THE RELATIONSHIP BETWEEN THE USE OF THE PARTOGRAPH AND BIRTH OUTCOMES AT KORLE-BU TEACHING HOSPITAL

THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON, IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PHILOSOPHY DEGREE IN NURSING

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July, 2007
DECLARATION

I, Florence Gans-Lartey, author of this thesis “The Relationship between the use of the Partograph and Birth Outcomes” do hereby declare that apart from references to past and current literature duly cited in this thesis, the entire research work presented in this thesis was done by me as a student of the School of Nursing, University of Ghana, Legon.

This work has never been presented in whole or part for any other degree in this university or elsewhere.

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(STUDENT)

This thesis has been presented for examination with our approval as supervisors.

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Dr Beverley O’Brien
(CO-SUPERVISOR)
DEDICATION

This thesis is dedicated to all parents, husbands, children, siblings or friends who have lost their daughters, wives, mothers, sisters or friends through pregnancy and childbirth.
ACKNOWLEDGEMENT

Without the support and encouragement of many people this thesis would not be a reality.

I am grateful to my supervisors, Mrs. Faustina Oware-Gyekye and Dr. Beverley O’Brien for their direction, suggestions and patience that enabled this research project to reach its conclusion.

I wish to thank committee members for the time spent and suggestions made in reviewing my proposal and final thesis.

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Finally, I wish to acknowledge my God, my creator and my source of strength.
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<th>Description</th>
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<tr>
<td>APGAR</td>
<td>Appearance, Pulse, Grimace, Activity and Respiration of the newborn</td>
</tr>
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<td>ARM</td>
<td>Artificial rupture of membranes</td>
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<tr>
<td>C/S</td>
<td>Caesarean section</td>
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<td>F/D</td>
<td>Forceps delivery</td>
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<tr>
<td>FHR</td>
<td>Foetal heart rate</td>
</tr>
<tr>
<td>LGA</td>
<td>Large for gestational age</td>
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<tr>
<td>MMR</td>
<td>Maternal mortality rate</td>
</tr>
<tr>
<td>N/A</td>
<td>Non-applicable</td>
</tr>
<tr>
<td>NICU</td>
<td>Neonatal intensive care unit</td>
</tr>
<tr>
<td>NSVB</td>
<td>Normal spontaneous vaginal birth</td>
</tr>
<tr>
<td>PPH</td>
<td>Postpartum haemorrhage</td>
</tr>
<tr>
<td>SGA</td>
<td>Small for gestational age</td>
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<td>SMI</td>
<td>Safe motherhood initiative</td>
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<td>SMP</td>
<td>Safe motherhood programme</td>
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<tr>
<td>UTI</td>
<td>Urinary tract infection</td>
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<tr>
<td>V/E</td>
<td>Vacuum extraction</td>
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ABSTRACT

The purpose of this study was to examine the relationship between the use of the partograph and maternal interventions as well as maternal and neonatal outcomes. A retrospective chart review of 1,845 primiparous and multiparous deliveries which met the inclusion criteria was conducted. Using pre-established criteria only 472 (25.6%) charts were adequately completed and on inspection some of these appeared to be completed retrospectively. Whether or not timely action was taken if the “action line” was crossed on the partograph was also assessed. Chi-square analysis showed that when the partograph was adequately used, there were more interventions to augment labour. There were differences in maternal outcomes with women being less likely to lose more than 500 millilitres of blood if partographs were adequately used. Although there were 13 intra partum deaths only one chart could be retrieved. While there appeared to be less pyrexia with the group whose partograph was inadequate, it is possible that this group also had their temperature monitored less frequently. Decreases in newborn outcomes including Apgar scores, birth injuries, NICU admissions and mortality were not found.

Recommendations were made to facilitate accurate documentation and completion of the partograph to help in taking prompt decisions or interventions. Periodic in-service training for record officers in health facilities is recommended to improve filing system to ensure easy retrieval of patients charts. Recommendations to shorten the length of time that action is taken when the action line was crossed.
CHAPTER ONE

INTRODUCTION

Pregnancy and childbirth involve many biological, psychological and social changes that require a great deal of adjustment and adaptation on the part of the mother. Pregnancy is considered a time of crisis or transition, although the changes are manifested more clearly in a woman's life when the baby is born (Barclay, Everitt and Rogan, 1997; Mercer, 1986; Rubin, 1984). It is a time when women’s health can be placed at risk by a host of factors. For example, they may be anxious and apprehensive about the outcome of the pregnancy itself or about the process of labour and delivery. They may also be apprehensive about being a mother. However, the outcome of pregnancy, for both mother and baby, is associated with the health of the mother and the quality of antenatal and intrapartum care. It is affirmed in several reports from higher income countries that women with uncomplicated pregnancies may be cared for by midwives, and taken through labour and delivery at home or in birth centres with no increased risk of adverse maternal or perinatal outcomes when compared to similarly low-risk pregnant women who deliver in hospital under the care of physicians (Ackermann-Liebrich, Voegeli and Gunter-Witt, 1996; David, Kraker von Schwarzenfeld, Dimer and Kentenich, 1999; Rooks, Weatherby, Ernst, Stapleton, Rosen and Rosenfield, 1989). The achievement of these comparable outcomes, however, can be attributed to early recognition of complications and prompt intervention or referral and transfer to hospitals for further care. It may also be attributed to the health status of the pregnant women (Nkyekyer, 2000).
Labour is seldom a problem if it goes at its proper pace. Most complications start when labour is delayed or obstructed. To manage such complications it is imperative for the provider to identify the occurrence of the problem as early as possible through effective methods of monitoring labour. One such method is the partograph. The introduction and use of the partograph in labour wards was to help prevent obstructed labour and uterine rupture. These conditions cause 70 percent of maternal deaths in lower income countries. The partograph can be used to monitor all labours in hospital in order to avoid unnecessary interventions so that maternal and neonatal morbidity are not needlessly increased. Furthermore, an appropriate use of the partograph will assist the provider to intervene in a timely manner so that maternal and neonatal morbidity and mortality can be avoided (Maternal and Neonatal Health, 2003).

The normal pattern of labour, including the latent and active phases of cervical dilatation, was first documented on a graph in the 1950s. In the 1960s and 1970s. further research led to improved tools to chart the progression of labour and to build a scientific basis for interventions to prevent prolonged labour. Friedman (1975) described a graphic analysis of labour, correlating the duration of labour with the rate of cervical dilatation. Philpott and Castle (1972; 1972b) further developed this tool and added a line to alert providers of prolonged labours as well as to record other intrapartum details. The partograph provided health professionals with a continuous pictorial overview of labour and allowed early identification and diagnosis of pathological labour. These early partographs formed the foundation for the WHO model of the partograph, which was developed as an international standard in 1988 following the launch of the worldwide safe motherhood initiative.
1.1 Background to the Study

Many people believed that the dawn of the 21st century would be associated with the disappearance of maternal mortality. Unfortunately, that is not the case, particularly in low-income countries including Ghana. On the Africa continent, one in 16 childbearing women will not survive because of a pregnancy related complication (Gerlus, Moran and Segu, 1999). Sub-Saharan African women are 175 times more likely to die from complications in pregnancy and childbirth compared to those in higher income countries. Most maternal deaths and disabilities result from delays in recognising complications, reaching a medical centre or receiving quality care (CBC News, 2003).

Although, through the safe motherhood programme, simple interventions were adopted to improve women’s health and reduce maternal mortality and morbidity, maternal deaths still remain unacceptably high. Maternal mortality is defined as “death of women while pregnant or within six weeks of the termination of a pregnancy, irrespective of the duration and site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accident or incidental causes” (WHO, 1997). The World Health Organisation (WHO) and United Nations International Children’s Emergency Fund (UNICEF) estimate that each year 585,000 women die from causes related to pregnancy and childbirth.

Every day at least 1,600 women die from complications associated with pregnancy and childbirth. Almost 90 percent of these deaths occur in Sub-Sahara Africa and Asia. (Maine, Akalin, Ward and Kamara, 1997). In Ghana, for example, although the maternal mortality rate has been officially reported to be 214 per 100,000 live births (Ghana Demographic Health Survey (GDHS), 2003), figures of 734.4 and 1140 per 100,000 deliveries have been reported
from two teaching hospitals (Lassey and Wilson, 1998; Martey, Djan, Twum, Browne and Opoku, 1998). Among the national health objectives, health leaders in Ghana stated a goal of reducing the rate of maternal death to 100 per 100,000 live births by the year 2001 (Annual Report. Reproductive and Child Health (RCH), 1999), but the institutional maternal mortality ratio (MMR) increased to 260 per 100,000 live births in 2001 despite efforts to reduce it (Annual Report. RCH, 2001). The MMR target of 180 per 100,000 live births for the year 2003 was not achieved. Eight hundred and fifty four institutional maternal deaths were recorded in 2003, representing a MMR of 205 per 100,000 live births, higher than the 2002 ratio of 204 per 100,000 (Annual Report, RCH, 2003).

Causes of maternal deaths are similar all around the world. About 80 percent of these deaths have direct causes resulting from obstetric complications of pregnancy, labour and puerperium. Deaths may also occur from interventions, omissions, incorrect treatment or a chain of events resulting from any of these complications (Bennett & Brown, 1999). In Ghana, the direct or major causes of maternal death are infection/sepsis, haemorrhage/bleeding, hypertensive disorders of pregnancy, obstructed labour and abortion complications. These direct causes result in about 80 percent of all maternal deaths. Other direct causes include ectopic and molar pregnancies as well as complications associated with anaesthesia. The indirect causes include anaemia, malaria and heart disease. These conditions affect the health status of all women who are of childbearing and are aggravated by pregnancy, (WHO, 1997). Indirect causes of death may arise as a result of previous existing disease or disease that developed during pregnancy and was aggravated by pregnancy. Other indirect causes are malnutrition, sickle cell diseases, infectious diseases, diabetes mellitus and
hypertension (Network Family Health International, 1999). Most of the causes of maternal mortality and morbidity can be prevented with improved health status and quality of care given by health care workers, as well as by access to emergency interventions for most of the pregnant women in hospital and in their communities (Starrs, 1998). The issue of maternal mortality has raised a lot of concern among governments and health workers, particularly those in low-income countries. The concern stems from the fact that proper care during pregnancy, delivery and puerperium may avert many of these deaths. There is evidence that adequate care during delivery and the puerperium alone can decrease the number of maternal deaths by 50 to 80 percent (Twum-Baah. Nyarko. Quarshie. Caiquo and Amuah. 1994). In adopting the safe motherhood programme. policy makers in many countries, including Ghana, hoped to improve women’s health in general and especially, to reduce maternal and newborn morbidity and mortality (RCH Annual Report 2001). The “safe motherhood initiative” includes a series of interventions. One of these is the use of the partograph.

