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USE OF PARTOGRAPHS IN WOMEN IN LABOUR AT MULANJE DISTRICT HOSPITAL IN MALAWI

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A Research Report submitted to the Faculty of Health Sciences, School of Public Health, University of the Witwatersrand, South Africa, in partial fulfilment of the requirements for the Degree of Master of Public Health - Maternal and Child Health

Submitted: August 2014

Declaration

I, Joyce Atuweni Jere, declare that this research report is my own work. It is being submitted for the degree of Master of Public Health - Maternal and Child Health at the University of Witwatersrand in Johannesburg, South Africa. It has not been submitted for any degree examination before at this or any other University.



Joyce Atuweni Jere

August 2014

Dedication

This work is dedicated to members of my family: Sonile my daughter and my husband Raymond for their love, support and encouragement at the time of my studies.

Abstract

Introduction: A partograph is a tool that is used to monitor progress of labour, and its correct use and appropriate interpretation can assist in early identification of complications of labour. The aim of this study was to assess if and how the partograph was used at Mulanje District Hospital in Malawi.

Methods: This was a retrospective review of records of women who delivered at the Mulanje District hospital from the 1st to the 30th of September, 2010. A total of 360 women's files were reviewed. Data was collected from the delivery register, theatre register, case files and partograph charts. A Chi-square was used for statistical analysis and a p value of < 0.05 was considered significant.

Results: The partographs were available in 93.3% (336/360) of women's files. Forty eight percent (162/336) of women's files had partographs with all three sections of labour monitoring documented, but only 10% (16/162) of the partographs had information correctly and completely filled in on each parameter of the three components of the partograph. Forty percent (64/162) of women delivered after crossing the action line, and 67.2% (43/64) who delivered after crossing the action line were referrals, while 32.8% (21/64) were women who came to the hospital in labour. Almost 40.6% (26/64) of women who crossed the action line suffered immediate adverse outcomes. There was no significant difference in maternal outcomes (post partum haemorrhage, ruptured uterus and maternal deaths) and foetal outcomes (low Apgar score of 5/10 or less at 1 minute and 5 minutes, fresh still births and deaths within 24 hours) between women that were from the primary care health centres and those that reported to the hospital in labour. The study found that 57.8% (37/64) of women who crossed the action line had spontaneous vertex delivery, almost 38% (24/64) delivered by caesarean section and 4.7% (3/64) delivered by assisted vacuum extraction. There was a significant difference in mode of delivery after

crossing the action line. More caesarean sections were performed on women from the primary care health centres as compared to those that came to the hospital in labour: 44.2% (19/43) vs 23.8% (5/21), p=0.049.

Conclusion and Recommendation: Although partographs were available in women's files, the partograph data were not completed adequately. While progress of labour was frequently documented, maternal and foetal condition were incompletely documented. Effective interventions such as in-service training, regular supportive supervision, regular audits of records of women in labour and intensification of use of guidelines for labour management are required to strengthen the use of the partograph for women in labour. Further research is recommended to highlight barriers for correct use of the partograph.

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LIST OF ABBREVIATIONS AND GLOSSARY

Abbreviation or Term	Complete Term or Definition
Action line	It is a second diagonal line on a partograph drawn parallel to the alert line, starting 4 hours later (See Figure 1.1)
Active phase of labour	It is a period from 4 cm dilatation of the cervix to full cervical dilation of 10 cm
Alert line	It is a diagonal line on a partograph that starts at 4cm of cervical dilatation to a point of expected full dilatation at 10 cm (See Figure 1.1)
Augmentation of labour	It is acceleration of labour with Oxytocin (use of drugs) or amniotomy (artificial rupture of membranes)
Cephalopelvic disproportion	It is a mismatch between the size of the presenting part of the foetus and the mother's pelvis so that progression of labour is slowed or halted
Clinical Officer	A qualified mid-level practitioner of medicine that is licensed to perform medical duties, general and obstetric surgery
DHO	District Health Officer
First stage of labour	First stage of labour begins with onset of regular painful uterine contractions

	accompanied by cervical dilatation, and ends with full dilatation of the cervix
FHR	Foetal Heart Rate
Health passport	A health passport is a standard booklet in which detailed health information is recorded at each visit to the health facility and it is traditionally kept with the patient
Latent phase	It is from the onset of regular painful uterine contractions accompanied by cervical dilatation, until the cervix reaches 4cm dilatation
Lifetime risk of maternal death	Probability of maternal deaths during a woman's reproductive life, usually expressed in terms of an Odds Ratio
MDHS	Malawi Demographic and Health Survey
MMR	Maternal Mortality Ratio (number of maternal deaths during given time period per 100,000 live births during the same period)
MDH	Mulanje District Hospital
NGO	Non Governmental Organisation
Obstructed labour	Labour is said to be obstructed when there is no advance of the presenting part despite strong uterine contractions
Partograph	It is a pre-printed graphic paper that is used to record and monitor progress of labour,

	maternal condition and foetal condition for women in labour
PPH	Postpartum haemorrhage (excessive loss of blood of 500mls or more from the genital tract within 24 hours of delivery [primary PPH], and after 24 hours of delivery until six weeks post delivery [secondary PPH])
Prolonged labour	Labour is said to be prolonged when progress is less than 1cm cervical dilatation per hour for a minimum of 4 hours
Second stage of labour	It is a period of labour that starts from full dilatation of the cervix to the expulsion of the baby
SVD	Spontaneous vertex delivery (delivery of a baby that comes head first through the birth canal)
Third stage of labour	It is a period from the birth of the baby to complete separation and expulsion of the placenta and membranes
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
WHO	World Health Organisation

CHAPTER 1

1.0 LITERATURE REVIEW

This literature review will give an overview of maternal mortality in general, and prolonged and obstructed labour specifically, both globally and in Malawi. The partograph is discussed as an intervention to improve intrapartum care, and the effectiveness as well as the utilisation of the partograph in different settings is reviewed. The chapter ends with justification for the study and the aim and objectives of the study described in this report.

Maternal deaths remain a major public health problem worldwide. Many women die annually due to complications of pregnancy, labour and delivery.[1,2] Reduction of maternal morbidity and mortality with cost effective interventions like the use of the partograph is considered a priority, especially in countries experiencing persistently high maternal deaths such as Malawi.[1,2]

The partograph is a tool that has been validated to prevent and manage complications of labour and delivery.[1,2] The major problem currently being reported is the decline in the use of the partograph.[3,4] The rate of its use is reported as low or almost absent and this has affected the quality of intrapartum care in Africa.[3,4]

Malawi adopted the partograph for labour monitoring and the Malawi labour management guidelines promote the use of the partograph for all women in labour. All facilities in Malawi have adopted the use of the partograph for labour monitoring.[5,6,7] Nevertheless, complications of labour are still not recognised in a timely manner and not managed effectively.[7] In this context, a review on the use of the partograph for women in labour is necessary to inform strategies to strengthen its effective use.

1.1 Burden of Maternal Mortality

1.1.1 Global burden of maternal mortality

Every day women continue to die during pregnancy and child birth worldwide, and their deaths are linked to millions of deaths of newborn babies due to complications of pregnancy, labour and child birth.[1,8] In 2008, there were an estimated 359,000 maternal deaths that occurred worldwide, a decline from 500,000 maternal deaths that occurred in 2005.[2,8,9]

1.1.2 Burden of maternal mortality in sub-Saharan Africa

The decline in global maternal deaths was negligible in developing countries. Ninety nine percent of maternal deaths occurred in developing countries according to the 2005 and 2008 global maternal estimates by the World Health Organisation (WHO).[8,9] In 2008, sub-Saharan Africa and South Asia accounted for 87% of the global maternal deaths and the maternal mortality ratio (MMRs) in sub-Saharan Africa was 640 per 100,000 live births.[9] The highest adult lifetime risk of maternal deaths was also in sub-Saharan Africa, with a risk of 1 in 31.[9] Besides complications of pregnancy and child birth, lack of skilled attendance and adequate care at delivery contribute to the increase of maternal deaths in sub-Saharan Africa.[1,9]

1.1.3 Burden of maternal mortality in Malawi

Malawi is one of the developing countries with high maternal mortality in the sub-Saharan region. Although the maternal mortality in Malawi had declined from 1,120 per 100,000 live births in 2000 to 675 per 100,000 live births in 2010, the figure was still high compared to other countries in developing regions.[10,11]

Developing regions like South Asia, Oceania, South East Asia, North Africa, Latin America, the Caribbean, Western Asia and Central Asia have a maternal mortality ratio of approximately 290 per 100,000 live births.[9]

1.2 Burden of Obstructed labour

1.2.1 Global burden of obstructed labour

Globally, about 70% of the maternal deaths are due to five direct causes: haemorrhage (25%), sepsis (15%), unsafe abortions (13%), hypertensive disorders (12%) and obstructed labour (8%).[12] Obstructed labour occurs when a foetal head is big or when the foetus is abnormally positioned and cannot progress into the mother's birth canal. Obstructed labour also occurs when the mother's birth canal is small.[13]

