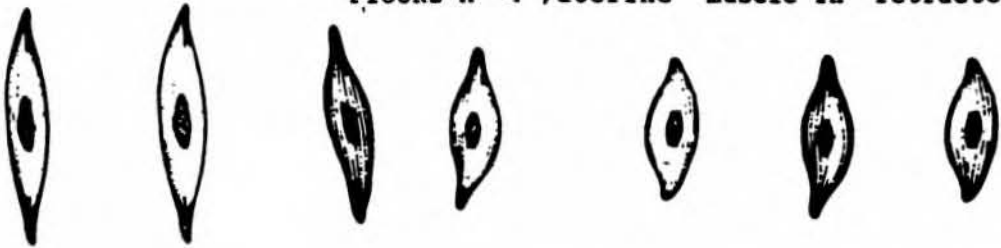


Figure AA 55 Uterine muscle in contracted state.

thickening of the upper uterine segment, whose cavity becomes limited in the process of progressive expulsion of the fetus [BENNETT AND BROWN, 1993:153] (See Figure A:3,A4 and A5).

These activities are triggered by the cascade of neuro-hormonal interactions as already stated in the causes of the onset of labour.

In the presence of aberration of these activities augmentation may be necessary to achieve vaginal childbirth or else abdominal delivery as the last resort.

EFFACEMENT AND DILATATION OF THE CERVIX

The contractions and retractions of the upper uterine segment result in the drawing up of the cervix into the lower uterine segment with the consequential enlargement of the cervical canal at the level of the internal os. In the primigravidae, the internal os does not dilate until the cervix has completely disappeared to lie flat over the presenting part, while in the multigravida the process of external os dilatation and effacement of the cervix occur simultaneously [BENNETT AND BROWN, 1993:155] [HENDRICKS ET AL, 1970:1069].

Hendricks et al (1970:1067) established that during the last few weeks of pregnancy and especially three days before labour starts (the pre-labour state) the nulliparous cervix is seventy per cent effaced and one point eight centimetres dilated while the cervix of the multipara is sixty-one per cent withdrawn and two point two centimetres dilated. That "cervical co-efficient" in pre-labour is fairly similar in both groups [HENDRICKS ET AL, 1970:106]. It is slower in the first eight hours called the latent phase [FRIEDMAN, 1954:1570, 1955:570] and from three to four centimetres dilation there is constant acceleration at a uniform rate till full dilation is reached. The rapid dilatation phase was termed the active phase by Friedman (1954:1571) and (1955:571).

THE SHOW

This is a pink jelly like substance, from the cervical canal which is a presumptive sign of labour [BENNETT AND BROWN, 1993:156; O'DRISCIOLL AND MEAGHER, 189:120.].

UTERINE POLARITY AND FUNDAL DOMINANCE

There is a harmonious relationship between the muscles and nerves of the upper and lower uterine segments. This cordial neuro-muscular relationship allows the upper uterine segment to contract strongly starting from one of the two cornua and producing the

strongest and long lasting sensation in the upper segment and spreads across and downward reaching the lower segment in naturally lower graded intensity

The intense contractions are relieved by retractions intermittently in the upper uterine segment, thereby dominating the lower tension activity of the lower segment, in order to force the expulsion of the fetus, this is the dominance. While the tension is created in the upper segment, the nerves allow only low tension contractile activity in the lower segment so that the cervix could be pulled up and dilate to permit the passage of the fetus. This action of high density action in one portion and low density action in the other is designated uterine polarity. If the natural high intensity action in the upper uterine segment and the lower intensity performance in the lower uterine segment do not proceed simultaneously in time and strength, then aberration of labour exists in which case augmentation of labour would be required.

UTERINE SEGMENTS AND RINGS

The segments of the uterus are two anatomically distinctive divisions of the uterus at term. The upper segment represents the top thick musculature portion which solely contracts and retracts to pull up the lower segment, a thinner less muscular structure formed from the isthmus, and prepared during pregnancy for dilation and distension in the process of labour (see figures A6 & 7).

While the thicker upper segment contracts and retracts in labour the lower segment thins out, resulting in the formation of ridge at their juncture. This junction is referred to physiologically as retraction ring. It is not obvious when the progress of labour is uneventful. When readily identified, it is indicative of obstructed labour with the possibility of uterine rupture. In that situation the ridge becomes pathological known as Bandl's ring [BENNETT AND BROWN, 1993].

THE WATERS OF LABOUR AND THE GENERAL FLUID PRESSURE

The forewaters is the fetal membranous sac of amniotic fluid which could reach a depth of 6 - 12 millimetres below a well flexed cephalic presentation. It is created in response to the detachment of the chorion from the lower uterine segment as it is drawn up by the upper segment.

By virtue of the fact that a well flexed head occupies the dilating os uteri neatly, the amniotic fluid surrounding the fetal head becomes a separate

entity from that fluid encircling the fetal body, thereby protecting the underlying membranes from pressure emanating from within the uterine cavity. The pressure could otherwise cause early rupture of membranes with consequential infection to both mother and baby, if the duration is over 24 hours.

The fluid surrounding the fetal body becomes the hind waters. Its function is to create equilibrium in the pressure applied by the force of uterine contractions within the uterine cavity if the membranes remain intact. Its purpose is to prevent compression of the placenta between the fetus and the uterine wall during contractions so that oxygen supply to the fetus is not interfered with and potential hypoxia is avoided. This mechanism is designated the general fluid balance [BENNETT AND BROWN, 1993:155].

