

**THE EFFECT OF FREE DELIVERY SERVICES ON PARTOGRAPH
UTILIZATION AT NAIVASHA DISTRICT HOSPITAL**

BY

DR. MAINA SAMMY KIGOTHO

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FULFILLMENT OF THE REQUIREMENT OF MASTER OF OBSTETRICS AND
GYNECOLOGY**

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DECLARATION

I declare this dissertation does not incorporate without acknowledgement, any material previously submitted for a degree or diploma in any university and that to the best of my knowledge, it does not contain any material previously published or written by another except where due reference has been made in the text. It is the product of my own research endeavors with the guidance of my supervisors.

Dr. Maina Sammy Kigotho

MMed registrar, Department of Obstetrics and Gynecology, School of Medicine

University of Nairobi

Signature: _____

Date: _____

CERTIFICATE OF SUPERVISION

This is to certify that the dissertation was researched upon by Dr. Maina Sammy Kigotho under my supervision and that this dissertation is submitted for review with my approval.

1. Prof. Patrick M. Ndavi

MBChB, MMed Obs & Gyn, MSc. Epid., FHBR, DLSHTM

Associate Professor, Department of Obstetrics and Gynecology, School of Medicine

University of Nairobi

Signature: _____ Date: _____

2. Dr. Onesmus Gachuno

MBChB, MMed Obs & Gyn, DPRM

Senior Lecturer, School of Medicine, University of Nairobi

Signature: _____ Date: _____

CERTIFICATE OF AUTHENTICITY

This is to certify that this dissertation is the original work of Dr. Maina Sammy Kigotho, registration number: H58/84036/2012, a Master of Medicine student in the Department of Obstetrics and Gynecology, College of Health Sciences, University of Nairobi. The research was carried out under the supervision of Prof. M. Ndavi and Dr. O. Gachuno. It has not been presented to any other university for award of a degree.

Prof. Omondi Ogutu,

Associate Professor of Obstetrics and Gynecology,

Consultant Obstetrician and Gynecologist,

Chairman, Department of Obstetrics and Gynecology, University of Nairobi

Signature: _____ Date: _____

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DEDICATION

I dedicate this work to my family: Anne Maina, the late John Maina, Lillian Maina and Mercy Wangechi, for their support and encouragement throughout the course of my studies.

Thank you also to my other sisters and brothers who have given strength to my revelatory knowledge and wisdom. Without them, I would not be the person that I am and I would not be able to reach where I am going to reach.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC	-	Antenatal Care
BP	-	Blood Pressure
EmCS	-	Emergency Caesarian Section
EMoC	-	Emergency Obstetric Care
FDS	-	Free Delivery Services
FHR	-	Fetal Heart Rate
FMC	-	Free Maternal Healthcare
GoK	-	Government of Kenya
KDHS	-	Kenya Demographic Health Survey
KNCHR	-	Kenya National Commission on Human Rights
KNH	-	Kenyatta National Hospital
MMR	-	Maternal Mortality Ratio
MDG	-	Millenium Development Goal
PR	-	Pulse Rate
SIRCLE	-	Health Services Implementation Research and Clinical Excellence
SMDP	-	Safe Motherhood Demonstration Project
SVD	-	Spontaneous Vaginal Delivery
UoN	-	University of Nairobi
WHO	-	World Health Organization

DEFINITION OF KEY TERMS

Partograph: The partograph is a graphical tool for monitoring of the progress of labour as well as maternal and foetal well-being and serves as an early warning system and assists in early decision making for intervention or transfer.

Structure indicators: Indicators that measure the organizational, material, human and intellectual resources needed to provide care

Process indicators: Indicators used to measure the activities used to provide care. These processes need structural inputs to be done effectively.

Outcome indicators: Indicators used to measure the results of the health care processes.

Fetoscope: Apparatus used for the physical taking of the fetal heart rate. It is usually placed on the abdomen and the user deciphers the fetal heart rate by placing his/her ear on the apparatus while on the abdomen of the mother.

APGAR score: A measure of the physical condition of a newborn infant. It is obtained by adding points (2 or 1 or 0) for heart rate, respiratory effort, muscle tone, response to stimulation and skin coloration; a score of ten represents the best possible condition.

ABSTRACT

Background: The Kenyan Maternal Mortality Ratio is estimated at 488/100,000 live births. Millennium Development Goals 4 and 5 to reduce child mortality and improve maternal health, remain important global health challenges and ensuring skilled birth attendance is a crucial intervention for achieving these goals. In order to try to circumvent one of the barriers to increased skilled birth attendance, the Government of Kenya, on June 1st 2013, initiated a policy of free maternity services in all public facilities, effective immediately.

Purpose of the Study: The study aims at assessing the effect of initiation of free delivery services at Naivasha District Hospital (county hospital in Naivasha-Kenya, a peri-urban area) by measuring a key process indicator for delivery services, partograph utilization, before and after the initiation of free maternity care.

Methodology: A before and after design (quasi-experimental design) was used in which, partograph data for two groups were collected at two different but commensurate periods in the period before and after initiation of free delivery services policy (“After” period: July to September 2013 and October to December 2013; “Before” period: July to September 2012 and October to December 2012). The study site was Naivasha District Hospital (model Level 4 county hospital). Partographs in the stipulated periods were retrieved, and randomly sampled to obtain the calculated sample size. Using a structured questionnaire, data from the partograph was extracted for: completeness, adequacy of filling, intervention characteristics (timeliness and appropriateness) and outcome indicators (delivery outcome and fetal outcome). The data were analyzed for descriptive statistics and tests of association carried out. The results for the ‘before’ and ‘after’ period were then compared for any similarities or significant differences.