1.2.2 Burden of Obstructed labour in Africa

Obstructed labour is one of the five major causes of maternal death in developing countries and it contributes to 4.1% of maternal deaths in Africa, whilst haemorrhage contributes to 33.9%, hypertensive disorders 9%, sepsis 9% and abortion 3.9%.[14] In both Nigeria and Ethiopia, obstructed labour contributed to 0.4% to 7.0% of maternal deaths in 1999.[15,16]

1.2.3 Burden of Obstructed labour in Malawi

An enquiry of maternal deaths in the Southern Region of Malawi in 2001 found that the major causes of maternal deaths were: sepsis (32%), obstructed labour (24%), haemorrhage (17%), abortion (10%) and hypertensive disorders (8%).[17] Assessment of obstetric care services in Malawi in 2005 showed that the most common causes of maternal deaths occurring in health facilities included: obstructed labour/ruptured uterus

(36%), sepsis (19%), post partum haemorrhage (14%), hypertensive disorders (8%) and abortion (5%).[18] The burden of obstructed labour in Malawi is similar to other African countries in the region.[15,16]

1.3 Complications of obstructed labour

When obstructed labour is not timely recognised and managed, it can lead to maternal and newborn mortality or morbidity such as ruptured uterus, postpartum haemorrhage, infection, obstetric fistula and foetal injury or anoxic brain damage.[2,13,19]

1.3.1 Uterine rupture

Uterine rupture is a serious complication of obstructed labour because it may result in haemorrhage, shock or death.[2] An audit done at a district hospital in Malawi revealed an incidence of uterine rupture of 19.2 per 1,000 deliveries in a 3-month period in 2007.[20]

1.3.2 Obstetric Fistula

Obstructed labour can also lead to an obstetric fistula (an opening which develops in the vaginal wall or rectum due to pressure by the presenting part during prolonged or obstructed labour).[13] In 1993, at least 2 million women in the developing world had obstetric fistulas attributed to obstructed labour.[19] In Ethiopia, 97% of vesicovaginal fistulas (an opening between a woman's bladder and vagina, resulting in urinary incontinency) occurred in women who had obstructed labour.[13,19] Studies in Malawi show that obstructed labour contributes to obstetric fistulas and ruptured uterus in many Malawian women.[21]

1.3.3 Post partum haemorrhage

In South Africa, obstructed labour/prolonged labour is not recorded as a specific primary cause of death. However, between 2005 and 2007 there were 163 maternal deaths (4.1%) that could have been attributed to obstructed labour and these included 51 deaths from cephalopelvic disproportion, 32 deaths from postpartum haemorrhage due to prolonged labour, and 80 deaths caused by ruptured uterus.[22]

1.3.4 Foetal complications

Infants whose mothers experience prolonged and obstructed labour may develop anoxic brain damage and/or infection, and they may die as a result.[13,18] In Ethiopia, a study on obstructed labour showed that half of the labours resulted in stillbirths, 5.2% in neonatal deaths, and 7.3% of the infants experienced other foetal injuries.[16]

1.4 Prolonged labour.

Labour is said to be prolonged when progress of labour is less than 1cm cervical dilation per hour for a minimum of 4 hours.[5,18,23] Prolonged labour occurs when the foetal head is too big or when the pelvis is smaller than the presenting part, when the foetus is abnormally positioned or when there is inefficient uterine contractions.[24] One of the causes of prolonged labour is obstructed labour.[24]

With obstructed labour the foetus cannot descend through the pelvis despite strong uterine contractions.[13] This result in slow progress of labour. When prolonged labour is identified and managed correctly, complications of obstructed labour can be prevented.[13,24] Prolonged labour can be detected by correct use of the partograph and appropriate management can prevent complications.[2,24]

1.5 The partograph

The partograph is a tool used to monitor maternal condition, foetal condition and progress of labour.[23] If effectively used, the partograph can assist in early diagnosis and prevention of complications of labour.[1,2,23,24]

1.5.1 History of the partograph

The partograph was first designed by Emmanuel Friedman in 1954, and the Friedman curve was modified by R. H Philpot in 1974 in Zimbabwe.[24,25] The aim of this tool was to improve maternity referral services from peripheral health settings through early identification of labour problems, especially in health institutions with limited obstetric personnel.[24] The World Health Organisation (WHO) in 1987 recommended universal use of a partograph during the Safe Motherhood Conference in Nairobi, Kenya.[2,24,25]

1.5.2 Effectiveness of a partograph

Earlier studies in Zimbabwe and Malawi showed that caesarean section rates and perinatal mortality dropped after introduction of the partograph.[23] In 1994, a prospective study by the WHO conducted in South East Asia showed a reduction of prolonged labour from 6.4% to 3.4%. Emergency caesarean section rates also dropped from 9.9% to 8.3%, and stillbirth rates declined from 0.5% to 0.3%.[24,25] In addition, the percentage of cases of labour requiring augmentation (use of medicines or other interventions to speed up the process of labour) decreased from 20.7% to 9.1%. It was concluded that the partograph was a necessary tool for universal application.[24,26] A study done in Nigeria in 2005 revealed that the use of the partograph was associated with a reduction of obstructed labour from 7.9% to 0.8%, obstructed labour was detected at an earlier stage and patients were more promptly referred.[27] The use of the partograph also improved the quality and

regularity of observations on the foetal and maternal condition, and the progress of labour.[27]

A Cochrane review that compared difference between outcomes for women in labour when the partograph was used or no partograph was used, found a non-significant reduced risk of caesarean section (risk ratio (RR) 0.64, 95% confidence interval (CI) 0.24 to 1.70), instrumental delivery (RR 1.00, 95% CI 0.85 to 1.17) and Apgar score of less than seven at five minutes (RR 0.77, 95% CI 0.29 to 2.06).[28] However, other studies showed a positive impact on maternal and perinatal health outcomes, especially the studies in low resource setting.[28] The studies showed no evidence of harm outweighing the benefits of the partograph in prevention of prolonged and obstructed labour.[28,29] As such, the studies recommended routine use of the partograph as part of care during labour especially where skilled care at birth is limited.[28,29] The partograph can be effective only when the information leads to action through appropriate interpretation and intervention.[29]

1.5.3 Use of the partograph in Malawi

In Malawi, the partograph has been in use since the early 1970's.[23] The WHO developed three types of partographs:

- a composite partograph that includes a latent phase of 8 hours and the active phase starts at 3 cm cervical dilatation
- a modified partograph that excludes the latent phase, and the active phase starts at 4cm dilatation
- a simplified partograph that excludes the latent phase and descent of the presenting part and the active phase starts at 4 cm cervical dilation.[29]

Malawi adopted the WHO composite partograph that includes both the latent and active phase of labour, and plotting on the partograph starts when cervical dilation is 4 centimetres.[18]

The Malawi Ministry of Health, with assistance from non-governmental organisations, developed an obstetric life saving skills manual in 2000 using evidence from WHO manuals.[5] In 2009, the Ministry of Health integrated maternal and neonatal care manuals were developed.[18] These manuals serve as guidelines for management of women in labour in hospitals, for pre-service and in-service training. The manuals also provide guidelines for use of the partograph in women in labour.[18]

1.5.4 Sections of the partograph

- The partograph has three sections where observations related to maternal condition (blood pressure, pulse rate, temperature, drug administration and urine output), foetal condition (colour of liquor, extent of moulding, foetal heart rate), and progress of labour (descent, cervical dilatation, and contractions) are recorded.[18,23]
- It also has two diagonal lines: the alert line and the action line drawn 4 hours parallel to each other.