In both Midwifery and Obstetric practices, there are proponents of artificial rupture of the membranes as an approach to acceleration of labour. However, studies have shown that the reduced amniotic fluid after the membranes have been artificially ruptured exposes the fetus to the risk of skull deformity [KEIRSE: IN: CHALMERS, ENKIN AND KIERSE (EDS), 1989:954]. O'Driscoll and Meagher argue

that research has established that the duration of labour is shorter when the membranes are ruptured than when they are left intact [O'DRISCOLL AND MEAGHER, 1989:150].

Since tactile stimulation induces the neuro-endocrine reflex, which influences the production of oxytocin; it has been suggested that sweeping of the membranes alone without rupturing them should be sufficient to facilitate acceleration of labour whilst avoiding the risk of bacterial invasion

associated with membrane rupture (Mary McNabb verbal communications, 1992; ALLOTT and PALMER, 1993: 898). BENNETT and BROWN (1993:156) propose that routine rupture of the membranes should be deployed only with the consent of the mother. Friedman believes that the latent phase of the first stage is prolonged when the membranes are ruptured before the active phase is reached [FRIEDMAN, 1955:585].

SPONTANEOUS RUPTURE OF THE MEMBRANES

Rupture of the membranes is a physiological process which should occur at the end of the first stage of labour when the os uteri is fully dilated and provides no more support for the fore waters.

Sometimes, however, if the presenting part does not fit neatly into the cervix, the hind waters gain access into the fore waters

through the sides of the presenting part, thus creating an extended bag of fore waters even before the os uteri is 4 centimetres dilated (personal observation).

Membranes have been known to rupture spontaneously, days or weeks before the commencement of labour. In general, spontaneous rupture of membranes is a strong clinical feature of labour [O'DRISCOLL AND MEAGHER, 1989:27].

APPENDIX IB

PHYSIOLOGY OF THE SECOND STAGE OF LABOUR

The second stage of labour which has the latent and active phases as its components, starts from full dilatation of the os, that is, a standard of 10 centimetres till the complete expulsion of the fetus.

There may be a brief period of transition from the first stage before the beginning of the second stage.

The contractions are stronger, last longer but may reduce in frequency as a natural way of providing a resting phase for both mother and baby. The physiological process of the first stage continues, the membranes may rupture spontaneously and aid the hard mass of the fetal head direct contact with the tissues of the vagina which distends in response [BENNETT AND BROWN, 1993:200].

With the distension of the vagina and especially at the delivery of the fetal head there is a hypersecretion of oxytocin, probably for the necessary haemostasis after delivery to prevent post partum haemorrhage [LEAKE ET AL, 1981:732]. Givens and Anderson (1981:139) confirmed that with cervical dilatation and the distension of the vagina plasma oxytocin surge occurs, a phenomenon which suggests that the Ferguson reflex is present in human beings. Oxytocin levels increase during the second stage of labour

suggesting that the neuro-endocrine reflex is activated in response to vaginal distension [FUCHS AND FUCHS, 1984:954].

With the surge of plasma oxytocin in the mother, the contractions which had slowed down earlier in the second stage, change to an expulsive nature which urge the mother to bear down in an involuntary manner. In response, the mother deploys her abdominal and diaphragmatic muscles to support the expulsion effort.

The descent of the fetal head is accompanied by displacement of the surrounding soft tissues, the bladder, the rectum and levator ani muscles which become thin, elongated and flattened anteriorly posteriorly and laterally so that any elimination either in the bladder in front or in the rectum at the back is expelled in the process to make enough room for the passenger. However, sometimes the bladder gets drawn up into the abdominal cavity and retains its content. The only positive feature that heralds the second stage is when no cervical rim can be identified on vaginal examination.

The cervix retracts around the head of the fetus and descent is greatest [FRIEDMAN 1954:1572].

With full dilatation of the os uteri the baby must continue its journey which was started four weeks earlier by, prelabour [HENDRICKS ET AL, 1970:1065] through a series of passive movements, described as the mechanism of normal labour to be born.

A good flexion and descent of the fetal head especially in the fourth phase of the sigmoid slope of labour graph, and an adequate pelvis are necessary for the head to be able to pass through the unique birth passage [FRIEDMAN, 1954:1573]. Gliding with the aid of amniotic fluid, and meeting the resistance of a taut pelvic floor muscle are the other positive requirements to aid the expected rotations of the head and shoulders for a successful outcome [BENNETT AND BROWN, 1993:201].

Sometimes however, mishaps including cephalo-pelvic disproportion, secondary uterine inertia, deep transverse arrest and fetal distress interfere with the normal expectation of the stage of expulsion. assisted vaginal delivery, abdominal delivery after the assisted expulsion has failed or straight decision for caesarean section may be the approach of choice to expedite the confinement [FRIEDMAN, 1954:1589; VACCA, A & KEIRSE MARC.JNC, 1989:1215; PHILPOTT AND CASTLE, 1972: 600]

APPENDIX IC

PHYSIOLOGY OF THE THIRD STAGE OF LABOUR

Even though the partograph is basically of use in the early identification of cephalo-pelvic disproportion and uterine inertia for timely intervention, the third stage of labour was included in this study because of the vulnerability of the mother during this phase. Up to the 1920's post-partum haemorrhage, an abnormal feature of the third stage, was perceived as the second principal cause of maternal death, after infection [INCH, 1988:42].