Results: There was a statistically significant decrease in the overall completeness of the partographs both in the immediate post-intervention period (28.4% to 10.2%) and short term post-intervention period (36.4% to 20.5%). Adequacy of filling of the fetal heart rate and progress of labour parameters was generally adequate (>70%) and there were no major differences both in the immediate term and short term post-intervention periods. Adequacy of filling of the maternal parameters was generally inadequate (<50%) and there was no statistically significant change in its recording both in the immediate term and short term.

Overall recording of the neonatal parameters was generally adequate (>80%) and there was no major change in its recording in the immediate and short term post-intervention. There was also no significant change in the intervention characteristics (timeliness/appropriateness of intervention). There was a slight rise in the SVD rate in the immediate term (89.8% to 90.9%), but a slight decline in the short term (93.2% to 78.4%). There was a decrease that was not statistically significant ($P=0.301$) in the emergency caesarian rate in the short term (10.2% to 5.9%) and a statistically significant ($P=0.047$) rise in the short term (6.8%-16.9%). There was a slight rise in the bad APGAR scores at 5 minutes in both the immediate term (5.7%-8.0%) and short term (3.4% to 6.8%). These changes were however not statistically significant ($P=0.159$)

Conclusion: Overall completeness of the partographs decreased both in the immediate and short term after introduction of free delivery services. There was also a slight rise in the bad APGAR scores. Despite these compromises, there were no significant changes in terms of adequacy of filling of most of the partograph parameters and intervention characteristics.

CHAPTER ONE

INTRODUCTION

1.1 The Kenyan Maternal Health Situation

The Maternal Mortality Ratio as per KDHS 2008-09 is estimated to be 488 per 100,000 live births. The fifth Millennium Development Goal is to reduce the maternal mortality ratio by 75 percent between 1990 and 2015.¹ The aforementioned MMR is still significantly high and a key strategy to reducing it is to ensure delivery by skilled staff. 2008-2009 KDHS data suggest that 44% of births are managed by health professionals and 43% are delivered at a health facility; 56% of deliveries occur at home.¹

Skilled pre-conception, ante-natal, delivery and post-delivery care is important in reducing complications rate to the mother and the baby. Increasing the delivery number in health facility settings is therefore an important factor in decreasing health risk encountered during the delivery process.¹

KDHS 2008-09 findings as per some of the factors contributing to where deliveries occurred (home versus health facility) were: parity status (higher parity increased the chances of the delivery occurring at home); rural versus urban status (deliveries in rural settings are more likely to occur at home); wealth quantile of the mother (the higher the wealth quantile, the less likely for the delivery to occur at home); level of education of the mother (the higher the education, the more likely for the delivery to occur in a health facility); number of antenatal visits (mothers who had more antenatal visits are more likely to deliver at a health facility).

Main reasons cited by women in the survey (KDHS 2008-2009) for not delivering in a health facility include: Distance being too far or lack of transport or both (42 percent) and that it was not necessary (21 percent). Cited frequently also was labor occurring too quickly (18 percent) and high cost (17 percent). Few women quoted: lack of female providers, it not being customary to delivery in a health facility, family prohibition, poor service quality or health facility not being open as factors contributing to them not delivering in a health facility.¹

Women in urban centers for example Nairobi (Capital city of Kenya) are more likely to cite cost as a factor to not delivering in a health facility than women in a rural area for example North Eastern region (pastoral area in Kenya). Women in North Eastern region are less likely to cite cost as a factor, but more likely to cite distance and poor service quality as their reasons for not delivering in a health facility.⁵ Abrupt deliveries is more of a factor in more educated and wealthier women than they are for those with less education and wealth¹

Regional differences exist in level of skilled birth attendance in the various regions in Kenya (Table 1.1). The main reasons contributing to this being: the urban/rural status of the town, wealth quantile of the people in the region and level of education. The unique feature of the North Eastern region is that: although 32% of the deliveries are attended by a skilled provider, only 17% occur in a health facility. A sizeable number of deliveries are attended by skilled providers at home.

Table 1.1: Proportion of births assisted my medically trained personnel¹

Province	Doctor	Nurse/Midwife	Other Health Worker	Total (%)
Nairobi	33.7	55.2	0.1	89
Central	45.0	28.8	0.1	73.9
Coast	21.3	24.3	0.2	45.8
Eastern	16.9	26.2	0.0	43.1
Nyanza	13.5	32.0	1.5	47
Rift Valley	10.0	23.7	0.4	34.1
Western	5.5	20.3	0.1	25.9
North Eastern	1.0	30.6	0.7	32.3

1.2 Introduction of free maternal health care in Kenya

Reduction of child mortality and improving of maternal health (MDG 4 and 5), remain primary global health challenges.² Ensuring skilled delivery care is a crucial intervention for achieving these goals.^{3,4}

Before the introduction of free delivery care, a point of note had been made that, despite Kenya having a high antenatal attendance rate (92%), most of these mothers end up not delivering under a skilled health attendant. Not delivering under a skilled attendant contributes to the high maternal deaths, since most of these deaths occur due to treatable and preventable causes including: obstructed labour, hypertension in pregnancy and its complications, infection, haemorrhage and unsafe abortion.