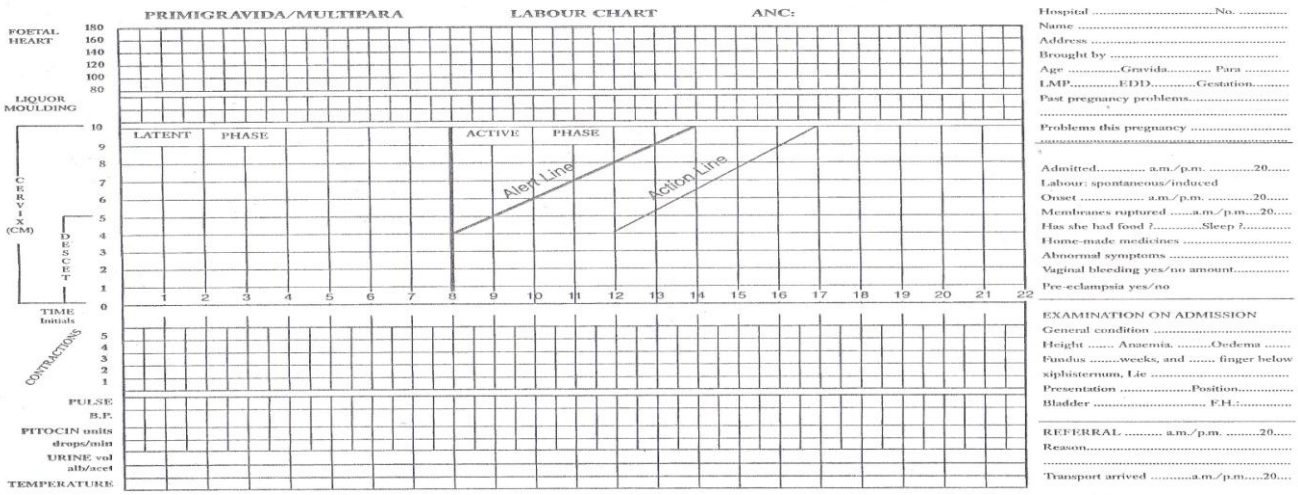


Figure 1.1 The partograph used in Malawi.[18]

1.5.5 Identifying pending signs of prolonged and/or obstructed labour

The alert and action lines are lines in the partograph that gives a warning that progress of labour may be delayed, and highlighting the need to consider an intervention when labour is prolonged.[5,18,23]

1.5.5.1 The Alert line

The alert line starts at 4 centimetre (cm) of cervical dilation and it is drawn to a point of expected full dilation at the top of the graph.[18,24] Normal progress of labour is 1cm per hour in the active phase of labour (dilation of the cervix from 4cm to full dilation of 10cm).[18,24] According to Malawi and WHO guidelines and evidence from literature, when progress of labour is slow, cervical dilation crosses to the right side of the alert line.[5,18]

If a woman is at the primary care health centre and the cervical dilation crosses the alert line, she should be referred to the district hospital (a secondary level hospital) immediately for critical assessment and management. Upon referral, the woman is accompanied by the partograph that was initiated at the primary care health centre. Upon arrival at the district hospital, the providers are expected to continue plotting on the same partograph.[18,23]

At the referral hospital, the woman should be assessed and if there is need, she should be rehydrated, her bladder should be emptied and she should be re-assessed in 2 to 4 hours, according to standard guidelines for labour management.[5,18]

1.5.5.2 The Action line

The action line is a second diagonal line drawn parallel to the alert line, starting 4 hours later (See Figure 1.1). It prompts an action to be taken to accelerate labour. According to Malawi and WHO guidelines, when labour crosses the action line and the woman is still at the primary care health centre, the following actions should be taken: commence intravenous infusion, empty bladder, monitor maternal and foetal condition, and she must be referred immediately. At the district hospital, the woman must be reassessed and the following actions taken: commence intravenous infusion if a woman was referred without the infusion, empty bladder, administer pain killer, commence antibiotics, augmentation of labour and make a final decision about assisted or operative delivery.[5,18,23] In Malawi, protocols for management of labour recommends delivery of a women after 2 hours of crossing the action line if there is no progress in cervical dilation and descent.[5]

1.5.6 Utilisation of the partograph in different settings

There are very few studies on how well the partograph is used in different settings in Africa. From the literature, the partograph was used in a low percentage of births. Studies in Mali, Nigeria and Kenya in 2004 revealed that 14% to 24% of partographs were correctly completed. The study in Mali further showed that 31% of deliveries were performed to the right side of the alert line and 4.7% to the right side of the action line.[30,31,32] An observation study in Kenya revealed that all the partographs evaluated were incomplete or incorrect in some aspects, the alert line was crossed in 17% of deliveries with no intervention, and 2.6%

of cases that crossed the action line waited for 3 to 26 hours before interventions were carried out.[4] In Uganda, the partograph was used in 70% of deliveries, with only 2% of the partographs that fulfilled the standard monitoring of foetal heart rate, and 1.3% of the deliveries occurred after crossing the action line.[33]

In Malawi, very few studies related to use of partograph were conducted, and those studies were done more than four years ago. One study was an evaluation of obstetric life saving skills training with a component of documentation on the partograph.[7] Two studies were audits of maternal morbidity and mortality with some component of partograph use.[17,20]

In conclusion, the literature shows that the partograph is a validated tool recommended for improving the quality of labour monitoring. However, most studies focussed on the rates of use of the partograph, and the rates of correct use on selected indicators on three sections of the partograph. There were very few studies that reviewed outcome of labour, and none of these studies were done in a district hospital.

1.6 Justification for the study

In Malawi, many women and newborn babies still die or develop long-term disability due to complications of labour and delivery. [10,11,17] In developed countries where effective systems of obstetric care were developed, complications of labour were eradicated in the middle of the 20th century.[14]

Correct use of the partograph, followed by correct interpretation of the partograph and appropriate interventions, may change outcomes and prevent complications of labour. Use of the partograph can be seen as the necessary first part of the chain of management of labour even though it will not make a difference unless the information leads to action.

The quality of partograph use by health personnel in health facilities such as district hospitals in Malawi is unknown. This study will be able to state whether, and to what extent, the partograph is used in the selected facility, as well as to generate information on problem areas and challenges in the use of partograph. Knowing the utilisation is important as it is part of standard care. The information generated will help to direct training courses and support of labour ward staff to strengthen the use of the partograph and improve intrapartum care at Mulanje District Hospital, and in time hopefully in Malawi.

1.7 Aim of the study

Hence this research project aims to assess if and how health providers use partographs for monitoring of women in the active phase of labour at Mulanje District Hospital in Malawi.

1.8 Study objectives

The study objectives were as follows:

a) To document the proportion of deliveries in which a partograph was used.
b) To assess whether health care workers documented the following completely:
    - foetal condition (foetal heart rate, colour of liquor and moulding).
    - maternal condition (blood pressure, pulse rate, temperature, urine output and use of oxytocin).
    - progress of labour (descent, cervical dilatation and contractions).
c) To assess the mode of delivery, maternal outcome (post-partum haemorrhage, ruptured uterus, maternal death) and foetal outcomes (Apgar score, death) of cases of women who crossed the action line.

d) To compare the mode of delivery, maternal and foetal outcomes between women that were referred from the primary care health centres to the district hospital and women that came directly to the district hospital when labour started.

CHAPTER 2

2.0 STUDY METHODOLOGY

Chapter two describes the methodology used in this study. The study design, study population and data collection procedure are discussed in detail in this chapter.

The study reviewed records of women who delivered at Mulanje District Hospital in Malawi. The women included those that were referred from the primary care health centres and those that reported to the district hospital in labour.

2.1 Study design

This was a retrospective record review.

2.2 Study setting

This study was conducted at Mulanje District Hospital in Malawi. Mulanje District Hospital was selected because of convenience, due to easy access. The researcher works for a project which implements its activities in partnership with Mulanje District Hospital.

Mulanje district is situated in the Southern Region of Malawi. The district had a population of 539,753 in 2008.[11] The district hospital is publicly funded and it serves a population of 40,255. The district has 21 primary care maternity health centres, and patients with complications of labour are referred to the district hospital from all the 21 health centres.

In 2010, 16,654 deliveries took place in all health facilities of Mulanje district, and 4,206 deliveries took place at the district hospital. Women who have their own transport, or who stay very close to the District Hospitals, present directly to the District Hospital. Women who stay far from the District Hospitals, go to the primary care centres. The women who present at primary care centre with a history of previous or current complications of labour

are referred to the District Hospital. The maternity ward of Mulanje District Hospital is served by 10 nurses, 2 clinical officers (a qualified mid-level practitioner of medicine that is licensed to perform medical duties, as well as general and obstetric surgery) and 2 medical officers. The main providers that staff the maternity ward are nurse midwives. Usually four to five nurse midwives and two clinical officers are assigned on duty in the labour ward during the day, and two to three nurse midwives during the night. The other two nurses are located in the post natal ward. The two medical officers are allocated on call and they rotate in all departments as well as the theatre. All these cadres of providers document findings on the partograph.

Women with complications are referred to the district hospital for further management. The referral system is as follows: Most primary care health centres are more than five kilometres from the district hospital (secondary level hospital). The primary care health centres are managed by one to two nurse midwives on average. When women develop complications, the nurses call for the ambulance from the district hospital. The ambulance takes about one to two hours to get to the primary care health centre due to poor roads.

Upon referral from the primary health care centres, the women are accompanied by their health passport book and the partograph that has been initiated at the primary care health centre. Plotting is continued on the same partograph when a patient arrives at the district hospital. Upon discharge, the partograph remains in the woman's file at the hospital and the health passport book is given back to the woman. A health passport is a standard booklet in which detailed health information is recorded at each visit to the health facility. A woman's health passport book includes information on antenatal, labour, postnatal and initial immunisation for the baby. The health passport is kept by the patient. The antenatal card is included in the woman's health passport book.