In the developing countries post partum haemorrhage is still recorded as one of the major causes of maternal loss [W.H.O./M.C.H./91:3:10].

Towards the end of the second stage, plasma oxytocin levels are increased when the vagina is distended by the passage of the baby through the excitation of the neuro-endocrine reflex [FUCHS AND FUCHS, 1984:954; LEAKE ET AL, 1981,732; GIVENS AND ANDERSON, 1981:139]. With the raised plasma oxytocin level, after an initial period of a resting phase up to one hour (personal observation) uterine contractions are resumed and the mother pushes the placenta out by her own effort.

Physiologically, during the resting period for the mother, the uterus which has been reducing in its size, in response to the

retractile ability of the muscles, initiates the reduction of the size of the placenta attached to the inner wall. The placenta is thus forced to squeeze and the blood between the wall is forced back into the inner layer of the uterine wall (the spongy layer)

causing congestion and tension in the veins, due to resistance from the retracted uterine muscle to allow any more exchange of gasses and fluids. Simultaneously, the placental wall is thickened, allowing the fetal cord to pulsate still due to the remnant of blood in the placenta that still flows into the baby.

As uterine contractions and retractions continue, there is rupture of the congested tense veins in the spongy layer. The ensuing bleeding clots by the aid of a transitory activation of the blood coagulation and fibrinolytic mechanisms as a life saving device during and immediately after placental separation [BONNAR ET AL, ----- 1970:200].

The clot called retro-placental clot, detaches the placenta from the uterine site. At the same time the criss cross muscles (living ligatures) of the uterus close off the torn edges as the placenta gradually detaches from the centre thereby ensuring only minimal blood loss up to three hundred millilitres. The placenta descends into the vagina, peeling off the membranes on its way with the retro-placental clot within.

If the separation was not centrally initiated, the placenta slides down sideways with the blood escaping with it into the vagina. If the woman is in the upright position the placenta falls out by gravity. The process is physiologically too fast to be complicated by contraction and retraction of the lower segment. When interference in the process of labour occurs, for example, the administration of heavy sedatives, or the giving of utero-tropic agents before the birth of the baby or the cord is clamped soon after the baby is born, then the normal mechanism has been interfered with and

post-partum haemorrhage may arise unless a uterotonic agent is administered parenterally. A situation described by Inch as a cascade of intervention [INCH, 1985:114]. Other predisposing factors are multiple pregnancy, ante-partum haemorrhage, polyhydramnios, fibroids, anaemia, high parity, ineffective uterine action in labour, prolonged labour, precipitate labour, oxytocin for induction or augmentation of labour.

A study of 4709 deliveries conducted at the Bristol Maternity Hospital (the Bristol Trial 1986-1987) concluded that active management which means the administration of oxytocic (uterotropic) agent at the birth of the baby's anterior shoulder, clamping and cutting of the cord 30 seconds after delivery and controlled cord traction was more effective in preventing and controlling post

partum haemorrhage than the physiological process [PRENDIVILLE
ET AL, 1988:1295].

In the hospital in Accra, where the study was conducted, the active
management that has been described above is the practice in force.

APPENDIX 2

DATA COLLECTION

The data were coded directly from the mother's records file.

To qualify for the sample population the inclusion/exclusion criteria below had to be fulfilled:

INCLUSION CRITERIA

- (1) She ought to be a primiparous woman
- (2) Expecting a single baby, who was
- (3) Presenting by the head (vertex). These were necessary because the value of the instrument was being assessed and any abnormal variable would render the exercise bias. Initially, Philpott tested the partograph with primiparous women without pregnancy abnormalities.
- (4) Was the gestation at thirty-six weeks? At the onset the criterion was thirty-seven weeks, but it was discovered that some of the consultant teams repeatedly recorded thirty-six weeks once the client reached thirty-six weeks gestation, instead of the conventional indication of, for example, thirty seven weeks, thirty-eight weeks, forty-

weeks,ex.cate ra. The implication was that if the thirty-seven weeks was not reduced to thirty-six weeks it was not possible to obtain the desired sample size.

As a feedback was not received for this rather peculiar approach, the investigator decided to imitate Radin et al (1993;14) who selected Nulliparous women with fetuses presenting by the vertex from thirty-six weeks for their study of six thousand and seven hundred women who had caesarean sections. The unusual protocol should be abrogated to be replaced by a simple, cheap and highly effective approach called Symphysis Fundal Height Measurement [QUANATA ET AL, 1981:116]. The tool screens for small for gestational age and makes a more positive assessment than the misleading traditional method of assessment. [BEAZELAY AND UNDERHILL, 1970:404].

- (5) Did the labour start spontaneously? This was important since initial interference was not acceptable.
- (6) Was the mother an attendant of the hospital? The prominent issue was normality, therefore, referred clients who could have been victims of aberrations in labour were not welcome.

EXCLUSION CRITERIA

- (7) Insofar as this study was concerned, pregnancy abnormality such as gestational diabetes, pre-eclampsic toxæmia, eclampsia, gestational hypertension and antepartum hæmorrhage were undesirable variables.

THE INFORMATION GATHERED

21

Once randomly selected the following data were recorded accordingly.