The partograph is a tool that when used appropriately should result in timely management of prolonged labour. Labour and delivery is considered a critical time for the mother and interventions at this time may be essential to reduce maternal morbidity and mortality. Even with adequate screening during the antenatal period, the intrapartum period can be complicated, requiring emergency intervention. Delivery must be safe, atraumatic and clean if maternal mortality is to be reduced. As much as possible delays, such as delay in deciding to seek care, or in reaching an appropriate care facility because of difficulties with transportation and referral system, or in receiving care after arriving at a health facility, should be reduced (Safe Motherhood Newsletter, 1995).
The WHO partograph is an instrument used to improve maternal health care through early detection of complications during labour by personnel functioning with or without the support of an obstetrician (WHO/MCH. 88.3, 1988). However, more emphasis is being placed on midwifery notes rather than partographic documentation to the extent that the partograph is often being completed in retrospectively to correspond with midwifery notes (Groeschel and Glover, 1998). It is therefore not clear whether the partograph is being used adequately or inadequately. The question then is “What is the relationship between the appropriate use and the outcomes of birth?”

1.2 Statement of the Problem

A parameter to describe the level of care provided by obstetric services is the maternal mortality ratio (MMR) or the number of maternal deaths per 100,000 deliveries). The MMR may be the gold standard for obstetric epidemiology but less than 30 percent of countries provide reliable maternal mortality data and maternal deaths are frequently underreported in both higher and lower income countries (Pittrof, 1997). Maternal mortality continues to be a major problem in sub-Saharan Africa. It is estimated to be about 10 per 1000 live births or higher in some rural communities in sub-Saharan Africa and these rates are among the highest in the world. Complications during delivery directly cause about three-quarters of all maternal deaths. The remaining deaths are the result of medical conditions such as viral hepatitis, anaemia and cardiovascular disease that are aggravated by pregnancy (Herz and Measham, 1987).

Ghanaians, mostly women and children, die each year from preventable causes, and the official maternal mortality rate was reported as 260 per 100,000 live births (MOH, Ghana.
This trend is unacceptable and calls for all concerned with issues related to women and children to develop strategies or interventions to prevent or reduce this horrific toll of maternal deaths. One such intervention is the introduction of the WHO partograph in the labour wards as a tool for early identification and diagnosis of abnormal progress of labour. This should lead to timely interventions. The partograph is a simple chart that is used to guide the health care provider in recording the progress of labour as well as monitor the health status of both the foetus and mother. It is an inexpensive, low technology tool, which requires basic, though vital, midwifery skills to save lives (WHO, 1994).

The partograph consists of three components: the foetal condition, the progress of labour and the maternal condition. It can be used for all labours in hospitals and health centers and at the domiciliary level where trained nurse/midwives practice midwifery. The purpose of the partograph is to reduce maternal and perinatal mortality and morbidity worldwide (Preventing Prolonged labour: A Practice Guide. The Partograph Part 1. WHO/FHE/MSM/93.8, 1993). As soon as a woman enters labour, the chart is used to record the progress of her labour, in particular the rate of cervical dilatation and the pattern of uterine contractions. The partograph helps providers ensure that women are carefully monitored during labour, unnecessary interventions are avoided and complications recognised and responded to in a timely manner. It gives providers objective data on which to base their clinical decisions and enhances communication among members of the team of providers who are caring for the woman in labour.
According to the WHO (1994), the partograph when used appropriately has the potential not only to reduce foetal and maternal mortality and morbidity but also to reduce the rising tide of caesarean deliveries. In projects in Indonesia, Uganda, Nigeria and Ghana where the use of the partograph in community obstetrics was examined, it was revealed that its use was successful in urban community settings. Yet prolonged and difficult labour contributes to at least a third of all maternal deaths (Lennox and Kwast, 1995).

The most problematic time in pregnancy is the intrapartum period. The Safe Motherhood Initiative introduced strategies to address this problem. An important strategy is the use of the WHO partograph, which is intended to be used to prevent prolonged labour. Important questions are: 1) “Is the partograph being used properly?” and 2) “When properly used, does it reduce the MMR?”

The specific research questions were:

1. What is the relationship between outcomes of labour and appropriate use of the partograph.

2. Do health care professionals take action in a timely manner when the action line is crossed.

1.3 Purpose of the Study

The partograph has been shown to be an efficacious tool for monitoring labour and identifying women in need of obstetric intervention. Partographs have been introduced in many countries and the introduction is supported by guidelines and training workshops but often with little follow-up and supervision. Moreover, there are concerns that the use of the
partograph may increase the rate of unnecessary obstetric interventions. The purpose of this study is to explore the relationship between the use of the partograph and birth outcomes.

1.4 Significance of the Study

Health care providers/midwives will gain more understanding in the use of partograph and this will increase the observation and interpretation skills related to the progress of labour. Health workers can only use the partograph effectively if they have adequate training. The results of the study will help identify the extent to which the partograph is used, determine whether it is used correctly, identify the relationship between correct use and outcomes, and identify areas where education or training needs to be strengthened. Utilisation of the findings will inform policy makers who make decisions about training programmes of personnel needs that will allow them to reach the millions of women who are delivered with no attendant or with the assistance only of a relative or other untrained person. Findings will guide further research in the area of safe(r) motherhood in labour and delivery, with the view of improving maternity care and reducing maternal morbidity and mortality.

1.5 Definition of Terms

**Maternal mortality** - is defined as the death of a woman during childbirth and/or within 2 weeks after delivery.

**Maternal morbidity** -- is any sign or symptom resulting from or made worse by pregnancy or childbirth. In this study, maternal morbidity is defined as assisted birth, pyrexia and haemorrhage of 500mls or more.

**Neonatal morbidity** - any complication to the newborn resulting from childbirth. In this study, neonatal morbidity will be reflected in 1 and 5 minutes APGAR scores of 6 or less.
cephal haematoma or other birth injury and admission to the Neonatal Intensive Care Unit (NICU).

**Neonatal mortality** – death of a newborn during birthing and/or within 2 weeks after birth

**Appropriate or adequate use of partograph** – correctly filled out partograph with no omission or minor omissions. Adequacy is determined by guides established by the WHO.
CHAPTER TWO

REVIEW OF LITERATURE

The purpose of the review of the literature is to summarise and critically analyse existing theoretical and research literature relating to maternal mortality and morbidity, the Safe Motherhood Initiative and the partograph as a specific intervention for reducing maternal mortality. Using electronic searches such as Databases (ERIC, EMBASE, CINAHL, Pubmed, Medline), Internet search engines such as Google and abstracts from dissertations, a wide range of articles relevant to the proposed research question were found. References were cited from 1987 to 2003. However, studies published earlier than 1987 but found to be relevant to the proposed research study were included. Key words used for the search included safe motherhood, WHO partograph, maternal mortality and morbidity, quality maternal services, programme evaluation and pregnancy outcome.

The magnitude of maternal mortality will be evaluated. Strategies to reduce rates, particularly in low-income countries, will be discussed and an emphasis will be placed on the WHO partograph as an intervention. Every minute a woman dies of causes related to pregnancy or childbirth (Gerlus, Moran and Segu, 1999). She is most likely to be young, already a mother, and living in a low-income country or within the disadvantaged minority groups of relatively high-income nations. For each woman who dies, an estimated 100 women survive childbearing but are afflicted by disease, disability or physical damage caused by pregnancy-related complications (Koblinsky, 1993). In the late 1980s maternal deaths were often described as ‘silent’, because so little had been heard of the women who died, the circumstances in which they died, and what may have contributed to their deaths. Because it
was ‘silent’ it was not known how many maternal deaths occurred in low-income countries. “Unheard, unseen, uncounted, unattended, they died” (Peters, 2000 pp 2-7). This is no longer so. The silence has been cracked, if not broken, by the gaining of a much better understanding of why these women die, how many, and in what circumstances.

All pregnant women are at risk of obstetric complications. Most life-threatening complications occur during labour and delivery, and these cannot all be predicted. Prenatal screening does not identify all of the women who will develop complications (Rooks, Winikoff and Bruce, 1990). Women not identified as ‘high-risk’ can and do develop obstetric complications. Most obstetric complications occur among women with no obvious risk factors. Similarly, evidence that obstetric complications may occur despite intensive prenatal care and screening was illustrated in a study of deliveries in out-of-hospital birth centres in the United States (Weatherby, 1990). One of every 13 women categorized as ‘low-risk’ and receiving intensive prenatal care developed serious complications. Additionally, maternal deaths, with all the attendant personal loss a family and nation experience, is only a tip of the iceberg because the true incidence of maternal mortality and morbidity is extremely difficult to measure, particularly in low-income countries, and has a wide margin of error. Implications for economic productivity for the nation, health of the family and loss of personal fulfillment of individual women are incalculable. The difficulty of measuring maternal mortality has long proved to be an impediment to progress in alerting health planners and others to the magnitude and causes of this problem and hence to effective interventions on an appropriate scale (WHO Maternal Mortality Rates, 1986).
2.1 Maternal Mortality Worldwide

Profound differences still exist in maternal mortality ratios for women depending on where they live in the world. Maternal deaths range from less than 10 per 100,000 live births in Northern European countries to more than 1,000 per 100,000 live births in some low income countries (WHO, 1992). Women from Southern Asia and Africa are at highest risk. A community-based study in Bangladesh showed ratios of approximately 600 maternal deaths per 100,000 live births. In a rural India a study in Andhra Pradesh, a ratio of 874 per 100,000 was reported (WHO. Maternal Mortality Rates, 1986).

Northern and Southern Africa report lower mortality rates than the rest of Africa. However, the very high fertility rate (an average of eight live births per woman plus foetal deaths) yields a lifetime risk of greater than five percent that a woman will die from a pregnancy related death (WHO. Maternal Mortality Rates, 1986). In rural Africa, ratios of 1,000 per 100,000 live births have been recorded in several studies and in urban studies ratios of over 500 per 100,000 live births with an overall ratio of 640 per 100,000. Thus Africa, while contributing eighteen percent of the world’s live births, contributes thirty percent of the world’s maternal mortality. On the other hand, the higher income nations contribute fourteen percent of the world’s live births, but only one percent of the maternal mortality (WHO, Maternal Mortality Rates, 1986).