The partograph has been in use at Mulanje District Hospital for more than 20 years. All the staff working at the maternity unit received training on how to use the partograph during their pre-service training. Besides, members of the staff undergo in-service training on Basic Emergency Obstetric and Neonatal Care. This training includes use of the partograph as one of its modules.

2.3 Study Population

All women who delivered at Mulanje District Hospital.

2.4 Study sample

The sample included all women in labour who delivered at Mulanje District Hospital from the 1st of September to the 30th of September, 2010. Both women who were referred from the primary care health centres and the women who came directly to the hospital when they were in labour, were included. These two groups are compared. The difference between the two groups is that the women who report at the primary care health centres have less opportunity to receive standard care because there is only one or two nurses who look after the women in labour. When complications arise, they have to wait a long time to be transferred to a hospital for further management. In contrast, the women who report to a district hospital have an opportunity to have timely observations and interventions when complications arise because the district hospitals are managed by nurses, medical officers and clinical officers. So the rationale to compare is to assess if there is a difference in observations and outcome between the two groups.

2.4.1 Inclusion criteria

All women in the active phase of labour were included in the study. The active phase begins at 4cm dilation of the cervix, to full dilation of 10cm.[7,15]

2.4.2 Exclusion criteria

Women who had a planned caesarean section were excluded from the study. In addition, women in labour who delivered in less than 2 hours after admission were excluded, because such records would not provide sufficient data for assessment of monitoring and documentation.

2.5 Instrument

A standardised data collection form was designed based on information from the partograph used in Malawi, and World Health Organisation and Malawi Obstetric skills guidelines (see **Annex** 1). The data collection form was used to extract information from the partograph charts, women's files, delivery register, theatre register, and maternal death records.

A pilot study was carried out on the records of 10 cases of women in labour to improve the quality of the data collection tool. The pilot study was conducted on records of women who delivered at the same study site in January 2010, a few months earlier than the study period. Data for the pilot study and the research was extracted by the researcher. Following the pilot study, indicators such as *not observed* and *not applicable* were added on the data collection form. The rest of the information remained unchanged.

2.6 Data collection procedure

Data was collected for all deliveries between the period of 1 to 30 September 2010.

2.6.1. Labour ward delivery register.

The labour ward delivery register was reviewed to extract information on the total number of deliveries, deaths and number of caesarean sections during the study period.

2.6.2. Women's files

Women's files of all deliveries during the study period were retrieved from record cabinets situated within the labour ward. All files for women that delivered in September 2010 were available. The partographs were filed in the women's files.

Data collected from the women's files included:

- Demographic data: age, gravidity and parity.
- Number of cases where a partograph was used.
- Number of women referred from the primary care health centres, and number of women who came directly to the hospital when they were in labour.
- Number of women who crossed the alert and action lines on the partograph.
- Documentation on the partograph (See Figure 1.1): The researcher evaluated documentation of the foetal condition, maternal condition and progress of labour.
    - On foetal condition: the researcher assessed if foetal heart rate was recorded half hourly, and colour of liquor and moulding 4 hourly.
    - On maternal condition: blood pressure and pulse rate hourly, temperature 4 hourly, urine output and use of Pitocin.
    - On progress of labour: descent of foetal head and cervical dilatation 4 hourly, contractions hourly.
- The researcher judged whether women were assessed and managed according to guidelines for labour monitoring, and evaluated the parameters mentioned above to

be: not done, incomplete or completely done. Complete documentation implies that data was recorded diligently in every cell in the partograph according to standard guidelines by the Ministry of Health.

- Mode of delivery after crossing the action line: spontaneous vertex delivery (SVD), caesarean section and vacuum extraction were noted.
- Maternal and foetal outcomes after crossing the action line were recorded:
    - Maternal outcome: postpartum haemorrhage, ruptured uterus, caesarean section and death.
    - Foetal outcome: Apgar score, still birth, and death within 24 hours of birth.
- Progress notes: progress notes from the files were reviewed to identify any missing data. The progress notes had information from admission and outcome of deliveries in case of complicated labour.

2.6.3 Theatre register

The theatre register was reviewed to assess patients who delivered by emergency operative procedure, to extract maternal and foetal outcome and any missing data from the women's files.

2.6.4 Maternal death records

Maternal deaths records were reviewed to correlate data with the labour ward delivery register and check whether all deaths were captured there.

2.7 Data processing and analysis

Data was entered into an Excel spreadsheet. Data was analysed using Statistica 6.0. Most data was descriptive and proportions were used to describe usage and documentation of

components of the partograph. For comparison between two proportions such as foetal and maternal outcome for those that were referred and those that were not referred, a Chi-square test was used and a p value of <0.05 was considered statistically significant.

2.8 Ethical consideration

Ethical approval (**M111151)** for the study was granted by the Human Research Ethics Committee (HREC) from the University of the Witwatersrand in Johannesburg, South Africa (see **Annex** 2). Since the study was conducted in Malawi, another ethical approval was obtained from the Malawi Health Sciences Research Committee (see **Annex 3**). Written official authorisation from Mulanje District Hospital (District Health Officer) was obtained before commencement of the study (see **Annex 4**).

To protect the patient's identity, patients were allocated a unique identifier number. Patient's data were kept in a separate computerised data base which could only be accessed by the investigator through a password.

CHAPTER 3

3.0 RESULTS

Chapter three describes the results of the study presented in flow chart and table format. Results presented include data on the usage and level of correct documentation of the partograph regarding foetal and maternal condition as well as progress of labour, followed by data on maternal and foetal outcome.

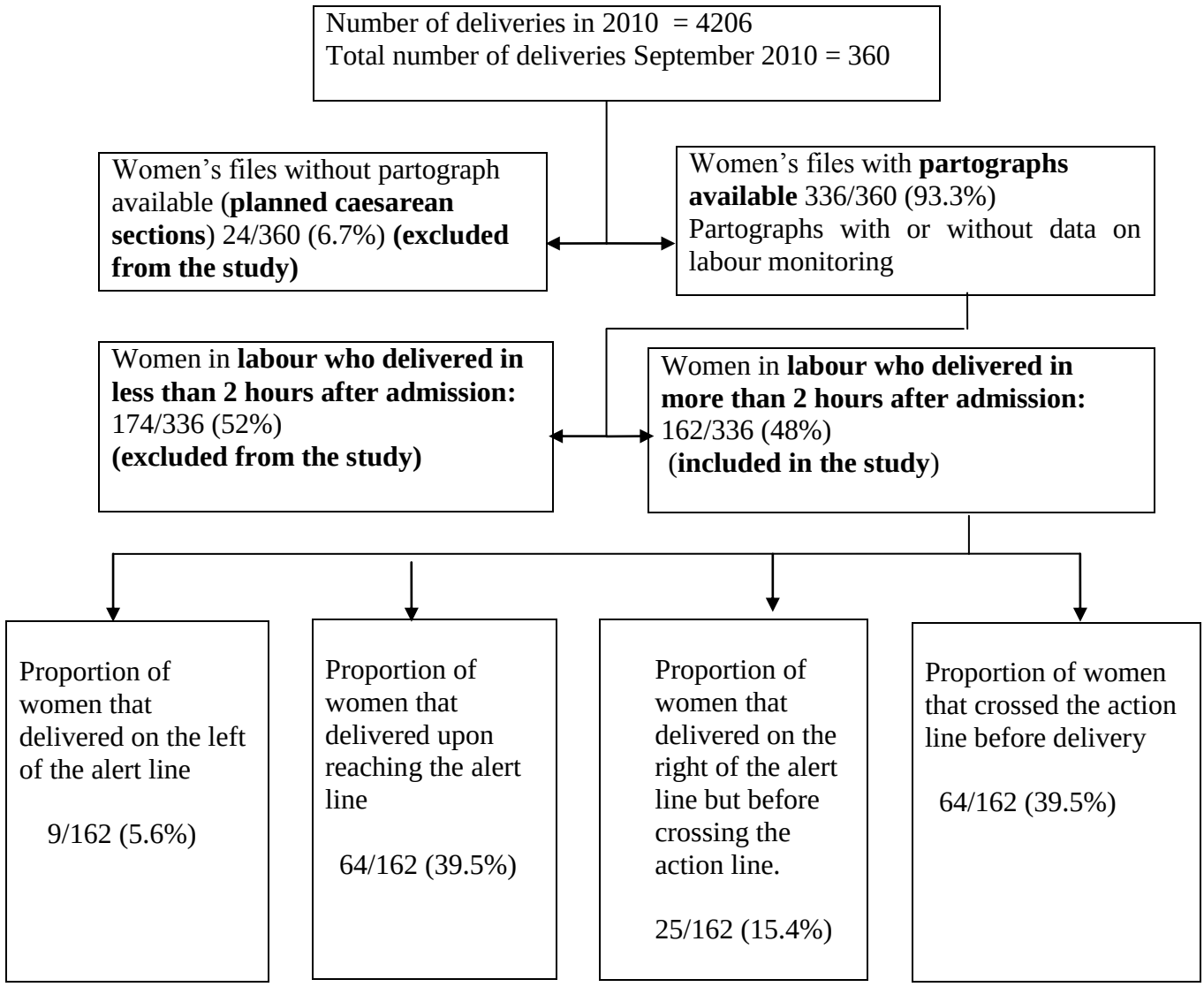


Figure 3.1 Usage of the Partograph

3.1 Partograph usage

The sample consisted of all women in labour, who delivered at Mulanje District Hospital from the 1st of September to the 30th of September 2010. There were 360 deliveries in the month of September.