- (8) Research number was granted for identification and confidentiality.
- (9) Hospital number for similar reason.
- (10) The Marital Status. This was essential but unfortunately the hospital did not record this variable. This omission is unfortunate especially in the primigravida because a young unmarried primigravida faces a good degree of stress situations for failing to be "a good girl". In the past, failure to go through the puberty rites before pregnancy culminated in the belief that the "bad" girl, in so doing would bring curse of the ancestors and the whole nation upon the family, the Ashanti and in the Akans as a whole - a big ethnic group in Ghana [SARPONG, 1977:14]. The girl and her partner were ostracised throughout pregnancy and until 40 days after delivery and after purification rites of the

offenders and the whole community [SARPONG, 1977:48]. That meant no scientific ante-natal care. Any girl who got pregnant before the "Dipo" ritual of the Krobos - another ethnic group, was severely punished by heavy fine or ostracism, the partner paid a heavier amount [ODONKOR, 1971:55.; ANTOBAM; 1963:51, 1971:55; TEYEGAGA, 1985:29.]

Even though the emphasis is not that great today, the pregnancy of an unmarried daughter is still dreaded by families to the point that some mothers would rather aid their girls to procure abortion than to face the disgrace and the financial burden encountered

and the girl would not experience peace for a long time in her life, and her baby might forever remain with a grandparent. Since it has been established that anxiety and worry tend to prolong labour [BENNETT and BROWN; 1993:400; SWEET; 1989:336; HADDAD and MORRIS; 1985:77; FRIEDMAN; 1955:585], it would have been good to identify any correlation between prolongation of labour and the unmarried primigravida in this study. In future it would be advisable to include marital status in the demographic identification, if only to aid midwives in their care provision.

iThe age and parity would be recorded.

iiWas she a known attendant of the ante-natal clinic of the hospital? This information was essential since the study intended to use first referrals only.

iii) The date and time of admission in labour. This was necessary because in the use of the partograph the time of admission marks the beginning of labour, time spent at home in labour was irrelevant. [HENDRICK ET. AL. 1970 ; 1088; PHILPOTT and CASTLE 1972; 593; STUDD; 1973; 451]

iv) Record of temperature, pulse and blood pressure. This is to obtain an idea about the woman, general health state on admission.

v) The gestational age and the height of the fundus would be recorded to ensure that the subject was thirty-six weeks or more pregnant in order to qualify for the study.

vi) The presentation of the fetus; in order to identify that the presentation was cephalic since only vertex presentation would be included in the study in order that the potential of partograph as a screening tool for cephalo-pelvic disproportion would be fairly or accurately tested.

vii) Whether the pregnancy was a singleton, since multiple pregnancy was not included in the criteria.

viii) Was there any diabetes mellitus, hypertension, pre-eclampsia or eclampsia? The presence of any of these would disqualify the sample, because they could expose the client to obstetric intervention.

(11) The characteristics of the uterine contractions whether they were:

PRE-PARTOGRAPH

POST-PARTOGRAPH

In Group

Group

Fair

C1

C1 less than twenty seconds

Fairly strong

C2

C2 lasts twenty to forty seconds

Strong

C3

C3 lasts more than forty seconds

This information would supply some indication of progress of labour.

(12) Were the membranes intact on admission or ruptured spontaneously or artificially?

- (13) If the membranes were ruptured artificially what was the indication? This information would be useful in two ways:
- (a) To indicate that the labour had to be accelerated by artificial rupture
 - (b) If it ruptured spontaneously and long before the birth of the baby, that would give a clue of a possible perinatal infection.
- (14) Was she given any oxytocin augmentation?
- (15) What was the dilation of the os uteri on admission? This information would portray the progress or otherwise of labour and admit the client on the partograph.
- (16) How many vaginal examinations were carried out: If too many were done that could expose the mother to genital tract infection requiring antibiotics within ten days post partum.
- (17) Was she given any pain killer?
- (18) What was the mode of delivery? This information would assist in recording whether caesarean section rate has dropped or not, which is one of the variables in the hypothesis.

- (19) Did the cervicograph cross the alert and/or action lines? This information would indicate whether uterine dysfunction was present or absent.
- (20) Was she in labour for less than 24 hours or more than 24 hours? This information is important in order that one of the hypotheses would be confirmed or refuted.
- (21) Did she have elective caesarean section? If so she would be disqualified for the study.
- (22) Was there any antepartum haemorrhage? If so she would be disqualified.

THE OUTCOME OF THE MOTHER

- (23) What was the estimated amount of blood loss?
- (24) Was any utero-tropic agent given? That would show the effort to control haemorrhage.
- (25) Was any blood transfusion given? This information would be helpful in determining the outcome of the mother.
- (26) Record of the temperature, pulse and blood pressure one hour after delivery would be one of the yard sticks in the measurement of the mother's outcome.

- (27) Was there any genital tract infection requiring antibiotics within ten days of delivery?
- (28) Did she attend post-natal clinic within 6 weeks of delivery, this would indicate her being alive.
- (29) Was she dead within 6 weeks?
- (30) If dead what was the cause of death?

PROFILE OF FETUS/BABY

- (31) Was fetal heart rate over 160 beats per minute, between 120 and 160 per minute or less than 100 per minute?
- (32) Was there meconium stained liquor?
- (33) What was the Apgar score at 1 minute and 5 minutes?
- (34) What was the birth weight in kilograms?
- (35) Was the baby managed in the intensive care unit?
- (36) If yes, what was the indication?
- (37) Was there any apparent birth injury?

(38) Was the baby alive on the 7th day after delivery?

(39) If no, specify cause of death.