Latin American mortality rates vary markedly between temperate and tropical areas. It is estimated that in tropical South America mortality ratios are an average of 270 per 100,000 live births, with temperate climate ratios somewhat lower. Fifty percent of the Latin American maternal deaths are secondary to complications from illegal abortions. Latin American women
die in unacceptably high numbers due to lack of access to safe abortions. In contrast to Southern Asia, Eastern Asia enjoys quite low maternal mortality ratios. China reports rural ratios of 59 maternal deaths per 100,000 live births and urban ratios of 25. Widespread access to prenatal care and safe abortion are two important contributors to these relatively low ratios. However, underreporting in China may account for the reduced rates. USSR maternal mortality data were not available.

Maternal mortality ratios in Northern and Western Europe, Canada, the United States, Japan, Australia and New Zealand are all in the range of 10 per 100,000 or lower. Canada in the year 2000, recorded that 20 women died giving birth, for a rate of one in 8,700. In the United States, there were 660 deaths during the same year, for a rate of one in 2,500. Britain recorded 85 deaths, a risk of one in 3,300. These deaths include incidental deaths which are frequently related to low income and this may account for the slightly higher rates in Britain. In Europe, North America and Australia, the average is one in 2,800. However, the World Health Organisation, the Children’s Fund and the Population Fund gave no reason for the higher number of deaths in the United States or the differences among higher income countries (CBC News. 2003). The Nordic countries are the lowest with ratios of 2 to 6 per 100,000. Romania in Eastern Europe has a ratio out of line with the rest of the region, i.e., more than 30, largely due to abortion related deaths (WHO, Maternal Mortality Rates, 1986).

2.2 Maternal Mortality in Ghana

What is known about maternal mortality in Ghana is fragmented. Ampofo reviewed the causes of maternal death from 1963 to 67 at Korle-Bu Maternity Hospital in Accra. Korle-Bu is one of the two teaching hospitals in Ghana and a major referral point for patients within the
Greater Accra Region. It is also a referral centre for other parts of the country and neighbouring West African countries. During the five-year period reviewed by Ampofo, 238 maternal deaths were recorded for 35,193 births, giving a ratio of 676 per 100,000 births. Of the 238 deaths, 63 were attributed to haemorrhage, retained placenta and hypofibrinoginaemia. Sixty-one deaths were attributed to obstructed labour, including 33 who suffered from ruptured uteri. Twenty-four died of puerperal sepsis. Ghana has the additional infection burden caused by unregistered patients self-treating with herbs and various medicinal potions applied prior to admission to the vaginal canal in the form of pessary (Ampofo, 1969).

Seven deaths were attributed to severe anaemia of pregnancy and 23 deaths were attributed to sickle cell anaemia. Due to the difficulty in obtaining laboratory confirmation, these diagnoses were made clinically or from autopsy findings. Twenty-seven of the deaths were due to ectopic pregnancy, four of which were advanced extra-uterine pregnancies. Within the study period 952 ectopic pregnancies were diagnosed with a mortality rate of about 3 percent. Abortion accounted for only 33 deaths in this study. Abortion, though a common practice, was illegal in Ghana during that period. Treatment of complications of abortion was the most common condition seen during the study period and this could be due to sepsis (Ampofo, 1969).

Nine women died from trophoblastic disease, two from hydatidiform mole and seven from choriocarcinoma. Though it was noted that these women ran a rapid course to death, it is clear that these deaths were within 42 days of delivery. Thirty-five deaths were due to eclampsia; 30 of these women died prior to delivery. Of the indirect obstetrical deaths, liver disease was the leading cause of death claiming 31 women (Ampofo, 1969).
Korle-Bu teaching hospital was the site for a broader maternal and child health study conducted by Family Health International, North Carolina. This Maternity Care Monitoring Project was a multi-site study, which eventually included deliveries of more than half a million women in 64 countries. Information was collected on a uniform data collection sheet, which ran one page per mother-child unit. Information was collected at Korle-Bu teaching hospital on 4,990 deliveries occurring between August 1981 and August 1982. Eleven deaths were recorded from this study group of women for a ratio of 230 per 100,000 live births. Only in-hospital deaths were recorded. Any of these women who died after discharge but before 42 days postpartum were lost to follow up and not included; therefore the number of maternal deaths was underestimated. Although an incomplete ratio, this represents a tremendous change from the 1,080 deaths per 100,000 live births noted in the previous study. Within the study group, 5.2 percent of the women delivered by caesarean section and 12.7 percent of the births were attended by a physician (Arruda, Covington, Janowitz, Morris and Rodriques, 1985).

The maternal mortality rate remains high in Ghana with estimates ranging from 214 (Ghana Statistical Survey (GSS), 1994) to 740 deaths (WHO/UNICEF, 1996) per 100,000 live births. Institutional data estimated the Maternal Mortality Ratio (MMR) in 2001 as 260/100,000 live births. Central and Western regions continued to record the highest rates with 450 deaths per 100,000 live births. The Greater Accra region registered the lowest MMR with 150/100,000 live births (RCH Annual Report, 2001). Other health issues of specific concern to women involve a very low level of knowledge among women about causes, prevention, risk factors and signs of gynaecological malignancies such as cancer of the cervix.
Cervical cancer deaths are high at 57.8 percent, followed by ovarian cancer at 25.3 percent of all female genital tract malignancies (Women’s Health Foundation’s Brochure, 2003).

Global experience suggests that the majority of pregnancy-related deaths are preventable, and a significant body of research on strategies for reducing maternal mortality has been generated but there appears to be no decrease in the maternal mortality rate since 1975. Specific attention to women’s health is thus warranted and in fact well overdue.

2.3 Programmes to Reduce Maternal Mortality

Since maternal mortality was known to be an important public health problem, there have been efforts to reduce it, though some strategies have proved to be more effective than others. To ensure safer motherhood, numerous organisations and groups have introduced several mechanisms or strategies to help prevent or reduce maternal mortality. Examples of such organisations include WHO, UNICEF, UNFPA, USAID, JHPIEGO, the World Bank, the Population Council, IPPF and the Carnegie Corporation of New York. However, efforts to increase safe motherhood vary among countries depending on the resources available and the social and cultural environment in which women live. The Safe Motherhood Initiative was launched in 1987 by international agencies and governments to raise global awareness about the impact of maternal mortality and morbidity, and to find solutions.

Authors of safe motherhood programmes assume that maternal health services can reduce maternal mortality (Campbell, Heichelheim and Koblinsky, 1999; National Research Council, 1997; Tinker and Koblinsky, 1993). The assumption that services make a difference is supported by historical data on the timing of reduction in maternal mortality, which suggests that such declines have not coincided with socioeconomic gains but with improvements in
specific services (Loudon, 1991; Papiernik, 1995). Data supporting the effect of services is coming from case-control and experimental studies. For instance, Midhet, Becker and Berender (1998) linked lower maternal mortality in rural Pakistan to health facility staffing and the availability of essential obstetric care. Frankerberg and Thomas (2001) linked the addition of village midwives in Indonesia, if not to decreases in maternal mortality, at least to an increase in body mass among women of reproductive age.

An important question is which maternal health services reduce maternal mortality. Shiffman (2000) indicates that, in cross-national regressions, having trained attendants at delivery is strongly associated with lower rates of maternal mortality. Sloan, Winikoff and Fikree (2001) counter that the case for any intervention is unprovable from such data, because of strong interdependence among possible determinants of maternal mortality. Such ‘single solutions,’ they argue, do not take into account of interdependence among services. The Inter-Agency Group for Safe Motherhood (1997) reports that ensuring that a trained attendant is present at all deliveries has now become the cornerstone of safe motherhood programmes. However, having trained attendants at birth or having supervised delivery may not be enough to reduce maternal deaths. All birth attendants, including midwives, must possess the requisite skills and competencies, and be knowledgeable in the use of effective technologies that monitor mother and foetus during pregnancy and labour, so as to make pregnancy and birthing safer and less painful for the mother (Smeenk and Ten-Have, 2003).

In further research to improve maternal health services, the focus was on indicators such as socioeconomic development. Hertz, Hebert and Landon (1994), for instance, used the availability of medical resources as an indicator, and found that maternal mortality across
countries was associated with total energy consumption and excess energy consumed as fat. Other authors explored a variety of socioeconomic variables relating to development and women’s status, and similarly supported the hypothesis that maternal mortality levels were dependent on some of them (Shen and Williamson, 1999).

2.4 The WHO partograph as a SMI Intervention

As part of its contribution to the Safe Motherhood Initiative (SMI) which was launched in 1987, the WHO introduced and promoted the use of the partograph with a view to monitoring labour and introducing quick and effective interventions. The magnitude of maternal/infant morbidity and mortality to the family, community and the nation cannot be over emphasized. A mother’s death greatly influences the health and livelihood of her surviving children. When a mother dies, her surviving children are three to ten times more likely to die within two years than those with both parents living (Tinker, 1997). In addition, surviving children often do not receive adequate health care and education as they grow up. The death of a mother has an impact beyond that of her immediate family. A productive worker, one who rears and guides the next generation, cares for the elderly, and contributes stability to the community is lost. As such, the SMI had among its objectives to reduce maternal mortality by 50 percent by the year 2000, and included supervised delivery as one of its interventions to achieve this objective. Supervised delivery is defined as the percentage of deliveries attended by skilled health personnel irrespective of the outcome. This is one of the important components of the safe motherhood programme and also an important aspect in midwifery practice.
Pregnancy and childbirth have the potential for being intimate and emotionally charged experiences for all involved. Whether the experience is positive or negative, midwives are involved in providing support for women and their families, and in dealing with the feelings that arise. Midwives everywhere are concerned at the loss of a woman’s life at or near the time of giving birth and would therefore use every skill they possess and all their expertise to facilitate the safe delivery of both mother and infant. All women seem to develop expectations of childbirth and the kinds of expectations vary among women, as does how realistic they are. The pain women expect to feel can provoke anxiety and fear, because the quality and duration of the potential pain are unknown (Beaton and Gupton 1990). Women also express fears of loss of control, abandonment, self-injury, or injury to the baby (Green, 1993; Lowe, 1996; Sjogren, 1997).

Women’s satisfaction with maternity services primarily depends on the quality of communication between the women and their caregivers. This enables these women to experience an enhanced sense of recognition and feel more involved in their care as they build a relationship with a “known midwife” (McCourt and Pierce, 2000). Tarkka and Paunonen (1996) also reiterated that the midwife was the main source of emotional support for mothers during labour and that the mothers attached much importance to the presence of the midwives, for the encouragement they offered, and for their individual treatment. The mothers felt safer if they had their own midwife with them throughout childbirth.