Government of Kenya, on 1st June 2013, and with immediate effect, initiated a policy of free delivery services in all public health facilities. This was done in order to circumvent one of the barriers to skilled delivery care. Effects of the implementation of this policy were felt almost immediately with the Director of Public Health and Sanitation reporting increases in facility deliveries ranging between 10% to 50%.⁵ Some facilities, for example Kenyatta National Hospital (KNH; Kenya's national referral hospital), reported even higher numbers. KNH reported increases of almost 100% in the clients seeking maternal care⁵

1.3 The partograph as a quality assessment and assurance tool

Kenya's MMR is still high-448/100,000 live births as per the KDHS 2008-09. A significant cause of maternal mortality in the Kenyan population is: prolonged labor. Others include: hemorrhage, infection and pre-eclampsia/eclampsia.^{6,7}

Prolonged labor can lead to the following complications: ruptured uterus, exhaustion, dehydration, maternal infection and obstructed labor. It can also lead to neonatal infection.⁸ Obstructed labor results from a disproportion between the presenting part and the encountered pelvic diameter. World Health Organization recent data approximate 8% of maternal deaths as being attributable to obstructed labor.⁹

Management of labor using a partograph, a chart for recording information about the maternal status, fetal status and progress of labor, is a key instrument in prevention and management of prolonged labor and its complications (post-partum haemorrhage, sepsis, obstructed labor, uterine rupture).¹ Prompt detection of abnormal progress of labor will prevent prolonged labor and its sequelae: all of which are major causes of maternal mortality and morbidity.^{8,9,10}

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This section discusses the various pertinent literatures to the study. It starts by discussing the various experiences of the different countries (low and middle income) that have implemented free maternal health care. It then discusses various literatures as pertains the assessment of quality of care in health. It then concludes by discussing various literature on the significance, use and levels of utilization of the partograph as an intra-partum monitoring tool.

2.1 Effect of Free Maternal Health Care

Due to its unpredictable, yet essential nature, the cost of delivery can represent a significant challenge to especially the low and middle income household.

User fees for health services were introduced or substantially increased in many low-income countries in the 1980s and early 1990s as part of structural adjustment policies promoted by the World Bank¹¹ and in African countries in particular following the 1987 joint World Health Organization/United Nations Children's Fund Bamako Initiative.¹² The Bamako Initiative aimed to address severe problems in the financing of primary health care including maternity care. User charges for essential drugs were introduced to generate funds to improve the quality of health services and equity in access to these services. Recently, however, numerous countries in sub-Saharan Africa have officially abolished or reduced user fees for childbirth services with the aim of increasing skilled birth attendance and reducing the catastrophic costs of emergency delivery care.

Dzakpasu (2013) et al.¹³ did a systematic review of 20 studies dealing with the “impact of user fees on maternal health service utilization and related outcomes in low and middle income countries.” The study reported the following outcomes in these key areas of maternal health:

Impact on antenatal care

Generally, ANC visits tended to increase with fee abolition and decrease on fee introduction. Exceptions to the above trend were: an increase in ANC attendance at a Cambodian hospital following fee introduction (postulated to be due to improved quality and substitution of formal fees with informal fees)¹⁴, and after abolition of fees, “no effect on the use of a mobile clinics serving 14 rural communities in South Africa”(fees were initially low, so abolition of fees did not represent a significant enough cost saving to counteract and ongoing trend of decreased ANC use)¹⁵ and following fee abolition, an un-sustained increase in visits in Afghanistan (attributable to the fact that ANC services had largely been free even before the fee abolition).¹⁶

Impact on facility deliveries

The general trend noted was that there was a decrease in facility deliveries with introduction of fees and an increase with abolition of fees. Exceptions were the study in a Cambodian Hospital hospital where the reverse was noted: an increase in facility deliveries following fee introduction and quality care improvements¹⁴, and three other studies in Cambodia¹⁷, South Africa¹⁸ and BurkinaFaso¹⁹ which showed temporal and geographic fluctuations in facility delivery but no overall impact following fee changes.

After institution of fees, two hospital studies in urban Nigeria noted an increase in the number of delivery admissions with complications^{20,21}. Ekwempu et al. (1990)²⁰ noted this pattern despite an increase in the number of midwives and the number of obstetricians remaining constant. Both studies suggested that this trend was due to reduced and delayed health-seeking behavior due to the financial burden imposed by fee introduction. In Ghana^{22, 23, 24}, Senegal²⁵ and Nepal²⁶, following removal or reduction in fees, a rising number of pregnant patients with complications (haemorrhage, hypertensive disease in pregnancy, caeserian section rate) was noted. In these studies, the percentage increase in attended deliveries with complications was always higher than the percentage increase in facility deliveries overall^{22,23,24}.

Effects on maternal and perinatal mortality

An increase in the maternal and perinatal deaths following fee introduction was noted in the two Nigerian Hospital studies.^{20,21} On the other hand, Bosu et al. (2007)²³, following fee exemption, reported reductions in delivery-related mortality ratios and institutional MMR in Ghana's Central and Volta regions. Acknowledgement however was made that there had been already a downward trend in MMR even before fee abolition. Daponte et al. (2000)²⁷, however, found that the institutional MMR at a South African tertiary hospital increased following fee removal. It was postulated that: an increase in patient load was not backed up by a corresponding increase in staff and other facility resources, and thus quality of care deteriorated.

Effects on inequality

One study in Ghana showed that facility deliveries increased in all wealth quantiles following fee abolition; however, this did not consistently result in reduction in inequality.²⁸

Dzakapsu et al. (2013)¹³ systematic review had the following conclusions: “Most studies to evaluate the impact of user fees on utilization of maternal health services employ poor methods and therefore cannot produce reliable estimates of effect. Nevertheless, consistency in the direction of effects provided some evidence that removal of fees increases facility delivery in particular, and may also increase the number of managed delivery complications. Few studies look at impact of user-fees on related health outcomes or on equity in access to care. User fee changes are often large-scale programs which are best evaluated using interrupted time series or controlled before-and-after study designs both of which facilitate estimating effect sizes net of temporal trends. Impacts on facility delivery must be evaluated jointly with indicators of quality of care, access to emergency obstetric care and equity for a comprehensive understanding of user fee effects.”