See the pre-coded data collecting schedule in next page

PRE-CODED DATA COLLECTING SCHEDULE

(An analysis of characteristics of labour and outcome of mother and baby before and after the introduction of the partograph. A retrospective, comparative study of randomly selected women).

GUIDELINES

Please tick or fill in the blanks as appropriate

INCLUSION/EXCLUSION CRITERIA

Please ensure that the subject L(Mother) fulfils these criteria before including her in the study.

Q1. Was the mother a primiparous woman?

Yes C1 No C2
() ()

Q2. Was the pregnancy singleton?

Yes C1 No C2
() ()

Q3. Was the presentation vertex?

Yes C1 No C2
() ()

Q4. Was the gestation at 36 weeks or more?

Yes C1 No C2
() ()

Q5. Did the labour start spontaneously?

Yes C1 No C2
() ()

- Q6 Was the mother an attendant at the hospital antenatal clinic?**
- Yes C1 No C2
() ()
- Q7 Was there any gestational diabetes mellitis?**
- Yes C1 No C2
() ()
- Q8 Was there any pre-eclamptic toxæmia?**
- Yes C1 No C2
() ()
- Q9 Was there any eclampsia?**
- Yes C1 No C2
() ()
- Q10 Was there any gestational hypertension?**
- Yes C1 No C2
() ()
- Q11 Was there any ante-partum hæmorrhage?**
- Yes C1 No C2
() ()
- Q12 If she had a caesarean section was it elective?**
- Yes C1 No C2
() ()
- Q13 Research Number**
- Q14 Date of Collection**
- Q15 Hospital Number**
- Q16 Married?**
- Yes C1 No C2
() ()
- Q17 Parity: Primipara?**
- Yes C1 No C2
() ()
- Q18 Was she an attendant of the hospital ante-natal clinic?**
- Yes C1 No C2
() ()

Q19 Specify Age

15 - 19 () C1

20 - 24 () C2

25 - 29 () C3

30 - 34 () C4

35 - 39 () C5

40 - 44 () C6

Q20 Date of admission

Q21 Time of admission

Q22 Vital signs on admission

Temperature

Pulse

Blood Pressure

Q23 Gestation/fundal height

Q24 Indicate nature of contractions on admission

Pre-Partograph Group

Post-Partograph Group

Fair	C1	(C1	lasts for less than twenty seconds
Fairly strong	C2	(C2	lasts twenty to forty seconds
Strong	C3	(C3	lasts more than forty seconds

Q25 What was the dilation of the OS uteri on mothers admission?

Pre-Partograph Group			Post-Partograph Group
1 - 2 Fingers	C1	(C1 1-3 Centimetres
3 - 4 Fingers	C2	(C2 4 - 5 Centimetres
½ - Full Dilation	C3	(C3 6 - 10 centimetres
Not Indicated	C4	(C4 Not Indicated

Q26 Was artificial rupture of membranes done?

A	Yes C1	No C2	Not Specified C3
	()	()	()

A27 If yes, specify indication

- () C1 To accelerate labour
- () C2 Leaking membrane
- () C3 Not specified
- () C4 Irregular fetal heart rate
- () C5 Not applicable

A28 If the membranes had ruptured before admission, state duration in hours

- Up to 23 () C1
- 1 - 7 days () C2
- Not applicable () C3

Q29 Was she given any pain killer/tranquillisers in labour?

- Yes C1 No C2
- () ()

Q30 If yes, specify:

- () C1 Injection pethidine
- () C2 Injection sosegon
- () C3 Injection or tab vallium
- () C4 Injection phenergan
- () C5 Injection sosegon and vallium

- () C6 Injection pethidine and phenergan
 () C7 Injection pethidine and asegon
 () C8 Injection pethidine and valium
 () C9 Not applicable

Q31 Did cervicograph cross alert line?

- | Yes C1 | No C2 | Not Applicable |
|--------|-------|----------------|
| () | () | () |

Q32 Did cervicograph cross action line?

- | Yes C1 | No C2 | Not Applicable |
|--------|-------|----------------|
| () | () | () |

If yes, specify protocol adopted for intervention

- () C1 ARM only
 () C2 Sedation only
 () C3 ARM and sedation only
 () C4 IV infusion only
 () C5 ARM and infusion
 () C6 ARM, sedative, IV infusion with oxytocin
 () C7 ARM, sedative and ordinary IV infusion -

no

oxytocin

- () C8 not applicable

Q33 Indicate:

(a) Date of full dilatation of cervix

(b) Time of full dilatation of cervix

Q34 State:

(a) Date of delivery

(b) Time of delivery

Q35 How many vaginal examinations were performed on her?

1 2 3 4 5 6 7
() () () () () () ()

Q36 Specify mode of delivery

() C1 Vaginal delivery without perineal tear

() C2 Vaginal delivery with perineal tear

() C3 Spontaneous delivery with episiotomy

() C4 Vacuum extraction

() C5 Forceps delivery

() C6 Caesarean section

Q37 Satate indication for delivery mode (I) Caesarean section)

- 1 () C1 Cephalo-pelvic disproportion
- 2 () C2 Cephalo-pelvic disproportion with fetal
distress
- 3 () C3 Fetal distress only
- 4 () C4 Cephalo-pelvic disproportion and failed
vacuum
extraction
- 5 () C5 Cervical dystocia
- 6 () C6 Persistent occipito posterior or occipito
posterior with
no progress
- 7 () C7 Prolonged labour/senior primigravida
- 8 () C8 Sickle cell disease
- 9 () C9 Bad obstetric history

INDICATION FOR VACUUM EXTRACTION

- 1 Poor maternal effort or
() C10 Maternal exhaustion
- 2 Delayed 2nd stage with meconium stained liquor or
() C11 Delayed 2nd stage

- 1 () C12 Delayed descent of fetal head
 () C13 Not applicable normal delivery

Q38 What was the total duration of labour?