The partograph is an instrument used to improve maternal health care through early detection by any trained birth attendant of complications during labour. The progress of labour, especially the rate of cervical dilatation, is recorded in the partograph. It helps to detect
abnormal progress in labour so that appropriate interventions can be taken which may save the lives of mother(s) and infant(s). The partograph has been in use in many countries for over 25 years but adoption in lower income countries has been slower. Research on the use of this partograph has taken place mainly in hospital settings. WHO undertook the largest and best-known study in South East Asia through the SMI, in which 35,000 partographs from eight hospitals were surveyed (WHO/FHE/MSM/94.4, 1994). Statistically significant differences were found in numbers of prolonged labours, caesarean sections and labours requiring oxytocin augmentation when partographs were used.

There was also a marginal improvement in newborn outcomes as measured by intrapartum foetal deaths, Apgar scores, resuscitation measures and admission to neonatal special care facilities. However, the partograph played a minimal role in 47 cases of maternal mortality and 55 cases of uterine rupture, as most of these occurred as a result of delayed presentation of complications. In Ghana, specifically in Accra, the WHO partograph was introduced in the labour wards in 1990 and by the end of 1991 it was used in almost all the regional and district hospitals. The partograph was intended to be used routinely for every delivery attended by midwives and other health care practitioners from all levels of health care.

There is increasing awareness of the extent of maternal ill health, and more knowledge about interventions that can be effective in reducing this burden (Ronsmans et al. 2001). Yet there has not been enough progress. It is an international disgrace that mothers in poor countries, at the beginning of the 21st century, should be experiencing unimaginable suffering
and death, due to a scandalous lack of effective care during pregnancy and childbirth, which is resulting in approximately 600,000 women dying annually (Walley, 2002).

Unlike higher income countries, birth for most women in Ghana is quite hazardous, especially in the rural areas where most women give birth in their homes or rural clinics, far from emergency maternity care. The majority of the women are delivered by traditional birth attendants (TBAs) or village women who have minimal or no formal training (Matthews, 1999). The introduction of the use of the partograph in maternity care is to help reduce prolonged labour and the sequelae of maternal morbidity and mortality for both women and infants, to improve the quality of care for women in labour and to increase the observation and interpretation skills of all birth attendants including midwives and other health professionals.

Nakkaki (1998) audited 1000 partographs for patients in Nsambya Hospital, Uganda, between June 1998 and June 1999. She looked at the use of the partograph as an indicator for the quality of care provided in the hospital. She wanted to know whether partographs were being used in the labour wards and whether midwives and doctors were using them correctly. The results revealed that hospital staff used the partograph for the majority of labours and that most of the partographs were completed correctly. However, a few partographs had errors, which might have contributed to poor labour outcomes. Trainees, new doctors and midwives who had never used a partograph outside the classroom committed these errors.

A prospective population-based study conducted among 20,326 pregnant women in seven primarily urban areas was used to ascertain whether clinical risk factors for late stillbirth in West Africa can be detected during antenatal care or only during labour. The investigators concluded that the principal risk factor for late stillbirth could be detected only in the late...
antenatal and intrapartum period. The potential benefits of partograph use are highlighted in these findings (Bouvier-Colle, Breart and Chalumeau and the MOMA Group, 2001). Seffah (2002) conducted a study to find out whether the introduction of the WHO partograph to the labour wards in Accra, Ghana in 1990 had reduced the incidence of ruptured uterus, maternal mortality and perinatal mortality. There were 136 cases of ruptured uterus diagnosed for 71,067 deliveries between January 1996 and December 2001 (incidence 1 in 523). In 1971 when the partograph had not been introduced in Accra, the incidence was 1 in 257. Other variables such as improved technology and increased surveillance during labour may have influenced some of these maternal outcomes.

The quality of monitoring during labour for routine maternity care after partograph introduction in three hospitals in southern Tanzania (two governments, one mission) was assessed. In each hospital, all (62; 65; 69; totalling 196) deliveries were observed and partographs for each woman were analysed during a 4-week period (Bosse, Massawe and Jahn. 2002). They concluded that the partograph helped to improve delivery outcomes. However, its implementation needs continuous reinforcement and quality assurance. Concerns that the partograph leads to higher rates of caesarean section were not supported by the data. The sample size may be too small to make any definitive statement. The use of the partograph in monitoring labour in a woman who had a caesarean section was studied at Korle-Bu Teaching Hospital in 1991–1992 (Amaniampong, Seffah, and Wilson, 1994). They analysed the case notes of 15,347 deliveries and confirmed that prolonged labour can be prevented using the partograph as described in the WHO manuscripts.
The impact of breech labour management on foetal and maternal outcomes of labour was assessed using the WHO partograph (Lennox, Kwast and Farley, 1997). In all 1,740 breech presentations in a larger multicenter hospital-based were studied. The researchers concluded that the use of the WHO partograph in the management of breech labour reduced prolonged labour and (among multigravida) caesarean section and also improved foetal outcomes. However, in the study, caesarean section was reported to be a safer method of delivery for the baby, regardless of whether or not the partograph was used (International Federation of Gynaecology and Obstetrics, 1998). Other studies have shown that using the partograph can be highly effective in reducing complications for the mother from prolonged labour for the mother (postpartum haemorrhage, sepsis, uterine rupture) and in preventing newborn death from anoxia and infections (MSH and UNICEF, 1998).

Some researchers argued that the partograph can be used as a traditional format with separate pages for the delivery summary and midwifery notes, whereas others incorporated the summary, the partograph and notes into one comprehensive document. Thus, the use of the partograph reduces excessive documentation on the part of the midwife as well as reducing prolonged labour as asserted by other researchers (Groeschel and Glover, 1998).

In another study, Lavender and Malcolmson (1999) studied midwives’ views on the value of action lines when using the partograph and reported that 83 percent of midwives surveyed felt that action lines helps to ‘manage labour’ and ‘diagnose prolonged labour at a glance’. However, others felt that it takes away autonomy and individual clinical decision-making. Though the study does not indicate the number of midwives interviewed, it is worth
noting that documenting the information correctly on the partograph can help in early identification of the abnormal progress of labour and make timely intervention more likely.

Ghanaians adopted the use of the WHO partograph in the labour wards in 1990 – 1991, to monitor labour and help to identify women in need (abnormal progress of labour) of an obstetrical intervention, with a view to reducing the number of prolonged labours, appropriately augmenting labour with oxytocin, reducing rates of caesarean section and reducing the incidence of infection, thereby improving maternal health and reducing maternal and perinatal mortality. Has the introduction of the WHO partograph helped in making decisions early enough for women in need of interventions? Are providers still using the partograph? Are they using it correctly? Is the correct use associated with changes in outcomes for mother and baby?

2.5 Theoretical Framework

Of all the health indicators monitored by WHO, maternal mortality rates (MMR) demonstrate the largest disparity between higher and lower income countries. The disparity of MMR between countries can largely be attributed to knowledge gap and lack of human, financial and material resources available to women of low socioeconomic status with less education and living in poorer countries.

To help bridge this gap, series of activities were designed by the WHO under its Safe Motherhood Programme to update the knowledge and skills of providers of maternity services. The Life Saving Skill (LSS) training programme for midwives and doctors was developed to provide clinical training and practice in such areas as use of the partograph.
manual removal of the placenta, prevention and management of haemorrhage and post-
abortion care including manual vacuum aspiration. It is anticipated by those concerned with
maternal and neonatal health that if the partograph is adequately used and necessary
interventions are promptly initiated, most complications occurring during childbirth will be
prevented. This will reduce maternal and neonatal deaths to a level comparable to those
observed in higher income countries.

This approach is consistent with the theoretical approach taken by the *Neuman Systems
Model* (George, 1985), where three levels of prevention, that is, primary, secondary and
tertiary preventions are described. Primary prevention relates to general knowledge applied to
client assessment in an attempt to identify stressors before they occur. Secondary prevention
relates to symptomatology which includes interventions that are initiated after an encounter
with a stressor (George, 1985). Nurses and midwives uniquely use this model to assist
individuals, families and other groups to attain and maintain maximum levels of total wellness
by purposeful interventions. The use of the partograph is a secondary prevention strategy. It
enables providers to monitor labour effectively so that timely interventions can be taken as
needed to ensure the safety of the mother and the newborn.
CHAPTER THREE
RESEARCH PROCESS

Although there have been studies on evaluation of the use of the WHO partograph in relation to maternal and neonatal outcomes in other parts of the world, there has not been adequate assessment of this tool in monitoring labour and its outcome in Ghana. This is a retrospective study, which is an example of a non-experimental research design to evaluate the relationship between the use of the partograph and the outcomes of birth. Retrospective studies are almost always cross-sectional and data are collected concurrently with regard to the independent (partograph) and dependent (maternal and neonatal outcomes and interventions) variables. The discussion of the research method includes information about a) sample, b) instrument, and c) procedure.

Advantages of a Retrospective Study

- It is an efficient and effective means of collecting a large amount of data about a problem area.
- It tends to be high in realism and it is seldom criticised for its artificiality.
- It helps in advancing our understanding of what the world around us is like.

Disadvantages of a Retrospective Study

- It is weak in its ability to reveal causal relationship among variables. Manipulation of an independent variable and control of extraneous variables are not possible because the events occurred prior to data collection.
- It is susceptible to faulty interpretation (Polit and Hungler, 1997).
Three hypotheses each with accompanying sub-hypothesis, were advanced to answer research questions posed for this study.

Hypothesis 1:

There will be more interventions documented in the partographs that are used adequately than in those that are used inadequately.

a) There will be more augmentation documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

b) There will be more artificial rupture of membranes (ARM) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

c) There will be more assisted births (i.e., vacuum extraction, forceps delivery, Caesarean section) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Hypothesis 2:

There will be less intrapartum and postpartum (within 2 weeks of birth) morbidity documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

a) There will be less pyrexia at any time during the intrapartum and postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.
b) There will be less haemorrhage (i.e., blood loss estimated to be more than 500 ml) at any time during the postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

c) There will be fewer readmissions during the first 2 weeks of the postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

d) There will be less mortality at any time during the intrapartum and postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Hypothesis 3:
There will be less newborn morbidity documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

a) There will be more newborns with Apgar scores of 7 or more at 1 minute of age and 5 minutes of age documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

b) There will be few birth injuries (i.e., cephal haematoma) to newborns documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

c) There will be fewer admissions to the neonatal intensive care unit (NICU) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.
d) There will be fewer neonatal deaths (during the intrapartum and within 2 weeks of birth) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

### 3.1 Design

To assess the relationship between the use of the partograph and birth outcomes, a retrospective comparative chart review was used and charts were assigned to one of 2 groups depending on whether or not a partograph was used and adequately completed.