3.1.1 Availability of partographs

Partographs were available in 336/360 (93.3%) files of women. Twenty four (6.7%) of records of women had no partographs. The records which had no partographs belonged to women who had planned caesarean sections, and were excluded from the study.

3.1.2 Partographs used for labour monitoring

Out of the 336 records, 162 records (48%) of deliveries belonged to women whose labour lasted more than 2 hours. These were the records of women that were included in the study. Fifty two percent (174/336) were records of women with labour that lasted less than two hours. These records were excluded from the study since they did not have adequate information for review. See Figure 3.1

Out of the 162 records, 49.4% (80/162) records had partographs of women that were referred from the primary care health centres and 50.6% (82/162) of records had partographs of women that reported to the hospital in labour.

3.1.3 Partographs with complete documentation

Only ten percent of the one hundred and sixty two records (16/162) had partographs that were completely documented on each parameter of the three components of the partograph.

3.2 Assessment of documentation on partographs

Three parameters (completely documented, incompletely documented and not documented) were used to assess the nature of documentation of foetal condition (foetal heart rate, moulding and colour of liquor), maternal condition (temperature, blood pressure, pulse and urine) and progress of labour (contractions, descent and cervical dilatation) on the partographs.

Table 3.2.1 Assessment of documentation on partograph parameters: Foetal Condition (n=162)

Foetal condition	**Completely documented**
Foetal Heart Rate n= 162	20 (12.3%)
Moulding n= 162	56 (34.6%)
Liquor n = 162	60 (37.0%)

Table 3.2.1 shows that foetal heart rate was the least correctly documented parameter on foetal monitoring.

Foetal condition was mainly incompletely documented or not documented at all: 87.7% (142/162) for foetal heart rate, moulding 65.4% (106/162) and liquor 63.0% (102/162). Foetal heart rate was the least completely documented with 12.3% (20/162) compared to moulding 34.6% (56/162) and liquor 37% (60/162).

Table 3.2.2 Assessment of documentation on partograph parameters: Maternal condition n=162

Maternal condition	**Completely documented**	**Incompletely documented or not documented**
Temperature n= 162	18 (11.1%)	144 (88.9%)
Blood Pressure n= 162	8 (4.9%)	154 (95.1%)
Pulse Rate n=162	8 (4.9%)	154 (95.1%)
Urine n=162	12 (7.4%)	150 (92.6%)
Age n= 162	162 (100%)	0
Parity n= 162	161 (99.4%)	1 (0.6%)
Gravidity n= 162	161 (99.4%)	1 (0.6%)

Table 3.2.2 shows that maternal condition was mainly incompletely documented or not documented at all. Blood pressure and pulse rate were the least documented.

Age, parity and gravidity were indicated in almost all the partograghs. Temperature was completely documented in 11% (18/162), while pulse rate and blood pressure were completely documented in only 4.9% (8/162) of records of women. Urine output was completely documented in only 7.4% (12/162) of the partographs.

Table 3.2.3 Assessment of documentation on partograph parameters: Progress of labour n = 162

Progress of labour	**Completely documented**	**Incompletely documented or not documented**
Contractions n = 162	43 (26.5%)	119 (73.5%)
Descent n= 162	96 (59.3%)	66 (40.7%)
Cervical dilatation n=162	111 (68.5%)	51 (31.5%)

Table 3.2.3 shows that cervical dilation was the most completely documented.

Progress of labour was the most frequently completely documented compared to maternal and foetal condition. Complete documentation included the following: Cervical dilatation was documented in 68.5% (111/162) and descent in 59.3% (96/162) with contractions 26.5% (43/162) the least documented parameter on progress of labour.

3.3 Maternal and Foetal outcome for women who crossed the action line

Table 3.3 Maternal and foetal outcome for women who crossed the action line n=64

Outcome	**Presented at hospital** n=21(32.8%)	**Referred from health centre** n=43 (67.2%)	**Total** n=64	***p*-value**
Caesarean section	5 (23.8%)	19 (44.2%)	24 (37. 5%)	**0.049 (significant)**
Spontaneous vertex delivery	15 (71.4%)	22 (51.2%)	37 (57.8%)	0.0584
Vacuum extraction	1 (4.8%)	2 (4.6%)	3 (4.7%)	0.492
Postpartum haemorrhage	2 (9.5%)	2 (4.7%)	4 (6.3%)	0.224
Ruptured uterus	0	0	0	-
Maternal death	0	0	0	-
Low APGAR Score below 5/10 at 1 minute	6 (28.6%)	10 (23.3%)	16 (25%)	0.323
Low APGAR Score below 5/10 at 5 minutes	3 (14.3%)	3 (7.0%)	6 (9.4%)	0.174
Fresh still birth	0	1(2.3%)	1 (1.6%)	-
Early neonatal deaths within 24 hours	3 (14.3%)	2 (4.7%)	5 (7.8%)	0.0869

Table 3.3 shows that more women that had crossed the action line were from the primary care health centres.

3.3.1 Maternal outcome

Out of the 162 records, 5.6% (9/162) delivered on the left of the alert line, 39.5% (64/162) delivered upon reaching the alert line, 15.4% (25/162) delivered after crossing the alert line but before crossing the action line, and 39.5% (64/162) delivered after crossing the action line – see Figure 3.1. Among those who crossed the action line, the majority of women 67.2% (43/64) were referred from primary care health centres and 32.8% (21/64)

came straight to the district hospital when in labour. Only 4.7% (2/43) from the women referred from the primary care health centres were referred after crossing the action line, the other 95.3% (41/43) were referred before crossing the action line, but delivered after crossing the action line.

3.3.1.1 Mode of delivery

While most women, 57.8% (37/64), delivered spontaneously, 37.5% (24/64) delivered by caesarean section and 4.7% (3/64) delivered by assisted vacuum extraction. Table 3.3 shows a significant difference in caesarean section rates between women who were referred from the primary care health centres and those who came to the district hospital in labour. More caesarean sections were performed on women from the primary care health centres as compared to those that came to the district hospital in labour: 44.2% (19/43) vs 23.8% (5/21), p= 0.049. Fifty-eight percent (11/19) of women from the primary care health centres had caesarean sections five hours or more after crossing the action line.

Membranes were ruptured in 8% (5/64) of women that crossed the action line. However, there was no documentation whether membranes were ruptured spontaneously (spontaneous rupture of membranes) or actively by providers (artificial rupture of membranes). There was also no documentation of use of Oxytocin to accelerate labour.

3.3.1.2 Adverse outcome

Postpartum haemorrhage (PPH) occurred in 6.3% (4/64) of women, and all the women that had PPH had delivered by caesarean section or vacuum extraction. There was no significant difference in post-partum haemorrhage between women that were referred from primary care health centres and those that reported to hospital in labour, $p = 0.224$. There was no ruptured uterus or maternal death in the sample population.

3.3.2 Foetal outcome

Out of the 64 women that crossed the action line, 71.8% (46/64) of infants delivered had an Apgar score of more than 5/10 at one minute, 25% (16/64) of infants had low Apgar scores of less than 5/10 at 1 minute, fresh still birth occurred in 1.6% (1/64), and there was no documentation of Apgar score in one infant, 1.6% (1/64). Early neonatal deaths within 24 hours occurred in 7.8% (5/64) of infants. The neonates who died within 24 hours had low Apgar score of less than 5/10 at 5 minutes. The information on cause of death was not collected.

Table 3.3 also shows that there was no significant difference in foetal outcome (low Apgar score at 1 minute and 5 minutes, fresh still birth or deaths within 24 hours after birth) between those that were referred and those that reported to hospital in labour. The proportions for Apgar score less than 5/10 at 5 minutes were 7% (3/43) for women that were referred from the primary care health centres, vs 14.3% (3/21) for women who came directly to the hospital, p= 0.174.