2.2 Measuring the quality of maternal health care

Donabedian model (1988)²⁹ measured quality of care in terms of: (i) Structure or inputs- the organizational, material, human and intellectual resources needed to provide care (ii) processes, the activities in which these resources are used to provide care and (iii) outcomes, the results of the activities. Health care processes eventually result in health impacts.

The structure components input into the processes; and the processes influence the outcomes.

The goal of quality improvement is to produce better outcome; better outcomes are achieved by improving the processes that lead to the outcome of interest.

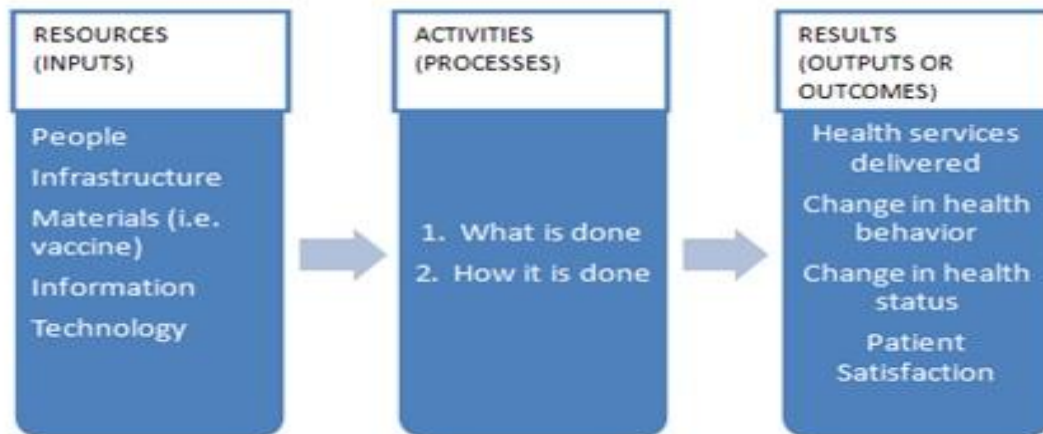


Figure 1.1: Donabedian framework for assessing quality in healthcare²⁹

In 2011, The Ministry of Medical services partnered with SIRCLE (Health Services Implementation Research and Clinical Excellence) to further develop and undertake a survey exercise in which they developed appropriate indicators for assessing quality of care in the major inpatient departments spanning: maternity care, newborn care, paediatric care and adult medical and surgical care in 22 internship training hospitals surveyed. As regards maternal health, they focused on measuring the institution's capacity to avail comprehensive emergency obstetric care. They assessed this under 3 broad outlines: structure indicators, process indicators and outcomes by diagnosis. Availability of signal functions (labour ward supplies, pharmacy supplies and safe blood), operating equipment and anesthetic drugs were used to assess structure indicators of providing quality comprehensive EmOC. The following aspects were evaluated under process indicators of quality of emergency EmOC:

- i. Completion of admission notes to labour ward
- ii. Adequacy of partograph completion in monitoring of labour
- iii. Level of care in patients with obstetric haemorrhage
- iv. Level of care in patients with severe pre-eclampsia and eclampsia
- v. Emergency response for emergency caesarean section

Under partograph completion in monitoring of labor, of the abstracted case files, 364 patients were required to use a partograph, out of these 333 (96%) used the partograph. Table 2 shows the results of adequacy of partograph completion with a median (IQR) score of 7 out of 10 (2-9). Cervical dilatation, contraction and foetal heart rate were recorded in more than 70% of cases. Liquor, degree of moulding, maternal temperature and respiratory rate were inadequately documented.

Table 1.2: Adequacy of completion of partograph as per results of the SIRCLE survey³⁰

Variable scored atleast one observation recorded (N=333)	% of time documented
i. Cervical Dilatation	73
ii. Contractions	72
iii. Fetal Heart Rate	71
iv. Maternal Blood Pressure	67
v. Fetal Head Descent	65
vi. Maternal Pulse Rate	59
vii. * Liquor	48
viii. * Degree of moulding	36
ix. * Maternal Temperature	42
x. * Maternal Respiratory Rate	31
*Done in \leq 50% of cases	

2.3 Partograph for intrapartum labour monitoring

The partograph is a graphical tool for monitoring progress of labor, maternal and fetal well being during labor. It serves as an “early warning system” and assists in early decision making for transfer or intervention.³¹ Ministry of Health-Kenya, in 1995, introduced as a policy a modified partograph for labour management and monitoring.

A multi-centre WHO study involving over 35,000 study participants had findings that suggested that the partograph is beneficial in reducing: intra-partum still births, reducing augmented labor, prolonged labor and emergency caesarian sections (EMCS)^{32,33}. Wasike(1991)³⁴ study locally collaborated the above findings .

Safe motherhood Demonstration Project (SMDP) in Western Kenya 2000-01 showed that training improves partograph utility (11% utilization before SMDP; 85% utilization during SMDP)³⁵.

A cross-sectional study by Qureshi et al. (2012)³⁶ on partograph knowledge and utilization came up with the following results: The correct use was low, the knowledge on the use of the tool was average and there was minimal formal training being provided. Staff shortage was listed as the most common cause of not using the tool. Other reasons for poor partograph utility included: lack/shortage/dysfunctional supplies for monitoring labour (fetoscopes, blood pressure machines), negative attitudes, lack of knowledge especially on interpretation of findings, conflict between providers as to their roles in filling the partograph, and senior staff themselves not acting as role models with regards to the use, advocacy and implementation of the partograph.