The partograph consists of three components: foetal condition, progress of labour and maternal condition.

- **Foetal condition** consists of foetal heart rate (FHR), status of membranes and appearance of liquor as well as presence of moulding. During labour the foetal heart rate must be checked and recorded every hour, but if the foetal heart is irregular then it should be checked and recorded every fifteen minutes. The state of the membranes and liquor and moulding should be checked and recorded every four hours.

- **Progress of labour** comprises cervical dilatation, descent of the presenting part and uterine contractions. In labour, dilatation of the cervix and descent of the presenting part should be assessed on admission and repeated at least every four hours. More frequent examination should be done as the need arises. Uterine contractions should be checked and recorded every half hour.

- **Maternal condition** has the following components: maternal blood pressure, pulse, temperature and assessment of urine for presence of protein and keynotes. Pulse rate should be
assessed and recorded hourly, blood pressure, temperature and urinalysis should be assessed and recorded every four hours.

A partograph was considered to be adequately or appropriately used if all the three components: progress of labour, maternal condition and foetal condition were assessed and the partograph was filled out in the manner recommended in the WHO guidelines (Appendix B). Furthermore, if there were no omissions in any of the above areas or if the omissions were deemed to be minor (1-2 omissions in any of the components) the partograph was considered adequate or appropriate. A partograph was considered to be inadequate if there were moderate (3-4 omissions in any of the components) or major (5 or more) omissions. Definitions of levels of omissions are presented in the following table.

**Table 1: Components of Partograph and levels of omission**

<table>
<thead>
<tr>
<th>Components of Partograph</th>
<th>No omission</th>
<th>Omission</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Foetal condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I. FHR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II. Moulding</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III. Liquor</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Progress of labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV. Descent of foetal head</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V. Cervical dilatation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI. Uterine contractions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Maternal condition</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VII. Pulse</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
A score of 10 was possible for all partographs, one point for each of the ten variables under the components of partograph chosen for this study and classified as adequate or inadequate.

**Table 2: Levels of Omissions resulting in adequate and inadequate partograph**

<table>
<thead>
<tr>
<th>Adequate Partograph</th>
<th>No Omission</th>
<th>Minor Omissions, i.e.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1 – 2 omissions</td>
</tr>
<tr>
<td>Inadequate Partograph</td>
<td>Moderate Omissions, i.e.</td>
<td>Major Omissions. i.e.</td>
</tr>
<tr>
<td></td>
<td>3 – 4 omissions</td>
<td>5 and above omissions</td>
</tr>
</tbody>
</table>

3.2 Setting

Korle-Bu Teaching Hospital, the site for the study, is situated on the west part of Accra about 0.5 kilometers from the Korle lagoon. Korle-Bu Teaching Hospital is the oldest, largest and first teaching hospital in the country and serves as the teaching hospital for the College of Health Sciences, which is comprised of the Medical and Dental School, School of Nursing, School of Public Health, Noguchi Memorial Institute for Medical Research and Allied Health Sciences. Currently, it has about 1,560 beds, making it one of the biggest hospitals in the country. It consists of the following departments:

- Medicine and Therapeutics
- Surgery, Theatres and Recovery
- Allied Surgery
The Department of Obstetrics and Gynaecology has two main units, that is, the Department of Obstetrics (Maternity Block) and the Department of Gynaecology. The setting for this study was the records department at the Maternity Block of the Department of Obstetrics and Gynaecology, which handles about 12,000 deliveries annually, with an average of about 993 deliveries per month. The unit serves as referral point for various lower-level health facilities within metropolitan Accra and surrounding areas. The unit is managed under 5 teams of doctors with 14 physicians on each team and 253 nursing and midwifery staff.

The department has six floors or wards with 54 beds each except the 6th floor, which has 24 beds. It has 2 labour wards and 2 obstetrics theatres, an out-patient unit including 8 consulting rooms and an admission bay where all patients admitted to the facility are registered and examined prior to admission. The Neonatal Intensive Care Unit (NICU), which
is part of the Department of Child Health, is also housed on the 3rd floor of the maternity block. There is a laboratory unit, an X-ray, Pharmacy and Medical statistics and documentation units.

The department operates 24-hour emergency services for both antenatal and postnatal women as well as management of labour and delivery and ultrasonologic services. There is also the Public Health unit where immunisations for mothers and babies are done, counselling for family planning take place and cervical cancer screening mothers antenatally and postnataally.

The Department of Gynaecology is behind the main Administration Block of the Korle-Bu Teaching Hospital. It has an Out-Patient unit with 7 consulting rooms and an emergency room. It also has 3 main wards, namely, Ward E with 34 beds, Chenard A with 50 beds, Chenard Annex with 30 beds and a Gynaecology theatre. The unit handles all reproductive health cases including early pregnancy care, obstetrics emergency care, cervical cancer screening services and family planning services.

3.3 Sample

To avoid selection bias, charts of women who delivered at Korle Bu and met inclusion criteria were enrolled as sequentially as possible. The charts were from both labour wards (i.e., 1 & 2). Charts of multiparous and primiparous women at any gestational age greater than 24 weeks and who were deemed to be in active labour (regular uterine contractions, i.e., 3 contractions in 10 minutes) and had a cervical dilation of least 4 centimetres but not fully dilated were included.
Charts of women treated for hypertension during the index pregnancy or who had been admitted to hospital with a blood pressure greater than 140 systolic and/or 100 diastolic were excluded. Charts of women who arrived at the hospital in second stage of labour or were booked for elective Caesarean section or had experienced intrauterine death prior to labour in the index pregnancy were also excluded.

The sample consisted of charts from the defined cohort of births occurring at Korle-Bu teaching hospital during the months of May 1 to June 30, 2003. These months had the highest recorded deliveries, 1,187 and 1,215 respectively. In all, 1,845 charts were reviewed. About 100 to 150 charts were reviewed daily and about 24 percent of these charts did not meet the inclusion criteria.

3.4 Procedure

The protocol for data collection was as follows:

a) Data were extracted manually from the medical records of the selected cohort and recorded on the attached data collection sheets (Appendix B).

b) Eligible charts were selected serially as arranged by medical records

c) For the first 10 charts, the researcher assessed inter-rater consistency in recording the adequacy of the partograph, the use of interventions, and all maternal and newborn outcomes by having a colleague with about the same level of skill and experience also complete data collection forms. An agreement of 90% was accepted.

d) Data from the data collection sheets were transferred to the computer database.

e) A colleague checked every 20th entry for accuracy.
3.5 Assumptions

It was assumed that information recorded on the charts accurately reflected the characteristics of the women, the interventions that were performed, and level of maternal and neonatal morbidity and mortality.

3.6 Analysis

Data were analysed using a comparative design because the researcher is interested in assessing the relationship between 2 variables [i.e., the adequate use of the partograph (independent variable) and birth outcomes (dependent variable)]. A database compatible with the most recent version of the *Statistical Package for the Social Sciences (SPSS)* was developed.

The analyses consisted of two sections. First, the demographic characteristics and outcomes recorded in the charts were described and relationships among selected variables were evaluated. Categorical variables were described using percentages and bar charts. Numerical variables were described using measures of central tendency (means, medians) and variability (ranges, standard deviations). Relationships among selected variables were calculated using simple correlations and Chi-square analysis. Next relationships between selected outcomes and the use of the partograph were assessed using non-parametric (i.e., Chi-square) statistics.

3.7 Variables

Data were collected for the following demographic, maternal intervention, maternal and newborn outcome, and partograph variables.

1. Demographic
a. Age (actual age)

b. Parity (0, 1, 2-5, more than 5)

c. Marital status (married, single, divorced, widowed)

d. Occupation (unemployed, informal private sector, formal private sector, public sector)

e. Mode of last delivery prior to the index pregnancy (N/A, NSVB, C/S, Vacuum extraction, forceps)

f. Gestational age at onset of labour (37 weeks or less, 38 weeks or more)

2. Maternal Interventions

a. Oxytocin augmentation (yes, no)

b. Artificial rupture of membranes during labour (yes, no)

c. Assisted delivery (C/S, vacuum extraction, forceps, episiotomy, breech extraction)

3. Maternal Outcomes

a. Pyrexia above 37.5 C at any time (yes, no)

b. Maternal haemorrhage of 500 ml and above (less than 500ml is no, 500-1000ml is moderate: more than 1000ml is severe)

c. Readmission to hospital within 2 weeks of birth (yes, no)

d. Mortality (yes, no)

4. Newborn Outcomes

A. Apgar Scores (6 or less) or (7 - 10) at one minute of birth

b. Apgar Scores (6 or less) or (7 - 10) at five minutes of birth
c. Birth injury (cephal haematoma, others)

d. Admitted to NICU (yes, yes but after operative birth, no)

e. Mortality (yes, no)

5. Partograph adequacy (yes, no)

   a. Adequate (1 if no omissions, 2 if minor omissions)

   b. Inadequate (3 if moderate omissions, 4 if major omissions)

   c. Date and time action line was crossed

   d. Action taken in timely manner (yes, no)

A data collection sheet was developed to reflect values for the above variables (Appendix C).

3.8 Ethical Considerations

A letter requesting permission to conduct the study was sent to the Deputy Director of Nursing Services (DDNS) of the Korle-Bu Teaching Hospital, the Deputy Director of Nursing Services (DDNS) of the Department of Obstetrics and Gynaecology and the head of the Medical Statistics and Documentation Department of the study area (Appendix D). This proposal was submitted to the Institutional Review Board of the Noguchi Memorial Institute for Medical Research (NMIMR) and approval obtained before the commencement of data collection. All data were extracted from the medical records by the researcher. Confidentiality was maintained since no names or identifying information were collected with the data. A colleague who does not work at the maternity unit and therefore was unlikely to know the names of the subjects whose charts were being reviewed assisted in examining the charts. This also ensured confidentiality in the charts reviewed. No consent from subjects was required because charts rather than individuals were studied. Data sheets were stored in a safe locked
cabinet in the *School of Nursing, University of Ghana* and secondary analysis will be done only with approval of an appropriate ethics committee.
CHAPTER FOUR

RESULTS

The results of the data analysis are presented in this chapter. First, the demographic characteristics (including age, parity, marital status, occupational status, mode of last delivery and gestational age of onset of labour) are presented. Then the relationship between the independent variable (i.e., adequacy of the partograph) and the frequency of maternal interventions, maternal outcomes and newborn outcomes are reported. A total of 1,845 charts that met inclusion criteria for this study were reviewed. These included the charts of 930 women admitted to the Maternity Block of the Korle Bu Teaching Hospital in May 2003 and 915 in June 2003. A summary of how eligible charts were selected from the 2,622 admissions to the Maternity Block during that time is presented in Figure 1.