3.4 Adverse outcomes in women who crossed the action line, correlated with mode of delivery

Table 3.4 Mode of delivery versus maternal and foetal outcomes after crossing the action line n=64

Mode of delivery	**Total**	**Total maternal and foetal adverse outcomes**	**Adverse outcomes**			
			Low Apgar score <5/10 at 1 min n=16	**Fresh still birth (FSB)** n=1	**Early neonatal deaths within 24 hours** n=5	**Post partum haemorrhage (PPH)**n=4
Spontaneous vaginal delivery	37	10/37(27%)	7/16 (43.8%)	1 (100%)	2/5 (40%)	0
Caesarean section	24	13/24(54.2%)	8/16 (50%)	0	2/5 (40%)	3/4 (75%)
Vacuum extraction	3	3/3(100%)	1/16 (6.3%)	0	1/5 (20%)	1/4 (25%)
Total	64	26/64 (40.6%)	16 (100%)	1 (100%)	5 (100%)	4 (100%)

Table 3.4 shows that adverse outcomes occurred irrespective of mode of delivery

Of those who crossed the action line, 40.6% (26/64) had immediate adverse outcomes such as low Apgar score, fresh still birth, early neonatal deaths within 24 hours and postpartum haemorrhage. Adverse outcomes occurred to women who delivered spontaneously in 27% (10/37) of cases, to women who delivered by caesarean section in 54.2% (13/24) of cases, and to all women who had a vacuum extraction.

3.5 Foetal heart rate documentation versus foetal outcome in deliveries after crossing the action line.

Table 3.5 Foetal heart rate documentation versus foetal outcome in deliveries after crossing the action line: n=64

Frequency of foetal heart rate recording n=64	**Low Apgar Score <5/10 at 1 min**	**Fair Apgar score >5/10 at 1 min**	**Fresh still birth (FSB)**	**Early neonatal deaths within 24 hours**
Completely recorded n= 20	3/20 (15%)	16/20 (80%)	0	1/20(5%)
Incompletely recorded/ n = 43	13/43 (30.2%)	25/43 (58.1%)	1/43(2.3%)	4/43 (9.3%)
Not recorded and unknown n=1	-	-	-	-

Table 3.5 shows the correlation between foetal outcome and documentation of the foetal heart rate.

The adverse outcome of low Apgar score had been present in cases of both complete and incomplete documentation of the foetal heart rate. In cases where the foetal heart rate was documented completely, 15% (3/20) of the infants had low Apgar scores. While in cases where the foetal heart rate was documented incompletely, 30.2% (13/43) of infants had low Apgar scores and early neonatal deaths within 24 hours occurred in 9.3% (4/43) of the cases and still births occurred in 2.3% (1/43) of the cases.

Table 3.6 Maternal and Foetal outcomes for women who delivered before and after crossing the action line n=162

Outcome	**Women who delivered before crossing the action line** n=98 (60.5%)	**Women who delivered after crossing the action line** n=64 (39.5%)	**Total** n= 162	***p*-value**
Caesarean section	3 (3.1%)	24 (37.5%)	27 (16.7%)	**0.001 (significant)**
Spontaneous vertex delivery	95 (96.9%)	37 (57.8%)	132 (81.5%)	0.001
Vacuum extraction	0	3(4.7%)	3 (1.9%)	-
Postpartum haemorrhage	1(1.0%)	4 (6.3%)	5(3.1%)	0.024
Ruptured uterus	0	0	0	-
Maternal death	0	0	0	-
Low APGAR Score below 5/10 at 1 minute	3 (3.1%)	16 (25%)	19 (11.7%)	0.001
Low APGAR Score below 5/10 at 5 minutes	1 (1.0%)	6 (9.4%)	7 (4.3%)	0.005
Fresh still birth	0	1 (1.6%)	1 (0.6%)	-
Early neonatal deaths within 24 hours	1 (1.0%)	5 (7.8%)	6 (3.7%)	0.005

Table 3.6 shows that women that crossed the action line had more adverse outcome

Out of the 162 that had partographs, 60.5% (98/162) delivered before crossing the action line and 39.5% (64/162) delivered after crossing the action line. On mode of delivery, 81.5% (132/162) delivered spontaneously, 16.7% (27/162) delivered by caesarean section and 1.9% (3/162) delivered by assisted vacuum extraction. Table 3.6 shows a significant difference in caesarean section rates, postpartum haemorrhage, low Apgar score and early neonatal deaths within 24 hours between women who delivered before crossing the action

line and those that delivered after crossing the action line. More caesarean section were performed on women that crossed the action line as compared to those that delivered before crossing the action line: 37.5% (24/64) vs 3.1% (3/98), p=0.001. Post partum haemorrhage occurred to more women who delivered after crossing the action line as compared to those that delivered before the action line: 6.3% (4/64) vs 1.0% (1/98), p=0.024. More infants born after crossing the action line had low Apgar score at 1 minute as compared to infants that were born before crossing the action line: 25% (16/64) vs 3.1% (3/98), p=0.001. There were more early neonatal deaths among infants that were born after crossing the action line as compared to those that were born before crossing the action line: 7.8% (5/64) vs 1% (1/98), p = 0.005.

CHAPTER 4

4.0 DISCUSSIONS AND CONCLUSION

The aim of the study was to assess if and how health providers used the partograph for monitoring of women in the active phase of labour at Mulanje District Hospital in Malawi. This chapter discusses the results of the study in the context of available literature on the topic. The study limitations are then discussed and a conclusion on the study findings is given. The chapter is concluded by recommendations on how the use of the partograph could be improved.

This study found inadequate use of the partograph by health providers. Although partographs were available in women's files, the partograph data were not completed adequately. While progress of labour was frequently documented, maternal and foetal condition were incompletely documented. The majority of women crossed the alert line, and more than one third delivered after crossing the action line. Adverse outcomes were observed in all modes of deliveries, but mostly after delivery by caesarean section and vacuum extraction.

4.1 Discussion

4.1.1 The proportion of deliveries in which a partograph was used

This study established that the partographs were available in most deliveries. However, less than half of the partograph charts available in records of women in labour had information on all sections of labour monitoring. More than half of partographs that were available in the files were either not used, or were used to record demographic data and the summary of delivery for women who came or were seen in the second stage of labour. Perhaps the women came late, and there was no time for documentation.

This finding on availability of the partogragh was similar to what was observed in Kenya, Uganda and Nigeria where availability of partographs were found in more than half of women's records, but its use was as low as 2% to 24%.[32,33,34]

4.1.2 Health care provider documentation of maternal and foetal condition, and progress of labour

In this study, only one tenth of the partographs that had data on labour monitoring had information that was completely documented on each parameter of progress of labour, maternal and foetal condition. Most partographs were incompletely documented or not documented at all.

This finding may imply that either the women were monitored without documentation, or were not monitored at all. This finding was similar to a study conducted at the main referral hospital in Kenya. The study in Kenya observed that every partograph evaluated was incomplete or incorrect in some aspects.[4] Similarly, in Uganda, partographs were used in more than half of all deliveries, but only 2% of the partographs were used according to standard monitoring.[33]

The correct use of partographs in this study and the studies cited were low. Lack of correct use and documentation of the partograph affects identification of problems in the baby and the mother during labour.[4] Problems might be missed or detected very late, and this may affect intervention and outcome of labour.

4.1.2.1 Selective documentation of parameters

The study observed selective documentation of particular parameters. Certain parameters on the sections of the partograph were frequently documented, while other parameters were less frequently documented.

4.1.2.2 Frequently documented parameters

Cervical dilation was documented most frequently, followed by descent. The high frequency of recording of cervical dilation in this study compared to other parameters, was similar to findings of the studies in Kenya and Uganda where cervical dilatation was observed in more than 75% of deliveries.[4,33]

4.1.2.3 Less frequently documented parameters

Documentation of the foetal heart rate and maternal vital signs (blood pressure, pulse rate and temperature) were very low in this study.

- **Foetal heart rate**

Foetal heart rate was completely documented in only about 10% of partograghs in this study. Proper monitoring of foetal heart rate assists in detection of abnormal foetal heart rate which may signify foetal distress, and early detection of foetal distress can improve perinatal outcome.[4]

- **Maternal vital signs**

Checking of maternal vital signs (blood pressure, pulse rate and temperature) in early labour is very important, because it can assist in early identification of complications such as pre eclampsia, impending signs of uterine rupture and infections.[4,18]

  - **Blood pressure**

Blood pressure is essential for identifying of pre eclampsia or impending eclampsia, and is an important indicator for early identification of a ruptured uterus which is a possible complication of obstructed labour.[18] In this study, blood pressure and pulse rate were the

least documented parameters compared to temperature. The findings of this study was similar to that of a study conducted in Uganda which revealed that blood pressure was monitored in less than 10% of the study sample.[33]

- **Pulse rate**

Pulse rate was also (together with blood pressure) the least documented in this study with complete documentation in less than 5% of patients. A rise in pulse rate is also one of the danger signs in women with obstructed labour, because it signifies maternal exhaustion which occurs in prolonged labour, and it may signify shock as a result of bleeding.[18] This finding was different from the studies conducted in Kenya where pulse rate was indicated in more than a quarter of the study population.[4]

- **Temperature**

Assessment of temperature during labour is very important for early detection of maternal pyrexia which is a sign of obstructed labour with impending rupture of the uterus, or could signify maternal infection.[18] This study found that only about 10% of partographs had complete documentation of maternal temperature. Some women with abnormal temperature may have been missed.