The study concluded that: “The partograph was available in most units. However, accurate recording of parameters to monitor the foetus, the mother and progress of labour as recommended was mostly not done. Shortage of staff, lack of knowledge, lack of team work, lack of supplies and negative attitude among healthcare providers were some of the obstacles noted to hamper partograph use.”

A cross-sectional study by Fawole et al. (2008)³⁷ assessed knowledge and utilization of the partograph among health care workers in southwestern Nigeria. Respondents were selected by multi-stage sampling method from primary, secondary and tertiary levels of care. Findings were: Only 32.3% used the partograph to monitor women in labour. Partograph use was reported significantly more frequently by respondents in tertiary level compared with respondents from primary/secondary levels of care. Only 37.3% of respondents who were predominantly from the tertiary level of care could correctly mention at least one component of the partograph. The study concluded that: “The partograph is utilized mainly in tertiary health facilities; knowledge about the partograph is poor. Though affordable, the partograph is commonly not used to monitor the Nigerian woman in labor.”

The WHO partograph was modified to make it simpler and easier to use. The latent phase of labor was removed and plotting the partograph now begins in the active phase, when the cervix is dilated to 4 cm.³⁸ In the active phase of labor, the graph plotting cervical dilatation in relation to time will normally remain on or to the left of the alert line, and its crossing this line is a “warning sign” that labor may be prolonged. The action line is 4 hours to the right of the alert line; therefore, if a plot reaches the action line, a decision must be made about the cause of the slow progress and appropriate action taken as per intervention or referral.³⁸

2.4 Conceptual Framework

Various researchers in the healthcare industry have used the Donabedian framework to assess quality of healthcare service. This study utilized this framework (assessing structure indicators, process indicators and outcome indicators) to assess the quality of intra-partum monitoring (specifically using the partograph) before and after the initiation of free delivery services in Kenya.

The structure framework (in terms of number of workers, physical inputs for partograph utilization) of the healthcare institution (Naivasha District Hospital) more or less remained the same during the periods of this study hence much emphasis was not placed on the structure indicators.

The process indicator that was narrowed down on to assess delivery services was partograph utilization. Partograph utilization was assessed in terms of: (i) Completeness: that is if the five major parts of the partograph i.e. patient bio-data, maternal condition, fetal condition, labour progress and summary of labour were filled. (ii) Adequacy of filling of the partograph: that is if the parameters e.g. maternal blood pressure (BP) have been filled in as per the partograph guidelines. For example, in the case of BP, it's supposed to be filled four hourly. (iii) Intervention characteristics: If intervention was needed, an assessment was done of whether it was done or not. And if it was done, an assessment was done of its appropriateness and timeliness.

The outcome indicators that were assessed since they are directly influenced by the process indicator (partograph utilization), i.e. whose outcome could be more directly attributed to the quality of the process were: Fetal Outcome (specifically APGAR score at 5 mins) and Delivery outcome (Spontaneous Vaginal Delivery or Emergency Caesarian Section or Assisted Vaginal Delivery)

This relationship between the variables was summarized as below:

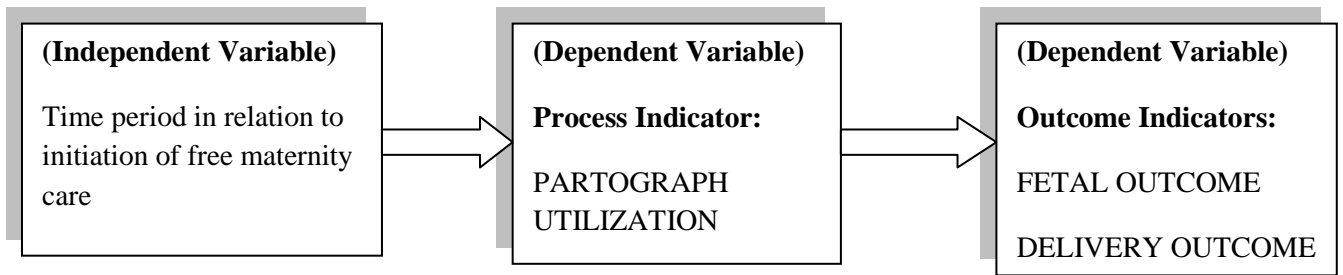


Figure 1.2: Conceptual Framework for the impact of free delivery services on partograph utilization (Source: Author (2015))

2.5 Operational Framework

The operational framework shows the measurable indicators derived from the dependent variables. The measurable indicators are the actual parameters that were measured in the field.