Figure 1: Obstetric Admission in Korle-Bu Maternity Block in May and June 2003
4.1 Demographic characteristics

4.1.1 Age

The average age of the women whose charts were included was 27.7 years old (SD 6.09 years). Their ages ranged from 15 to 45 years old. The majority of the women were within the age category of 21 to 30 years old.

4.1.2 Parity

Out of the 1,845 women whose charts were reviewed, 1,125(61.0%) were multiparous while 717(38.9%) were nulliparous. The modal category for parity was the 2 to 5 category. A more detailed description of parity is presented in Table 3.

Table 3. Parity

<table>
<thead>
<tr>
<th>Parity</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 (Primigravid)</td>
<td>717</td>
<td>38.9</td>
</tr>
<tr>
<td>1</td>
<td>505</td>
<td>27.4</td>
</tr>
<tr>
<td>2 - 5</td>
<td>569</td>
<td>30.8</td>
</tr>
<tr>
<td>More than 5</td>
<td>51</td>
<td>2.8</td>
</tr>
<tr>
<td>Missing data</td>
<td>3</td>
<td>0.2</td>
</tr>
<tr>
<td>Total</td>
<td>1845</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.1.3 Marital status

Of the 1,845 charts reviewed, marital status was reported for 1,843 women. Of these, 1,612 were married women living with their husbands. The remainder reported their marital status as single.

4.1.4 Occupation

Of the 1,845 charts reviewed, 1,831 women reported their occupations. Of these, 1,321 (71.6%) were employed either in the informal private sector, formal private sector or public sector. The remainder were unemployed. For 14 (1%), their employment status was not known.
4.1.5 Mode of last delivery

Of 1,128 multiparous women whose charts were reviewed, 989 (88%) had a previous normal spontaneous vaginal birth, while the rest delivered either by caesarean section or vacuum extraction. The previous delivery experience of multiparous women is provided in more detail in Table 4.

Table 4: Mode of Last Delivery

<table>
<thead>
<tr>
<th>Mode of last delivery</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal spontaneous vaginal birth (NSVB)</td>
<td>974</td>
<td>52.8</td>
</tr>
<tr>
<td>Caesarean section (C/S)</td>
<td>132</td>
<td>7.2</td>
</tr>
<tr>
<td>Vacuum extraction (V/E)</td>
<td>7</td>
<td>0.4</td>
</tr>
<tr>
<td>Non-application (Primigravid)</td>
<td>705</td>
<td>38.2</td>
</tr>
<tr>
<td>Missing data</td>
<td>27</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>1845</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.1.6 Gestational age of onset of labour

For the majority of the 1,824 women whose gestational ages were included on their charts, 1,396 (76.5%) experienced the onset of labour when their gestational age was 38 weeks or more. For 428 (23.5%), the onset of labour occurred prior to 37 completed weeks of gestation. Information about gestational age was missing for 21 charts.

4.2 Research Hypotheses

In the next sections the research hypotheses will be addressed. Each of the three hypotheses will be listed with the accompanying sub-hypotheses. The results of the analysis of each individual sub-hypothesis will be reported. Before reporting findings from research
hypotheses, guidelines used to establish the adequacy of the independent variables (i.e., partograph and whether or not timely action was taken) will be described.

4.3 Partograph

The independent variable is the adequacy of the partograph. Using guidelines based on World Health Organization (WHO) criteria established a priori to determine whether or not the partograph was judged to be adequate, maternal interventions as well as maternal and newborn outcomes were compared with respect to whether or not the partograph was adequately used.

The levels of omission in plotting the partograph as required by WHO guidelines are presented in Table 4. For the majority of charts that were reviewed for this study, assessments of components of the partograph (i.e., FHR, liquor and membranes, and presence of caput or moulding, as well as uterine activity, maternal pulse and urine analysis) were not plotted to specification. There were one or more omissions during plotting or charting of the partograph.

Table 5. Components of Partograph and Levels of Omission

<table>
<thead>
<tr>
<th>Components of Partograph</th>
<th>No omissions</th>
<th>Omissions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percent</td>
</tr>
<tr>
<td>a. Foetal conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>i. FHR</td>
<td>121</td>
<td>6.6</td>
</tr>
<tr>
<td>ii. Moulding</td>
<td>286</td>
<td>15.5</td>
</tr>
<tr>
<td>iii. Liquor</td>
<td>839</td>
<td>45.5</td>
</tr>
<tr>
<td>b. Progress of labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iv. Descent of head</td>
<td>1699</td>
<td>92.1</td>
</tr>
<tr>
<td>v. Cervical dilatation</td>
<td>1759</td>
<td>95.3</td>
</tr>
<tr>
<td>vi. Uterine contractions</td>
<td>211</td>
<td>11.4</td>
</tr>
<tr>
<td>c. Maternal conditions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>vii. Pulse</td>
<td>194</td>
<td>10.5</td>
</tr>
<tr>
<td>viii. BP</td>
<td>1568</td>
<td>85.0</td>
</tr>
<tr>
<td>xi. Temperature</td>
<td>1221</td>
<td>66.2</td>
</tr>
<tr>
<td>x. Urine (Urinalysis)</td>
<td>304</td>
<td>16.5</td>
</tr>
</tbody>
</table>
Of the 1,845 charts reviewed, the partographs were correctly filled out in accordance with WHO guidelines on 472 (25.6%) charts while 1,373 (74.4%) partographs were incorrectly filled out.

4.3.1. Action Line on Partograph:

Although the use of the partograph by care providers was filled on 464 occasions, it was also noted that when the action line was crossed, action was only taken in a timely manner on 226 (48.7%) occasions and was not taken on 238 (51.3%) occasions. Therefore, maternal and newborn outcomes were compared on a) whether or not the partograph was adequately filled out and b) the charts were further analyzed so that those for whom action was taken when the action line was crossed were compared with those for whom no action was taken.

Out of the 1,845 charts reviewed, for 1,381 (74.9%) women, labour ended without the action line being cross. For 464 (25.1%) the action line was crossed. Of these, action was not taken in a timely manner to augment labour for 238 (51.3%). Timely action was therefore taken to augment labour for only 226 (48.7%) women.

Hypothesis 1:

There will be more interventions documented in the partographs that are used adequately than in those that are used inadequately.

a) There will be more augmentation documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.
Of the 1,845 records, data were available for 1,844. Of these, the labour of 623 women was augmented with oxytocin. Those whose partograph was judged to be adequate were more likely to have their labour augmented than those whose partographs were judged to be inadequate ($X^2=175.8, \text{ df } 1, p<0.0009$). The hypothesis was supported.

b) There will be more artificial rupture of membranes (ARM) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Data were available on 1,835 of the 1,845 records. Of these, 673 had their labour augmented by having their membranes artificially ruptured during labour. Those whose partographs were judged to be adequate were more likely to have their membranes ruptured ($X^2=87.3, \text{ df } 1, p<0.0009$). The hypothesis was supported.

c) There will be more assisted births (i.e., vacuum extraction, forceps delivery, Caesarean Section) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Of the 1,845 records, data with respect to assisted birth were available on 1,839. Of these, 778 women had assisted births. These included Caesarean Section ($n=235$); vacuum extraction ($n=38$); forceps extraction ($n=5$); episiotomy ($n=455$); and assisted breech birth ($n=44$). This hypothesis was also supported as there were more assisted births in group whose partographs were adequately filled out ($X^2=108.3, \text{ df } 1, p<0.0009$).

4.4.2 Types of maternal interventions

Maternal interventions included oxytocin augmentation, artificial rupture of membranes (ARM) during labour and assisted deliveries such as Caesarean section, vacuum
extraction, forceps, episiotomy and breech delivery extraction. Six hundred and twenty-four (33.8%) of the women had their labours augmented with oxytocin and 673 (36.5%) had their membranes artificially ruptured during labour. Out of the 778 (42.2%) women who were assisted during delivery, 456 (58.6%) of them had normal spontaneous vaginal births with episiotomy while 235 (30.2%) had caesarean sections. If only Caesarean Section, vacuum extractions or forceps deliveries were considered as assisted birth, there were differences between those who had a partograph that was adequately filled out and those who didn’t (X²=5.16, df 2, p<0.03).

Table 6: Various Maternal Interventions

<table>
<thead>
<tr>
<th>Maternal Interventions</th>
<th>Yes</th>
<th>No</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Oxytocin augmentation</td>
<td>624 (33.8)</td>
<td>1221 (66.2)</td>
<td>100.0</td>
</tr>
<tr>
<td>b. ARM during labour</td>
<td>673 (36.5)</td>
<td>1172 (63.5)</td>
<td>100.0</td>
</tr>
<tr>
<td>c. Assisted delivery</td>
<td>778 (42.2)</td>
<td>1067 (57.8)</td>
<td>100.0</td>
</tr>
</tbody>
</table>

4.4 Maternal Outcomes

Hypothesis 2:

There will be less intrapartum and postpartum (within 2 weeks of birth) morbidity documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

a) There will be less pyrexia at any time during the intrapartum and postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Maternal temperature was available for all 1,845 records. Of these, 427 (23.1%) of the women had a body temperature record at or above 37.5 degrees Centigrade (C), at some time during their intrapartum or postpartum period. Those whose partographs were not adequately
completed were less likely to have a maternal temperature above 37.5 recorded on their partograph (X²=13.2, df 1, p<0.0009). The hypothesis was not supported.

However, maternal temperature was also compared between those for whom timely action was taken if the action line was crossed and those whom timely action was not taken. There were no between-group differences (X²=0.64, df 1, p=0.44).

b) There will be less haemorrhage (i.e., blood loss of more than 500 ml) at any time during the postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Data were available on 1,811 of the 1,845 records. The records of 1,360(73.7%) women indicated that they had experienced post delivery blood loss of less than 500mls while 485(26.3%) experienced either moderate or severe blood loss. The maximum blood loss was assessed to be 2500mls.

There were between-group differences with those whose partographs were adequately completed being less likely to have a moderate or severe haemorrhage (X²=81.5, df 2, p<0.0009). The hypothesis was supported.