Hendricks approach: from time of admission

Specify the total duration of labour according to mother's diagnosis i.e. from time of onset

1st Stage

2nd Stage

3rd Stage

Q39 Was she in labour for

- () C1 Less than 12 hours
() C2 12 - 24 hours
() C3 over 24 hours

Q40 Was she given any utero-tropic (oxytocin) agent after delivery?

- Yes C1 No C2
() ()

Q41 If yes specify

- () C1 Ergometrine injection
() C2 Syntometrine injection
() C3 Ergometrine and syntometrine
() C4 Syntocinon injection

Q42 What was the approximate blood loss

39

- A () C1 Estimated under 300 ml
B () C2 300 - 490 ml
C () C3 over 500 ml

Q43 Was she given any blood transfusion?
University of Ghana <http://ugspace.ug.edu.gh>

Yes C1 No C2
() ()

Q44 If yes, specify

A () C1 1 - 2 units
B () C2 3 - 4 units
C () C3 Not applicable

Q45 Indicate her post delivery vital signs recorded in the labour ward

Temperature
Pulse
Blood Pressure

Q46 Did she require antibiotics for genital tract infection within 10 days of delivery?

Yes C1 No C2 Not Specified C3
() () ()

Q47 If yes specify

A () C1 Ampicillin
B () C2 Crystalline penicillin
C () C3 Ampicillin and crystallin penicillin
D () C4 Amoxycillin
E () C5 Amoxycillin and Flagyl
F () C6 Amoxycillin and Ampicillin
G () C7 Antibiotic given but not specified
H () C8 Not applicable

Q48 Did she attend post-natal clinic

A () C1 One week
B () C2 Two weeks only
C () C3 Six weeks only
D () C4 One and two weeks only
E () C5 One and six weeks only
F () C6 Two and six weeks only
G () C7 One, two and six weeks
H () C8 Attended none

Q49 Was she dead within six weeks of delivery?

Yes C1 No C2 Not known, defaulted C3

- Q50** If yes, specify cause of death
- A () C1 Sick cell disease and complications
 - B () C2 Post partum haemorrhage
 - C () C3 Puerperal infection
 - D () C4 Other
 - E () C5 Not applicable

PROFILE OF FETUS/BABY

- Q51** What was the fetal heart rate on mothers admission?

- A () C1 Below 120 beats per minute
- B () C2 120 - 160 beats per minute
- C () C3 Over 160 beats per minutes

- Q52** Was there any meconium stained liquor?

- Yes C1 No C2
() ()

- Q53** What was the Apgar score in one minute?

- A () C1 7/10 - 10/10
- B () C2 5/10 - 6/10
- C () C3 0/10 - 4/10

- Q54** If 0/10 - 4/10 what was it in 5 minutes?

- A () C1 7/10 - 10/10
- B () C2 5/10 - 6/10
- C () C3 0/10 - 4/10

- Q55** Was there any birth injury

- Yes C1 No C2
() ()

- Q56** If yes specify

- Q57** What was the birth weight in kilograms?

- A () C1 Below 2.5
- B () C2 2.5 - 3.4
- C () C3 3.5 - 4.4
- D () C4 Over 4.4
- E () C5 Not weighed

- Q58** Was the baby ever managed in the intensive care unit?

- Yes C1 No C2

() ()

Q59 If yes, indicate reason for intensive care

- A () C1 Mild/blue asphyxia
B () C2 Severe/white asphyxia
C () C3 Grunting respiration
D () C4 Other
E () C5 Not applicable

Q60 Was baby alive on the 7th day?

Yes C1 No C2
() ()

Q61 If no, specify cause of death

- A () C1 Cerebral haemorrhage
B () C2 Infection
C () C3 Other
D () C4 Not known, mother defaulted
E () C5 Not applicable

APPENDIX 4A

20 Rye Close
GUILDFORD
Surrey
GU2 6JA

13th July, 1993

The Head
Department of Obstetrics and Gynaecology
Hospital

Accra
GHANA.

Dear Sir,

**Permission for Research in Partial Fulfilment of
Master of Science Degree In Advanced Midwifery Practice
- University of Surrey, Guildford, U.K.**

I write to seek permission to carry out an empirical study, in partial fulfilment for the degree of Master of Science In Advanced Midwifery Practice, in the Department of Obstetrics and Gynaecology at the Teaching Hospital, between October, 1993 and January, 1994.

Research Title

AN ANALYSIS OF THE DURATION OF LABOUR, THE MODE OF DELIVERY AND OUTCOME OF BABY AND MOTHER BEFORE AND AFTER THE INTRODUCTION OF THE PARTOGRAM IN THE TEACHING HOSPITAL, ACCRA

Type of Study

Quantitative retrospective comparative time scale among other variables include October, 1993 to January, 1994

Sampling

Possibly from February and March, 1988 and February and March, 1991 parturients.

I would be most grateful if the response to this request should be mailed to me before the end of August, 1993 to enable my lecturers to react as necessary.