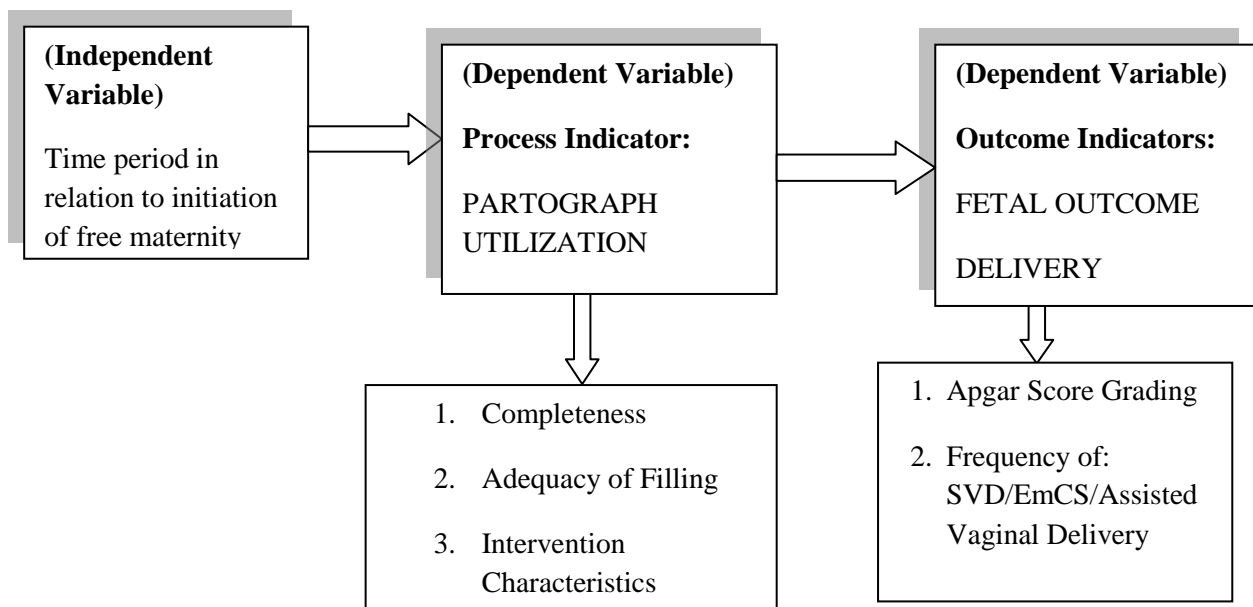


Figure 1.3: Operational framework for the impact of free delivery services on intrapartum monitoring using the partograph (Source: Author, 2015)

2.6 Research Justification

The Kenyan government in June 1, 2013 set up an initiative of free delivery services in order to increase access to skilled attendance and consequently achieve its MDG target of reducing its MMR.

In an ideal setting, increased attendance by skilled healthcare-workers would mean better care and thus an increase in quality obstetric care and thus better outcomes for both the mother and the baby. But the converse can also be true, such that with increased number of patients to handle, the quality of obstetric care might actually decline thereby negating the whole point of getting mothers to be attended by a skilled health practitioner.

Despite the current momentum globally to abolish maternal and child health user fees, adequate evidence quantifying impact remains scant. The study aimed at assessing if the quality of care, specifically in terms of intra-partum monitoring using the partograph tool, has improved or declined after the introduction of free delivery services.

The assessment of whether the quality of obstetric care has either improved or declined after the introduction of free delivery care can help in the formulation of policy in terms of:

(i) Providing a snapshot view of the current state of health affairs after the introduction of a key policy of free delivery services (ii) Identifying and assessment of the key areas of challenge in terms of effective implementation of free delivery care, specifically in ensuring that it is successful and it does not compromise other areas of quality of healthcare (iii) Identifying areas of improvement and recommendations henceforth.

2.7 Research Question

Was there any difference in partograph utilization, in the immediate and short-term period, after introduction of free delivery services at Naivasha District Hospital?

2.8 Null Hypothesis

There is no difference in partograph utilization, in the immediate and short term period, after introduction of free delivery services at Naivasha District Hospital.

2.9 General objective

The general objective of this study was to assess the effect of free delivery services on partograph utilization, in the immediate and short term period, at Naivasha District Hospital

2.9.1 Specific objectives.

Among women who delivered in the defined study periods “before” and “after” introduction of free delivery services at Naivasha District Hospital:

- i. To determine the difference in completion of the partographs
- ii. To assess the difference in the adequacy of filling of partographs
- iii. To assess the difference in the appropriateness and timeliness of interventions based on partograph findings
- iv. To determine the differences in early perinatal and maternal delivery outcomes

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Research design

A before and after study design (quasi-experimental) was used for this study. Comparison in partograph utility between two groups was done. 176 partographs were retrieved and data obtained for the period “before” and an equal number (176) of partographs were used for the period “after” the introduction of free delivery services. Measurement of the process (partograph utility) was conducted at two periods before (July to September 2012; October to December 2012) and at two periods after (July to September 2013; October to December 2013) the introduction of free maternity services. Similar points were picked for the before and after periods to try and reduce the effect of temporal trends in facility deliveries. The quality intervention policy (initiation of free delivery services) was commenced on 1st June 2013, hence evaluation of the ‘after’ period was done in the period 3 months after initiation: July-September 2013 (measured the immediate effect of initiation of free delivery services), and 6 months after the initiation: October- December 2013 (measured the short term effect).

3.2 Study Population

This was a retrospective review of all the partographs of deliveries fulfilling the inclusion criteria before and after the initiation of free delivery services at Naivasha District Hospital in the stipulated periods (Before period: July-September 2012; October-December 2012; After period: July-September 2013; October-December 2013).

Inclusion criteria

Partographs for all women reporting in labour at term (≥ 37 weeks) with no antecedent conditions

Pregnancy at term gestation which was monitored with a partograph (patients who labored, and partograph was blank, also included)

Partographs for all deliveries in the stipulated periods of the study

Partographs for all methods of delivery that qualify for partograph monitoring (Emergency Caesarian Section/Spontaneous Vaginal Delivery/Assisted Vaginal Delivery)

Exclusion criteria

Partographs of mothers who had antecedent conditions prior or during admission e.g. Pre-eclampsia, Obstetric Haemorrhage etc.

Partographs of women who were previously planned for an elective caesarian, then they went into labour and consequently were scheduled for an emergency caesarian section.

3.3 Study Site and Setting

Naivasha District Hospital: which is a model level IV county hospital. It was also selected due to its sound record keeping practices.