When the presence of minimal, moderate or severe blood loss was compared between those where action was taken in a timely manner when the action line was crossed and those where action was not taken, differences were not found.

d) There will be fewer readmissions during the first 2 weeks of the postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.
Of the 1,845 records, information about whether or not the mother was re-admitted to hospital during the postpartum period was available in 1,836. It was indicated in 92 charts that women were readmitted to the maternity unit. Of these, 26 (27.2%) of the women were readmitted with pre-eclampsia, 21 (19%) with puerperal sepsis, 19 (21%) with malaria or UTI and 8 (9%) with severe anaemia. The remaining 18 (20%) were admitted with complications such as wound infection, gaping episiotomy, bleeding per vagina (due to secondary PPH) and sickle cell crisis.

More women in the group whose partographs were adequately completed were readmitted during the first 2 weeks postnatally ($X^2=5.7$, df 1, $p=0.01$). The hypothesis was not supported.

With respect to whether or not action was taken in a timely manner, there were no differences between groups in rates of maternal readmission to hospital within the first 2 weeks following birth ($X^2=0.03$, df 1, $p=0.87$).

There will be less mortality at any time during the intrapartum and postpartum period documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Total admissions and deliveries recorded during the study period May and June, 2003 were 2,622 and 2,401, respectively. The unit recorded 29 maternal deaths during the same period. Of these, it was reported in the log book that there were 13 intrapartum maternal deaths but only 1 chart was located. The charts of the remaining 12 women who died during labour were among those that were missing. The researcher became aware of the number of deaths and their causes through scrutiny of records kept by nursing administrators.
The number of eligible charts of women who died was insufficient to assess between group differences with respect to the adequacy of the partograph. Therefore, the hypothesis was not tested.

4.5 Newborn Outcomes

Hypothesis 3:

There will be less newborn morbidity documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

a) There will be more newborns with Apgar scores of 7 or more at 1 minute of age and 5 minutes of age documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Out of the 1,845 charts reviewed, Apgar scores at 1-minute of age were available for 1,843 births. A total of 1,885 babies including 40 sets of twins were delivered during the study period. For this study only the Apgar scores of the first twin were recorded. Of these, 704 (38.1%) babies had Apgar score of 6 or less at 1 minute of age and 1,139 (61.9%) babies had scores of 7 to 10 within the same period of time. While 180 Apgar scores of less than 6 were expected, 238 were observed in the groups whose partograph was adequately completed. Conversely, while 524 Apgar scores of 6 or less were expected in the group where the partograph was inadequately completed, only 466 were observed. The differences were significant, in that Apgar scores were higher in those whose partographs were not filled out appropriately ($X^2=40.8, df 1, p<0.0009$). The hypothesis was not supported.

However, when the 226 cases where action was taken in a timely manner was examined, Apgar scores of 6 or less were expected for 114 of those where action was taken in
a timely manner; only 102 were observed. Conversely, the 238 where action was not taken in a timely manner, 120 cases were expected and 133 were observed. In this case, those who received timely action were less likely to have babies with low Apgar scores ($X^2=5.9$, df 1, $p=0.0009$)

Apgar scores were recorded on all charts for 1,845 births at 5 minutes of age. Of these, 207 babies (11.2%) had scores of 6 or less and 1,638 (88.8%) babies scored 7 to 10 at 5 minutes after birth. Those whose partograph were adequately filled out were more likely to have scores of 6 or less at 5 minutes of age ($X^2=5.6$, df 1, $p=0.01$). The hypothesis was not supported.

When those where action was taken in a timely manner were compared with those where action was not taken in a timely manner with respect to 5-minutes Apgar scores, those where action was not taken were significantly higher.

b) There will be few birth injuries (i.e., cephal haematoma) to newborns documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Of the 1,885 babies delivered from the 1,845 charts, only 17 birth injuries were recorded. Again, only data for the first of each of the 40 sets of twins were available. Of these 3(0.2%) suffered cephal haematoma while 14 were born with congenital abnormalities such as anencephaly, extra digits, haemangiolympangioma, ectropion of left eye, hydrospadias, exomphalous and supra-umbilical cord. Birth injuries were recorded for 6 neonates in the group whose partographs were adequately completed, while 11 occurred in the group whose partographs were inadequately completed. The number was small but Chi Square analysis...
was done. No between-group differences were found. The hypothesis was not supported ($X^2 = 0.9$, df 1, p=0.25).

For the 464 charts where it was recorded that the action line was crossed, there were no differences between those where timely action was taken and those where timely action was not taken ($X^2=0.004$, df 1 p=0.63).

c) There will be fewer admissions to the neonatal intensive care unit (NICU) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

Information was available on 1,841 records. Of these, 243 newborns, excluding twins were admitted to NICU. Of these, 62 were routinely admitted because of C/S and 181 were admitted because of other problems.

The timeliness of intervention after the action line was crossed was evaluated. Again, there were more admissions to NICU in the group where action was not taken in a timely manner ($X^2=7.8$, df 2, p<0.02).

d) There will be fewer neonatal deaths (during the intrapartum and within 2 weeks of birth) documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately.

There were 29 neonatal deaths. The sample size was small but Chi Square analysis was done and there were no differences in the number of deaths between those whose partograph was adequate and those whose partograph was inadequate. The hypothesis was not supported ($X^2=0.03$, df 1, p<0.52)
CHAPTER FIVE

DISCUSSION

5.1 Summary of Main Findings

In this study, 1,845 retrospective charts were reviewed and the adequate and inadequate use of the partograph was analysed using three main hypotheses. The study findings revealed that there were more maternal interventions, i.e., augmentation, ARM and assisted births, recorded in the charts of women whose partograph was adequately used. There were slightly more women with pyrexia and others readmitted to hospital documented in the adequately used charts. However, when the partograph was adequately used, women were less likely to haemorrhage (i.e., experience a blood loss of more than 500 millilitres). With respect to newborn outcomes, those whose partographs were adequate were less likely to have Apgar scores of 7 or more at 1 minute of age. In those charts where partographs were inadequate, newborns had fewer admissions to the NICU. No between-group differences in the number of birth injuries or neonatal deaths were recorded in the charts of women whose partograph were used adequately. The study also revealed that 472 (25.6%) out of the 1,845 charts reviewed were adequately filled out in accordance with WHO guidelines.

Data were further explored by comparing whether or not timely action was taken when the action line on the partograph was crossed. The action line was crossed on the partographs of 464 charts. In these, action was taken in a timely manner on 238 (48.7%) occasions. When action was taken in a timely manner, 1-minute Apgar scores were higher.

5.2 Discussion of Results

This study was designed to investigate the relationship between the use of the partograph and birth outcomes. A retrospective chart review of both primiparous and multiparous
deliveries from May 01 to June 30, 2003 was conducted. Charts of 1,845 women who met the inclusion criteria were assigned to two groups; omissions or no omissions based on WHO criteria. Data were analysed and discussed for each of the three main hypotheses that guided the data collection. Each hypothesis had three or four sub-hypothesis and the discussion covered all these hypotheses.

Hypothesis 1 was highly significant. It clearly revealed that adequate use of the partograph indicates more interventions, in terms of oxytocin augmentation, artificial rupture of membranes and assisted deliveries. These findings are compared with a previous multi-centre trial conducted by WHO in South East Asia on the use of the partograph in clinical practice, which revealed that competent use of the partograph can save maternal lives by ensuring that labour is closely monitored and that life-threatening complications such as obstructed labour are identified and treated (Maternal and Neonatal Health, 2002). However, this was not evident in this study since only 226(48.7%) out of the 464 women whose labour crossed the action line had interventions taken in a timely manner. Even though action was taken for the remaining 238(51.7%) women, they could have been among those women whose partograph was used inadequately.

It was hypothesized (Hypothesis 2) that there will be less intrapartum and postpartum (within 2 weeks of birth) morbidity documented in the charts of women where the partograph was used adequately than in those where the partograph was used inadequately. There were slightly more women who had pyrexia as was recorded on the partograph which was adequately used. These women may have been monitored more accurately; it is also possible
that those whose charts were inadequately monitored had their charts were filled out after delivery.

Women were less likely to haemorrhage if their partograph was adequately filled out. However, slightly more of these women were readmitted to hospital during the first 2 weeks of the postnatal period. The health status of a woman may determine her ability to survive pregnancy, labour and delivery as well as puerperium (Royston and Armstrong, 1989). There were 13 maternal deaths relating to complications of labour and delivery recorded during the study period but only 1 chart was retrieved. This number was insufficient to analyze and therefore the relationship between maternal death and the adequacy of partograph use cannot be assessed. WHO (1994) literature suggested that if the partograph was appropriately used, it has the potential of reducing infant and maternal morbidity and mortality.

It was further hypothesized (Hypothesis 3) that there will be less newborn morbidity documented in the charts of women where the partograph was used adequately. There were more newborns with Apgar score of 7 or more and reduced number of admissions to the NICU in those women whose partographs were inadequately filled out. No between-group differences were observed in the number of birth injuries or neonatal deaths within 2 weeks of birth. This finding differs from that found in a WHO study in South East Asia in which 35,000 partographs from eight hospitals were surveyed. They reported a remarkable improvement in newborn outcomes in the area of intrapartum foetal deaths, Apgar scores, resuscitation measures and admission to neonatal special care facilities. It was of interest that there did not appear to be an impact on neonatal health or that it may have even been compromised by adequate use of the partograph. However, it must be noted that there were more maternal
interventions during labour for the group whose partographs were adequately completed. These assisted births could well have contributed to the higher morbidity that was observed.

There did not appear to be a "buy-in" for partograph use in Ghana since only 26 percent of the partographs in this study were adequately used. It is possible that partograph use in South East Asia was more widespread so that greater opportunities existed to assess its impact on the outcomes of maternal and neonatal health.

5.3 Threats to Validity

In this section, potential threats to the validity of this study will be addressed and strategies that were used to minimize the threats will be described. Threats to internal validity will be identified so that rival explanations for study findings can be considered. History is a major threat to the internal validity of this study in that data were transcribed from the records of 1,845 available charts. Some charts were missing including all but one of the 13 women who died during the intrapartum period. Because of this, the number of maternal deaths (n=29) is likely underestimated. It is not possible to know whether these missing records would alter the relationship between the adequacy of the partograph and maternal and neonatal mortality. Another threat to history and also selection is that data were gathered during the two busiest months of the year (i.e., May and June) in that there were more births and more maternal mortality than during other months. It is not possible to assess the impact that increased workload may have had on maternal and neonatal outcomes in a climate where serious nursing shortages already exist.