4.1.3 Mode of delivery, maternal and foetal outcome of cases of women who crossed the action line

4.1.3.1 Proportion of women who crossed the action line

Studies show that high mortality rates are associated with delay in delivery of the baby of four or more hours after crossing the alert or action line, in the absence of appropriate intervention.[35] This study revealed that slightly more than half of women delivered after

crossing the alert line, and more than one third delivered after crossing the action line. More women from the primary care health centres delivered after crossing the action line.

Other studies in Mali and Nigeria showed that 30% to 40% of women delivered after crossing the alert line and 10% of women delivered after crossing the action line.[30,31] The study in Nigeria also showed more augmentation as an intervention to accelerate labour when progress of labour was slow.[31] The proportions of women who delivered after crossing the alert and action lines in the cited two studies were lower than the proportion of women who delivered after crossing the alert and action lines in this study.[30,31]

In this study, there was no documentation of interventions to accelerate labour. Perhaps lack of interventions between the alert and action line and after crossing the action line might be one of the reasons for more women delivering after crossing the action line, as compared to other cited studies. This is definitely identified as a big problem area that would need attention.

4.1.3.2 Maternal outcome after crossing the action line

In this study, less than two thirds of the women who crossed the action line delivered spontaneously, just more than one third delivered by caesarean section, and less than five percent delivered by assisted vacuum extraction. Postpartum haemorrhage occurred in women who delivered by caesarean section and vacuum extraction.

There were cases where five hours had elapsed after crossing the action line before caesarean section or assisted vacuum extraction were performed in this study. This might imply that there were delays instituting interventions for prolonged labour, although partographs were diligently or incompletely documented. This finding correlates with a

previous study in Kenya in which there were delays in intervening after crossing alert or action lines, and poor neonatal outcomes were observed.[4]

4.1.3.3 Foetal outcome after crossing the action line

This study showed that adverse outcomes of labour such as low Apgar score, fresh still birth and early neonatal deaths within 24 hours occurred with or without complete documentation of foetal heart rate. In contrast, a study in Uganda found that a good Apgar score was associated with standard foetal monitoring.[33] The finding in this study could mean that providers may have filled out the partograph according to requirements but not translated the findings into actions.

4.1.4. Comparison of mode of delivery and outcomes of labour between women that were referred from the primary care health centres to the district hospitals and women that came to the district hospital in labour

This study compared mode of delivery and outcomes of labour between women that were referred, and those that came to the hospital in labour. There were more women from the primary care health centres that delivered after crossing the action line, than those that presented at the hospital in labour.

More caesarean sections were performed on women that were referred from the primary care health centres. There is little evidence available on outcome data related to the use of the partograph. Most studies have focussed on rates of use of the partograph, or on clinical guidelines. A study in Nigeria showed a reduction of uterine rupture and maternal deaths after introduction of the partograph at a rural hospital.[27]

4.1.5 Comparison of outcomes of labour between women that delivered before crossing the action line and women that delivered after crossing the action line

This study showed that over one third of women with partographs experienced adverse outcomes. Women that delivered after crossing the action line experienced more adverse outcomes than women that delivered before crossing the action line. The adverse outcomes included caesarean section delivery, postpartum haemorrhage, low Apgar score and early neonatal deaths within 24 hours. Studies show that proper monitoring of progress of labour, early identification of the problems and appropriate intervention result in reduction of perinatal mortality.[4,36] The adverse outcomes might have not been related to the incomplete documentation of the partographs, but perhaps appropriate interpretation of the partograph might have affected early detection of women who needed prompt interventions. Better outcomes can be achieved if findings are translated into appropriate actions.[4,7]

4.2 Strengths of this study

- The design of this study was a record review and as such it was easier to get information, since data was already available in the form of medical records.
- The study was relatively inexpensive and conducted within a short period of time. Data was collected by the researcher within a period of one month.

4.3 Study Limitations

- The study was done in only one facility, namely a district hospital. The reason for this was that it was not feasible for one researcher to repeat the study at more facilities, because of time constraints.

- However, even if the study was done in only one district hospital, the findings can still be generalised to rural district hospitals in Malawi. Nurse midwives, clinical officers and medical officers provide obstetric and neonatal care in the district hospitals. All the mentioned cadres of health personnel undergo a training that includes obstetric and neonatal care. Besides, the training incorporates use of the partograph. The average staff ratio that provides care in the rural district hospitals is the same throughout the country.

- Since the study design was a retrospective review of records, some relevant data was missing due to inconsistency and incomplete documentation in the patient files. Progress notes in women's files were used to get missing data from the partographs.

- Since the study was limited to a period of one month (September), maternal and foetal outcome that occurred during the month of study might be different from outcomes of deliveries over a longer period. Some confounders such as malaria could affect the outcome of labour. Malaria is very common during the rainy season from the month of December to April, but it is not known to what extent malaria affects women in labour at Mulanje District Hospital.

- It was difficult to verify whether other interventions were implemented when no interventions were recorded, because data collection was limited to record review only. The lack of recording of interventions was identified as a problem area that would need investigation. However, a prospective design for a study or hospital audit would be required to assess whether the interventions were implemented but not recorded, or whether no interventions were implemented.

- In this study, it was also difficult to determine factors related to adverse outcomes as in cases of vacuum extractions, since the information could not be verified with the providers or the women because of the retrospective study design. Once again, a prospective study design would be needed to link vacuum extractions with adverse outcomes, and determine whether the outcome was because of the poor technique or because of the poor state of the mother or foetus by the time the vacuum extraction was done.

- A limitation of the study is that outcomes cannot be ascribed to the use or non-use of the partograph or complete or incomplete documentation, as the partograph is a tool to assess labour progress and not an intervention.

4.4 Conclusion

The study found that although partographs were available in all the files, correct usage of partographs for labour monitoring was low with 90% of partograph documentation incomplete. There was no documentation of any intervention as the women moved from the alert line to the action line, and the majority of women delivered after crossing the alert line. Adverse outcomes were observed in all modes of deliveries, but mostly after delivery by caesarean section and vacuum extraction.

These results highlight the need for training interventions to improve the use of the partograph by health care providers at Mulanje District Hospital and other district hospitals in Malawi. It is also expected that the results of this study will inform future similar studies which could inform policy to strengthen the use of the partograph for women in labour.

4.5 Recommendations

The findings of this study have implications for stakeholders in the health care delivery system in Malawi. The stakeholders include health care policy makers, service providers, training institutions, non-governmental organisations and professional bodies. These stakeholders should strengthen their efforts in ensuring access to quality care during delivery. Additionally, the following recommendations should be considered:

Clinical recommendations

- Health personnel working in maternity units should regularly undergo in-service training to improve skills on the use of the partograph and management of labour. Appropriate indications for referral and the time of referral from primary care health centres to a secondary level hospital should be emphasised during such training. There is also a need for induction of the new staff and those that transferred to maternity units, in particular labour wards.
- In-service training with particular emphasis on correct interpretation of the partograph findings should be strengthened to improve quality of care during labour and delivery.
- Regular supportive supervision for maternity staff with emphasis on partograph use and delivery outcome should be intensified through the district hospitals. The supportive supervision should be followed by immediate feedback or debriefing sessions with the providers.
- The district hospitals should strengthen regular clinical audits to evaluate the use of the partograph. More emphasis should be on appropriate decision making and correct intervention to improve the outcome of labour and delivery.

- Training institutions should ensure that correct use of the partograph, interpretation and appropriate decision making is one of the competencies achieved by the student midwives during their clinical placement.

Recommendations for further study

- A prospective audit of hospital practices with an aspect of record review, provider interview and women's perspectives on their experience during labour is also recommended. Observing and interviewing providers will shed light on some factors that were not addressed in this study, such as barriers to proper use of the partograph.
- Further research is also recommended to study the outcomes of all women who came in second stage of labour or were seen in second stage of labour. Information from such a study will highlight the outcomes for all women, since this study only focussed on outcomes of women that delivered before and after crossing the action line.

Persistent maternal and neonatal complications among women and children in Malawi should lead to increased efforts to improve intrapartum care using cost effective interventions such as the partograph. Use of the partograph coupled with the above mentioned recommendations can assist in reduction of maternal and neonatal morbidity and mortality in Malawi and other countries facing similar challenges.