3.4 Sample size and Sampling procedure

The sample size was calculated using the formula³⁹:

$$N = K \times \frac{P_1 (1 - P_1) + P_2 (1 - P_2)}{(P_1 - P_2)^2}$$

Description:

- K- constant which depends on α and β (15.68)
- P_1 - estimated proportion of partograph utilization prior to initiation of free delivery services
- P_2 - estimated proportion of partograph utilization after initiation of free delivery services
- Statistical significance= 5% ($\alpha= 0.05$)
- Statistical power= 80% ($\beta= 20\%$)
- P_1 - SIRCLE survey median= 62% (0.62)
- Effect size (smallest detectable change)= 20%
- $P_2= P_1 \pm$ Effect size
- N comes to 88 for each period of evaluation i.e. for the period July to September 2013, N=88; for the period October to December 2013, N=88; for the period July to September 2012, N=88; for the period October to December 2012, N=88.

Obtaining the specific partograph review samples for each of the stipulated periods was done as follows: The average number of deliveries for each of the stipulated time periods was calculated for example if the number of deliveries between the period July to September 2013 was 1500. The average number of deliveries per day becomes: 16 (1500/total number of days=1500/92). Thus, in-order to meet the specified sample size for the specified time period (in this case July to September 2013), data from 6 days would need to be collected (Needed sample size/Average number of deliveries per day=88/16). The specific 6 days were picked by random sampling of papers indicating the various days over the stipulated time period (In this case, all the dates over the period of July to September 2013 were written down on small pieces of paper and folded, random sampling of 6 of those papers was done to identify the 6 days which partograph data was

to be abstracted). Once the days were identified, 16 (for this example) of the files containing partographs fulfilling the inclusion criteria were abstracted for data collection.

3.5 Data collection procedures and instruments

A retrospective review of partographs fulfilling the inclusion criteria in the stipulated time periods was done. The researcher worked with record clerks to retrieve files of patients. The researcher reviewed the files and collected data from 88 partographs in each of the stipulated time periods. Data from the partographs was extracted and filled in a structured questionnaire to evaluate and grade the variables of the study as described below:

Completeness: Completeness of the partograph was measured depending on the five main sections: Patient Biodata(Name, Age, Gravida status, Parity, Patient Record Identifier, Date of Admission, Time of Admission, Rupture of Membranes), Fetal monitoring(FHR, status of membranes, liquor, and moulding), Maternal monitoring (temperature, blood pressure, and pulse rate), Progress of Labour(cervical dilatation, uterine contractions, and descent of foetal head), Summary of Labour(Apgar Score, Delivery Outcome)

Key to grading:

Complete: if there was some information on all five sections

Incomplete: If information was there on some sections, but not all

Blank: If there was no information on all sections

Adequacy of filling: Adequacy of filling was measured depending on the specified partograph guidelines for the specified parameter e.g. blood pressure should be recorded four hourly, cervical dilatations should be recorded four hourly etc.

Key to grading:

Adequate: If specified guidelines concerning recording of the parameter were met

Inadequate: If some readings were available but not according to the specified guidelines

Grossly inadequate: If no reading was available

Intervention Characteristics: As per the partograph data, and as per the partograph guidelines, determination was made whether intervention was needed (Intervention needed: Yes/No). If intervention was needed, assessment was done as per its: timeliness (Timely/Not timely) and appropriateness (Appropriate/Inappropriate).

Fetal Outcome: Fetal outcome was assessed depending on the “APGAR” scoring system at 5 minutes.

Key to grading:

Good: if it was greater or equal to 9 at five minutes

Borderline: If it was between 7 and 8 inclusive

Bad: If it was less than seven

Delivery Outcome: Assessed delivery outcome as per whether it was: spontaneous vaginal delivery, emergency caeserian section, assisted vaginal delivery

3.6 Data analysis and Reporting

Descriptive analysis tools e.g. percentages were used to present the number and percentages of the independent variables for example number and percentage of partographs that are complete. Presentation and reporting was made in tables.

The variables were coded, entered and analysed using SPSS version 18.0. The researcher and the statistician did the data cleaning, clarification and quality control. Descriptive statistics were run and frequency tables were produced to describe partograph utilization. Where the test was applied for statistical significance, the cut off point for the level of significance was 0.05.

3.5.1 Reliability and Validity

Reliability in a quantitative study is the extent to which results are consistent over time, accurately represent the total population and the degree to which the results can be reproduced under similar methodology.

Validity in quantitative research determines objectivity of the results thus whether the research truly measured what it was intended to measure. Credibility of the results depends on instrument construction.^{40, 41}

In this study, reliability and validity were achieved in a number of ways as follows:

- (i) Team approach where researcher and assistant regularly met and discussed the data collected from partographs. The in-charges were also contacted to verify some issues if not clear
- (ii) Same data collection tool was used consistently and the researcher and assistant were in constant communication especially where there arose any issues as per the grading of the independent variables.
- (iii) Feedback workshop: The information obtained from partograph reviews was complemented with health workers' responses. Preliminary findings were presented in a staff meeting to validate the findings and to reduce subjective views which might have lead to unwarranted emphasis or invalid conclusions. The researcher took advantage of the routine morning meetings for nurses and clinicians at Naivasha District Hospital to clarify any issues and to give feedback.

3.6 Ethical issues

Precautions were taken to ensure confidentiality of the patient's information obtained from the files.

Approval was sort from both: Naivasha District Hospital and KNH/University of Nairobi Ethical Review Committee

3.7 Study Limitation

The study though having tried to suitably select an appropriate study site for the study (Naivasha District Hospital), it is of importance to mention that the study site and its findings' may not in all dimensions represent the picture that is happening in all other public hospitals in Kenya.