The historical threat that is of greatest concern is always a concern for epidemiologists. Information on the charts would be affected by integrity of the many individuals who would
have recorded the information. Entries were made by providers in a very large national hospital as well as by those in smaller hospitals and polyclinics who made a decision to transfer their patients to Korle Bu Teaching Hospital. On inspection of several of the partographs, it was clear that all information was recorded at the same time; we can speculate that this would have happened at the time of birth, transfer to the tertiary care facility or when a labouring woman’s condition had clearly deteriorated. Since few providers adequately completed the partograph (25.6%) the “buy-in” by providers has not occurred. Finally, with respect to history, the investigator is not aware of media reports or other events during the study period that may have influenced attitudes toward the independent variable (i.e., partograph). Because it was unclear whether or not even the adequately completed partographs were used to monitor labour rather than being completed retrospectively, the timeliness of interventions once the action line was crossed was also assessed.

While data entered into patient records was beyond the control of the researcher, the criteria for adequacy of the partograph was established a priori and this criteria were applied to each partograph that was assessed, thus reducing the possibility in random error when determining the adequacy of the instrument. The researcher was always present when data were recorded. When she had assistants, inter-rater reliability was formally assessed. Any atypical records were discussed and consensus was reached. The sample size was large and the entire population of eligible charts that could be located were included.

It is also important to assess the external validity or generalizability of study findings. The charts of labouring women, including those with atypical pregnancies or multiple gestations that could have a partograph were included. Only those in second stage labour,
admitted for planned instrumental delivery or where the foetus was known to have died in utero were excluded. While a non-probability sample was used, it included the entire population for a specific period of time and was sufficiently large to overcome selection effects.

5.4 Limitations

In addition to threats to both internal and external validity which have already been addressed, important limitations will be outlined. The design can be described as an After-only Non-equivalent Control Group Design (Campbell & Stanley, 1966). Ideally, a prospective study would have been conducted so that more control could be maintained. Women would have been followed from the onset of labour until 2 weeks following their birth. However, a prospective design is not feasible for this study because the use of a tool (i.e., the partograph) in a real and pre-existing social setting was being assessed.

Non-parametric tests were used in the data analysis as they are based on fewer assumptions but are less powerful (Wood & Ross-Kerr, 2006). The design for this study is quasi-experimental in that it was not possible to exert further control by manipulating the independent variable or randomizing charts to study groups since the condition already existed in nature. Since full experimental control was not possible, given the nature of this study, one is less confident of “cause and effect” relationships.

Computerized patient records were not used in the study setting so all data were recorded by hand from available paper records. Data from data collection sheets were transferred to a computer database. Obviously, errors in both collecting and entering data are likely. To minimize this type of random error, for the first 10 charts the researcher assessed
inter-rater consistency in recording the adequacy of the partograph, the use of interventions, and all maternal and neonatal outcomes by having a colleague with about the same level of skill and experience also complete data collection forms. An agreement of 90 percent was accepted. Further, a colleague checked every twentieth entry for accuracy.

5.5 Implications for Nursing Practice

There appears to be an association between the appropriate use of the partograph and birth outcomes but more needs to be done in the timing of interventions to help save the lives of mothers and their babies. Although the providers used the partographs for all women in labour most did not use them adequately or perhaps even prospectively. Some important components, for instance, uterine contractions, foetal condition and maternal pulse were not assessed and plotted correctly. In all, it appeared the partograph was not correctly filled out as specified in the WHO guidelines.

The partograph serves as an “early warning system” and assists in early referral, augmentation and termination. It is therefore imperative that the nurses/midwives and obstetricians be well informed or reminded of their responsibilities regarding labour management and how they affect birthing outcomes.

5.5.1 Implications for Nursing Education

Periodic in-service education programmes and supervision for all nurses, midwives and other health care workers providing maternity services to pregnant women are of paramount importance in order to secure correct use of the partograph and improve labour management.
Emphasize the importance of monitoring and appropriate action that is needed when the progress of labour, maternal vital signs, and neonatal assessment fall outside acceptable variations.

A priority in providing a high standard of maternity care needs to be put in place to ensure that students are adequately supervised by highly skilled preceptors or mentors who can serve as models who provide a high level maternity care.

5.5.2 Implications for Research

The value of the partograph as a Safe Motherhood intervention needs to be assessed since neonates in this study did not appear to have improved outcomes and interest among providers appeared low.

Qualitative study to further understand why health professionals are not committed to using partograph.

Quantitative studies to further understand why timely action was not taken when the action line was crossed. Availability of intervention? Availability of personnel?

5.6 Recommendations

In view of the extensive literature reviews on the use of the partograph and its effect on labour, most of the research to date has been on prospective studies. The social, economic and emotional burden that families face when they lose any relative through childbirth cannot be over-emphasized. The researcher wishes to make the following recommendations

- Organize continuous educational programme to update knowledge and skills of nurses/midwives in labour management and care of the newborn.
• Develop educational models that can be delivered to more remote clinics as well as be used by nurses/midwives in larger tertiary care centres that will address both the commitment needed and skill level necessary to appropriately document maternal progress and maternal and foetal status using a partograph.

• Develop a similar educational model that may be used to assist nurses/midwives in decision making once an action line is crossed.

• A protocol for appropriate and timely action using recommended interventions needs to be developed and prominently displayed on the wards so that attending midwives can apply them promptly and effectively.

• Develop periodic in-service training for personnel at the Medical Statistics and Documentation Unit (Records department) in the health care facilities to improve the filing system and ensure easy retrieval of patients’ charts/folders. Missing records must be located and appropriately filed.

• Lobby the Reproductive and Child Health (RCH) Unit of the Ministry of Health to consider computerizing maternal/child records as a priority.

• Work with key representatives in the Maternal and Child Health Unit of the Ministry of Health to evaluate the efficacy of the use of the partograph in Ghana and identify barriers to appropriate use.

• Presentation of findings locally to the tertiary institutions (Korle-Bu and Komfo Anokye Teaching Hospitals), the RCH unit of the various health care facilities, Nurses’ and Midwives Council for Ghana and Ghana Registered Nurses/Midwives
Associations. Further, to wider African audience and WHO (Safe Motherhood Project).

5.7 Conclusion

In summary, the study which was a retrospective chart review sought to assess the relationship between the use of the partograph and birthing outcomes. The method used has information about sample, instrument and procedure. The data were analysed using simple statistical tools such as percentages, bar charts, measures of central tendency (means, median), variability (ranges, standard deviations) and chi-square. The results of the study revealed that 472 (25.6%) partographs were appropriately filled and timely interventions were taken for 226 (48.7%) women whose labour crossed the action line. Two hundred and fifty-nine (13.7%) babies were admitted to NICU with varying conditions. The partograph may be of great value in clinical practice today if it is accurately used by skilled nurses, midwives and obstetricians to help reduce maternal and infant morbidity and mortality.
METHOD OF DELIVERY: .................................................. DATE AND TIME OF DELIVERY: ..................................................

DURATION OF LABOUR: ..................................................

COMPLICATIONS: ..................................................

BABY: SEX: ..................................................

CONDITION OF BABY: ..................................................

APGAR SCORE:

<table>
<thead>
<tr>
<th>IMN</th>
<th>5MINS</th>
</tr>
</thead>
<tbody>
<tr>
<td>APPEARANCE</td>
<td></td>
</tr>
<tr>
<td>PULSE</td>
<td></td>
</tr>
<tr>
<td>GRIMACE</td>
<td></td>
</tr>
<tr>
<td>ACTIVITY</td>
<td></td>
</tr>
<tr>
<td>RESPIRATION</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
</tr>
</tbody>
</table>

Delivery By: ..................................................

Supervised By: ..................................................
APPENDIX B

WHO GUIDELINES IN THE USE OF THE PARTOGRAPH

A. FOETAL CONDITION

I. FHR  record FHR every hour but if foetal heart is irregular, check it every 15 minutes

II. Membranes and liquor - assess and record the state of membranes and liquor on admission and every 4 hours

III. Moulding - record degree of moulding 4 hourly

B. PROGRESS OF LABOUR

IV. Descent of foetal head – assess level of presenting part on admission and every 4 hours

V. Cervical dilatation – assess cervical dilatation on admission and every 4 hours.
   Vaginal examination may done frequently if the need arises

VI. Uterine contractions – plot uterine contractions half hourly

C. MATERNAL CONDITION

VII. Blood pressure – record BP 4 hourly

VIII. Pulse – record pulse hourly

IX. Temperature – record temperature 4 hourly

X. Urine (urinalysis) – test urine 4 hourly.
## APPENDIX C

### CHECKLIST (Data Collection Sheet)

<table>
<thead>
<tr>
<th>Participant No.</th>
<th>DEMOGRAPHIC CHARACTERISTICS</th>
<th>OUTCOMES</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1:0 2:0 3:0 4:0</td>
<td>1 2 3 4</td>
</tr>
<tr>
<td>1. Demographic characteristics</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. Parity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 – 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>More than 5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>married</td>
<td></td>
<td></td>
</tr>
<tr>
<td>single</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d. Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-employed (informal private sector)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal private sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public sector</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e. Mode of last delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-applicable (N/A)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal spontaneous vaginal birth (NSVB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caesarean section (C/S)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vacuum extraction (V/E)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Forceps delivery (F/D)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f. Gestational age on onset of labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>37 weeks or less</td>
<td></td>
<td></td>
</tr>
<tr>
<td>38 weeks or more</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Maternal Interventions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Oxytocin augmentation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b. ARM during labour</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c. Assisted delivery</td>
<td></td>
<td></td>
</tr>
<tr>
<td>C/S</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V/E</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F/D</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Episiotomy</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breech</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
3. Maternal Outcomes
   a. Pyrexia above 37.5°C
      - Yes
      - No
   b. Haemorrhage of 500ml and above
      - No haemorrhage – less than 500ml
      - Moderate - 500 - 1000ml
      - Severe - more than 1000ml
   c. Readmission to hospital within 2 weeks of birth
   d. Mortality
      - Yes
      - No

4. Newborn Outcomes
   a. Apgar scores at 1 minute of age
      - 6 or less
      - 7 – 10
   b. Apgar scores at 5 minutes of age
      - 6 or less
      - 7 – 10
   c. Birth injury
      - Cephal haematoma
      - Others
   d. Admitted to NICU
      - Yes
      - Yes but after operative delivery
      - No
   e. Mortality
      - Yes
      - No

5. Partograph
   a. Adequate
      - No omission
      - Minor omission
   b. Inadequate
      - Moderate omission
      - Major omission
   c. Date and time action line was crossed
   d. Action taken in timely manner
      - Yes
      - No
REFERENCES


Women’s Health Foundation Brochure, 2003.