Thank you very much for the anticipated co-operation.

Yours faithfully,

Felicia Darkwah (Mrs)

**Copies to: The Principal Nurse-Midwifery Officer in charge
Department of Obstetrics and Gynaecology
The Hospital
Accra**

**The Senior Nursing Midwifery Officer in charge
Labour Wards**

**The Principal Nursing Officer
The Hospital
Accra**

APPENDIX 4 B.
UNIVERSITY OF GHANA MEDICAL SCHOOL
 DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY

Phone. 05401, 08037/08

P. O. Box 4006

ACCRA.

My Ref No. NS-OGD/51.....



Your Ref No.....

17th August, 1993

Dear Mrs. Darkwa,

I have received your letter dated 13th of July requesting to come over and carry out a research. I note that this research is towards your MSc Degree in advanced Midwifery.

The subject of study you have selected 'An Analysis of Partograph' made after its introduction, the analysis of labour records, before then is very welcome indeed. It may interest you to note that we have discussed here the possibility of making this analysis for subsequent publication. Perhaps this your study may stimulate us to go along and do just that. You may also wish to know that only 3 weeks ago, I was discussing with your very good friend Faustina about her using this data for her own thesis towards her degree here, and subsequently publish the findings.

It will not be out of place if when you come you work with her and the results published together. Certainly you have my permission to use these records for your higher degree. I am very glad because I am not sure you made me aware that you were going to study for a higher degree.

I look forward to your coming back and joining the Department of Nursing and contributing effectively to Midwifery Education.

I hope that you are well and that your studies is proceeding smoothly.

Best regards.

Yours sincerely,

J. B. Wilson
 DR. J. B. WILSON
 HEAD OF DEPARTMENT.

Mrs. Felicia Darkwa,
 20 Eye Close,
 Guildford,
 Surrey,
 GU2 6JA

LETTER TO RESEARCH ASSISTANT.
20 Rye Close
GUILDFORD
Surrey
GU2 5SA

12th September, 1993

Nana Yaa K. Darkwah
P.O. Box 182
University of Ghana
Legon
Accra
GHANA

Dear Nana Yaa,

Instruction for Data Collection

Find the details of the strategy for the collection of the data for my research project.

Title:

"An Analysis of the duration of labour, the mode of delivery and outcome of the baby and mother before and after the introduction of the partograph in the Hospital, Accra, Ghana.

Type of Study:

A retrospective comparative randomised quantitative study.

Population:

Parturient women of the Department of Obstetrics and Gynaecology, the hospital, Accra.

Sampling:

Count all the women who delivered at the hospital in March, February and January, 1988 for the before group.

1. Total number
2. Then number of primiparas - your experts, that is Auntie Faustina Oware Gyekye, Nana Kusi-Yeboah, Mrs. Beatrice Amoah or Auntie Gladys Ikwaning will direct you and give you assistance as well. Total number of primiparas.....
3. Then with the guide, that is, the inclusion/exclusion criteria, the research team should select those primiparas file number that qualify to be included in the study.

4. Then list the qualified files from 001, 002 003 till all qualified files are numbered.
5. Then cut small pieces of papers and number them to correspond with the numbered files.
6. Then fold the numbered pieces of paper in a similar manner as it is done in balloting exercises.
7. Put these folded numbered pieces of paper in a hat or basket and shake,
8. Pick one at a time. If your first pick is number five, file numbered 005 qualifies for the randomisation; that is would have been randomly picked.
9. Pick one at a time until the sample size of 100 has been obtained, for the (March, February, and January, 1988) "before" group, i.e. the pre-partograph group.
10. Do the same for the "after group, that is March, February and January, 1989. That is the post-partograph group.
11. When the sample size of 200 has been collected, put back the "unqualified" ones in the records office or wherever they were collected from.
12. Keep the files as confidential as possible, use no names, but the numbers only. Use a hard cover notebook for the files, write the hospital number and give every file a research number, that is starting from 001. Make sure the identification on the file corresponds with the recorded one in the notebook. Example hospital number 19264/89. Research number 005, both numbers appear on the face of the file, both numbers appear in the notebook identical. (Eventually, 1991 files were selected - July, August and September for the post-partograph and July, August and September 1988 for the pre-partograph group).
13. Collect the information from the "qualified" files using the data collecting schedules.
14. After the collection - hand the files over to the personnel from whom they were collected.
15. Make photocopies of all 200 data collection schedules and keep a copy each in my bedroom.
16. Parcel one batch to me before mid-December, 1993.
17. Keep the other lot. If for any reason, the first batch does not arrive, we shall go through the exercise again.

Thank you

APPENDIX 4 D

PO Box 182
Legon - Accra
Ghana - West Africa

31 January 1994

TO WHOM IT MAY CONCERN

COLLECTION OF DATA FOR MRS FELICIA DARKWAH

TITLE 'An analysis of the duration of labour, modes of deliveries and the outcome of the baby and mother before and after the introduction of the partograph'.

Initially, the dates suggested were 1987 and 1990, but open consultation with the Head of Department of Obstetrics and Gynecology at the Hospital, the dates were changed to 1988 and 1991. This was not until towards the end of 1990 that the instrument was well implemented, in that it took the staff a while to understand the principle of the equipment. It was therefore decided that 1991 would show the effect of the use of the partograph better. Thus the months chosen were July, August and September 1988 and July, August and September 1991.