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Appendices

Appendix 1: Data collection form

Title: Use of partographs in women in labour at Mulanje District Hospital in Malawi	**Data Abstraction Form**

1	**Client code**	
2	**Date data abstracted from client's record**	**Day** **Month** **Year**

Section A: Demographic Data

Age	
Gravidity	
Parity	

Section B: Partograph use

1. Referral to hospital	No	0	☐	Yes	1	☐	(if no Q2 not needed)
2. Hospital patient	No	0	☐	Yes	1	☐	,
3. Partograph used	No	0	☐	Yes	1	☐	
4. Crossed the alert line	No	0	☐	Yes	1	☐	
5. Crossed the action line	No	0	☐	Yes	1	☐	

Section C. Documentation of foetal, maternal conditions and progress of labour

a. Foetal condition

Foetal heart rate half hourly Not done 0 ☐ partially done 1 ☐ Correctly done 2 ☐

- Foetal heart below 120 b/m No 0 ☐ Yes 1 ☐
- Foetal heart above 160 b/m No 0 ☐ Yes 1 ☐

Liquor 4 hourly Not done 0 ☐ partially done 1 ☐ correctly done 2 ☐ N/A 3 ☐

Moulding 4 hourly Not done 0 ☐ partially done 1 ☐ correctly done 2 ☐ N/A 3 ☐

b. Maternal condition

Temperature 4 hourly Not done 0 ☐ partially done 1 ☐ correctly done 2 ☐

Blood pressure hourly Not done 0 ☐ partially done 1 ☐ correctly done 2 ☐

Pulse rate hourly Not done 0 ☐ partially done 1 ☐ correctly done 2 ☐

Urine output 2 hourly Not indicated 0 ☐ partially done 1 ☐ correctly done 2 ☐

c. Progress of labour

Contractions noted hourly	Not done 0	☐	partially done 1	☐	correctly done 2	☐	
Descent 4 hourly	Not done 0	☐	partially done 1	☐	correctly done 2	☐	N/A 3 ☐
Cervical dilatation 4 hourly	Not done 0	☐	partially done 1	☐	correctly done 2	☐	
Pitocin used	No 0	☐	Yes 1	☐	Not applicable 3	☐	
Membranes ruptured	No 0	☐	Yes 1	☐	Not applicable 3	☐	

Section D: Mode of Delivery after crossing the action line

Caesarean section:	No 0	☐	Yes 1	☐	Not applicable 3	☐	Not indicated 4	☐	indicated 5 ☐
Vacuum extraction:	No 0	☐	Yes 1	☐	Not applicable 3	☐	Not indicated 4	☐	indicated 5 ☐
Vaginal delivery :	No 0	☐	Yes 1	☐	Not applicable 3	☐	Not indicated 4	☐	indicated 5 ☐

Section E: Maternal outcome after crossing the action line

Uterine rupture	No 0	☐	Yes 1	☐	Not applicable 3	☐
Postpartum haemorrhage	No 0	☐	Yes 1	☐	Not applicable 3	☐
Maternal death	No 0	☐	Yes 1	☐	Not applicable 3	☐

Section F: Neonatal outcome after crossing action line

Birth weight in kg	☐☐		unknown 98	☐	
Apgar Score at 1min	☐		unknown 98	☐	
Apgar Score at 5 min	☐		unknown 98	☐	
Baby born alive	No	0 ☐	Yes	1	☐
Neonatal death	No	0 ☐	Yes	1	☐
Fresh still birth	No	0 ☐	Yes	1	☐

Appendix 11: University of Witwatersrand ethics approval

UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
Division of the Deputy Registrar (Research)

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)
R14/49 Ms Joyce AM Jere

CLEARANCE CERTIFICATE	M111151
PROJECT	Use of Partograph on Women in Labour at Mulanje District Hospital in Malawi
INVESTIGATORS	Ms Joyce AM Jere.
DEPARTMENT	School of Public Health
DATE CONSIDERED	25/11/2011
M1111510DECISION OF THE COMMITTEE*	Approved unconditionally

Unless otherwise specified this ethical clearance is valid for 5 years and may be renewed upon application.

DATE 25/11/2011 **CHAIRPERSON** .....
(Professor PE Cleaton-Jones)

*Guidelines for written 'informed consent' attached where applicable
cc: Supervisor : Dr M Jordaan

DECLARATION OF INVESTIGATOR(S)
To be completed in duplicate and **ONE COPY** returned to the Secretary at Room 10004, 10th Floor, Senate House, University.
I/We fully understand the conditions under which I am/we are authorized to carry out the abovementioned research and I/we guarantee to ensure compliance with these conditions. Should any departure to be contemplated from the research procedure as approved I/we undertake to resubmit the protocol to the Committee. **I agree to a completion of a yearly progress report.**

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES...

Appendix 111: Malawi Ethics Approval

Telephone: + 265 789 400
Facsimile: + 265 789 431
e-mail doccentre@malawi.net
All Communications should be addressed to:
The Secretary for Health and Population



In reply please quote No. MED/4/36c

MINISTRY OF HEALTH
P.O. BOX 30377
LILONGWE 3
MALAWI

13th March 2012

Joyce Atuweni Jere
University of Witwatersrand

Dear Sir/Madam,

RE: Protocol # 1011: Use of partographs in women in labour at Mulanje District Hospital in Malawi

Thank you for the above titled proposal that you submitted to the National Health Sciences Research Committee (NHSRC) for review. Please be advised that the NHSRC has **reviewed** and **approved** your application to conduct the above titled study.

- **APPROVAL NUMBER** : **NHSRC # 1011**
  The above details should be used on all correspondence, consent forms and documents as appropriate.
- **APPROVAL DATE** : **13/3/2012**
- **EXPIRATION DATE** :This approval expires on **13/03/2013**
  After this date, this project may only continue upon renewal. For purposes of renewal, a progress report on a standard form obtainable from the NHSRC secretariat should be submitted one month before the expiration date for continuing review.
- **SERIOUS ADVERSE EVENT REPORTING** :All serious problems having to do with subject safety must be reported to the National Health Sciences Research Committee within 10 working days using standard forms obtainable from the NHSRC Secretariat.
- **MODIFICATIONS**: Prior NHSRC approval using standard forms obtainable from the NHSRC Secretariat is required before implementing any changes in the Protocol (including changes in the consent documents). You may not use any other consent documents besides those approved by the NHSRC.
- **TERMINATION OF STUDY**: On termination of a study, a report has to be submitted to the NHSRC using standard forms obtainable from the NHSRC Secretariat.
- **QUESTIONS**: Please contact the NHSRC on Telephone No. (01) 789314, 08588957 or by e-mail on doccentre@malawi.net
- **Other:**
  Please be reminded to send in copies of your final research results for our records as well as for the Health Research Database.

Kind regards from the NHSRC Secretariat.

.....
FOR CHAIRMAN, NATIONAL HEALTH SCIENCES RESEARCH COMMITTEE

PROMOTING THE ETHICAL CONDUCT OF RESEARCH
Executive Committee: *Dr.C.Mwansambo (Chairman), Prof. Mfutso Bengo (Vice Chairperson)*
Registered with the USA Office for Human Research Protections (OHRP) as an International IRB
(IRB Number IRB00003905 FWA00005976)

Appendix IV: Hospital Permission

Telephone + 265 01 466 211
Facsimile: + 265 01 466 295

All Communications should be addressed to:



In reply please quote No.

MULANJE DISTRICT HOSPITAL
P.O. Box 227
Mulanje
MALAWI

Ms. Joyce Jere
Global AIDS Interfaith Alliance
P.O. Box 51428
Limbe
Malawi

14 July 2011

Dear Ms. Jere,

I would like to convey my support of your research project for your master's thesis: USE OF PARTOGRAPH IN WOMEN IN LABOUR AT MULANJE DISTRICT HOSPITAL IN MALAWI.

The aim of the study is to assess if and how health providers use partograph for monitoring of women in active phase of labour who delivered from September 1st to September 30th in 2010 at a district hospital in Malawi.

Objectives

- To document the proportion of deliveries in which a partograph was used
- To assess whether health care providers correctly documented:
  - maternal condition (blood pressure, pulse rate, temperature)
  - foetal condition (liquor, moulding and fetal heart rate)
  - progress of labour (contractions, descent, cervical dilatation, liquor)
- To assess foetal and maternal outcomes of cases of women who crossed the action line.

I understand that this study will involve only review of patient records, and that you have requested access to the patient case files, partographs, and labour ward delivery and theatre books. You will not be interacting directly with patients.

We are eager to learn from research such as this which will assist us in improving health care within the district and eventually throughout
Malawi. Pending the approval of the College of Medicine Research Committee (COMREC) and National Research Council of Malawi, we recommend this project.

Sincerely,

District Health Officer, Mulanje

DISTRICT HEALTH OFFICER
MULANJE DISTRICT HOSPITAL
2011 -07- 14
P.O. 227, MULANJE

Appendix V: Partograph used in Malawi