Research

Assistants: The research assistants were Mrs Faustina Oware Gyekye and Miss Nana Yaa Darkwah. Mrs Oware Gyekye is a Nurse-Midwife, former Midwifery Tutor and a Principal Nurse Technician at the Nursing Department of the University of Ghana. Currently, she is on study leave and is studying a degree course in Nursing at the University take a course in Introductory Statistics and especially do a lot with regards to the collection of data to help in the project work they will do in their second and final years.

Nana Yaa has a Bachelor of Arts degree in Economics and Statistics from the University of Ghana.

The research assistants had some supplementary training in data collection from Dr L Oware Gyekye who is a Senior Research Fellow in the Institute of Statistical, Social and Economic Research at the university of Ghana. Finally, Nana Yaa was given some training to enable her to understand the technicalities involved in the basic midwifery, especially the terms used by the doctors in folders and in the labour wards, and all that had to do with the effective collection of the data required.

APPROACH

USED: A retrospective comparative, randomised study in the Department of Obstetrics and Gynaecology of the Hospital, Accra.

METHOD: A list of all the Primipara patients at the hospital who were attendants at the Hospital and who fulfilled the inclusion/exclusion criteria on the first page of the questionnaire

between 1st July to 30th September was compiled. Then each name on the list was given a number which was then written on small pieces of paper and folded in the same way to ensure randomness. For the 'before' group the number of 267. The 267 pieces of paper were then put in a hat and one hundred of them were picked one at a time from the hat, before the next one was picked. Then the folder sample of a hundred was written down and given to the people in archival section of the department to pull out the folders.

The same was done for the 'after' year group. The total number of patients in the population from which the sample of a hundred was randomly chosen in the after year group was 451.

A total of 200 folders were to be pulled out and a questionnaire was filled using the information from each folder. Unfortunately 44 folders could not be located.

PROBLEMS

ENCOUNTERED: Some of the hospital staff do not bother with the number of weeks once the gestation period reaches 36 weeks.

There was no information on the marital status of patients. Some patients failed to come back after delivery for post natal care.

CONCLUSION: The data were then posted to Mrs Felicia Darkwah in the UK after photocopying in case of loss.

NANA
YAA K DARKWAH

APPENDIX 5

APGAR SCORE

	A	P	G	A	R
	APPEARANCE COLOUR	PULSE HEART BEAT	GRIMACE RESPONSE to STIMULI	ACTIVITY MUSCLE TONE	RESPIRATION RESPIRATORY EFFORT
2	Completely Pink	OVER 100	Cough Sneeze Cry	Good Flexion Active Movements	Regular Strong Cry
1	Body Pink Extremities Blue	BELOW 100	Grimace only	Some Flexion No Movements	Irregular slow
0	Blue or Pale	ABSENT	No Response	Limp	ABSENT

SAFETY OF VITAMIN K IN NEWBORN BABIES:- A LETTER FOR PARENTS

There have recently been reports in the media linking vitamin K injections given to newborn babies to prevent bleeding problems, and the development of cancer in later childhood. This relates to a study published in the British Medical Journal, which suggested that babies given a single injection of vitamin K at birth are twice as likely to develop cancer before ten years of age than those given vitamin K by mouth.

Babies are born with low body stores of vitamin K, which is required to help the blood to clot normally. There are two forms of bleeding due to vitamin K deficiency - an early onset type (occurs in the first week), and a late onset type (occurs at one week to six months of age). To prevent both, almost all babies born in the UK are given vitamin K shortly after birth, usually by a single injection. If vitamin K is NOT given, up to 1 baby in 400 will have problems with bleeding in the first week of life, which varies from mild to life-threatening. In addition, about 1 baby in 20,000 will develop the much rarer, but more dangerous, late onset type, which causes death or severe brain damage in up to 50% of babies affected. Giving vitamin K by mouth will reduce the risk of late onset bleeding to around 1 in 70,000 babies, whilst giving it by injection lowers the risk much further to about 1 in 1,000,000.

According to the study in the British Medical Journal, giving vitamin K by injection at birth may double the risk of developing cancer in later childhood from 1.4 children per 1,000 to 2.8 per 1,000; there did not appear to be any increase in risk when giving it by mouth. However, whilst the benefit of vitamin K in preventing bleeding problems in babies is definitely established, the link with cancer is NOT. In addition, a recent report from America, where vitamin K has been given to babies routinely by injection since 1961, has shown NO increased risk of cancer in a very large survey. The Dept of Health is currently investigating the situation, but in the meantime, has not recommended any changes to the current practice of giving vitamin K to newborn babies. Thus, after careful consideration, we propose to continue giving vitamin K by INJECTION to all babies born at this hospital, because of it's proven benefit in preventing bleeding problems and it's much greater effectiveness than when given by mouth.

However, if you feel strongly that your baby should be given vitamin K by mouth rather than by injection, you should inform the midwife looking after you BEFORE your baby is born; otherwise, the vitamin K will be given routinely by injection. Please note that the oral preparation of vitamin K (Orakay) is new, and does not yet have a product licence for use in babies - nevertheless, we are able to prescribe it. In addition, if given by mouth, your baby will then require a second dose of vitamin K (also by mouth) at about TWO WEEKS of age for greater effectiveness. This will be given to you to take home at the time of your discharge from hospital.

Dr Sheila Chapman / Dr Mark Evans / Dr David Robins,
 Consultants, Paediatric Dept, Royal Surrey County Hospital.