It is important to note that the dimensions that were measured in terms of indicators of quality of care may not encompass all dimensions of quality of maternal healthcare as regards the partograph. This is so, especially as regards the structure indicators. However, other dimensions may be added and adopted, if required, in future studies.

Also of note, is that the study did not cover the long term effect of free delivery services at Naivasha District Hospital.

Despite some of these limitations, the study had some strengths in that: (i) Unlike previous studies, it measured partograph utility of almost all partograph parameters (ii) It also measured the immediate and short term effect of partograph utility after initiation of free delivery services policy and also took into consideration the temporal trends when it came to comparing partograph utility between the time periods

CHAPTER FOUR

RESULTS

In the period under consideration a total of 88 partographs were retrieved for each of the four periods: July-September 2012, October-December 2012 (the pre-intervention group) and July-September 2013 and October-December 2013 (the post-intervention group). July-September 2013 constituted the immediate post-intervention period and October-December 2013 constituted the short term post-intervention period. The following were the results that were obtained:

4.0 FACILITY DELIVERIES

Table 4.1: Facility deliveries at Naivasha District Hospital as per the specified period

	Pre-intervention	Post-intervention	% increase	Pre-intervention	Post-intervention	% increase
	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct-Dec 2013	
Facility Deliveries	911	1064	16.8%	894	1119	25.2%

Table 4.1 shows the Naivasha District Hospital (NDH) facility deliveries as per the specified periods. There was approximately a 16.8% increase in facility deliveries in the immediate term (July-September 2013) after introduction of free delivery services and an even higher increase of approximately 25% in the short term (October-December 2013).

4.1 BIODATA

Age distribution

The age distribution of the mothers whose records were retrieved for the study are summarized in Table 4.2 according to the period of study. The mean age of the mothers who delivered at Naivasha District Hospital was 24.8 and 24.9 years in July-September 2012 and 2013,

respectively and the mean age of mothers who delivered in October-December was 25.5 year in 2012 and 25.2 years in 2013 (Table 4.2). Between 46.6% and 59.1% of mothers delivering at the hospital during the four time periods were aged 19-24 years (Table 4.2).

Table 4.2: Age distribution of mothers delivering in Naivasha District Hospital according to delivery period

	Pre-intervention Jul-Sep 2012	Post-intervention Jul-Sep 2013	Pre-intervention Oct-Dec 2012	Post-intervention Oct-Dec 2013
Mean age \pm SD	24.8 \pm 4.7	24.9 \pm 5.3	25.5 \pm 6.4	25.2 \pm 5.2
19-24 years	41(46.6)	52(59.1)	45(51.1)	49(55.7)
25-29 years	30(34.1)	18(20.5)	17(19.3)	19(21.6)
30-34 years	15(17.0)	10(11.4)	13(14.8)	15(17.0)
35 + years	2(2.3)	8(9.1)	13(14.8)	5(5.7)

Parity

Table 4.3 shows the distribution of mothers whose partographs were used for the study at Naivasha District Hospital between July 2012 and December 2013 according to gravidity. Most mothers during each of the four periods were first time mothers with between 39.8% and 43.2% of mothers reporting that they were primigravidae. At least 10% (range 12.5% to 22.7%) of the mothers reported that the order of the index pregnancy was four or greater.

Table 4.3: Distribution of mothers delivering at Naivasha District Hospital according to gravidity and delivery period

	Pre-intervention Jul-Sep 2012	Post-intervention Jul-Sep 2013	Pre-intervention Oct-Dec 2012	Post-intervention Oct-Dec 2012
Gravidity				
1	35(39.8)	36(40.9)	36(40.9)	38(43.2)
2	27(30.7)	29(33.0)	17(19.3)	20(22.7)
3	12(13.6)	7(8.0)	15(17.0)	19(21.6)
4+	14(15.9)	16(18.2)	20(22.7)	11(12.5)

4.2 COMPLETENESS OF PARTOGRAPHS

Overall, most partographs were incomplete during both time periods before and after introduction of free delivery services (Table 4.4). In the pre-intervention period between 28.4% and 36.4% of partographs were considered to have been filled in completely compared to between 10.2 and 20.5% of partographs retrieved during the period after introduction of free delivery services. Only a single partograph retrieved during the period of the study was completely blank.

Table 4.4: Overall completeness of partographs before and after introduction of free delivery services in Naivasha District Hospital

	Pre-intervention	Post-intervention	P	Pre-intervention	Post-intervention	P
	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct-Dec 2013	
Completeness of partograph						
Complete	25(28.4)	9(10.2)	0.002	32(36.4)	18(20.5)	0.019
Incomplete	62(70.5)	79(89.8)		56(63.6)	70(79.5)	
Blank	1(1.1)	0(0.0)		0(0.0)	0(0.0)	

4.3 ADEQUACY OF FILLING IN PARTOGRAPHS

The adequacy of filling partographs was determined through assessing the level of documentation of monitoring for fetal heart rate, progress of labour, maternal and neonatal parameters.

4.3.1 Fetal heart rate

Table 4.5 shows that the between 72.7% and 83% of the partographs in the period before the introduction of free maternal services were filled in adequately. In the post intervention period the proportion of partographs with adequately documented fetal heart rate was between 77.3% and 80.7%. The proportion of grossly inadequate fetal heart rate monitoring

on partographs ranged from 8% to 12% before free delivery services and 14.8% to 18.2% in the post intervention period.

Table 4.5: Adequacy of documentation of fetal heart rate in the periods before and after introduction of free delivery services

	Pre-intervention	Post-intervention	P	Pre-intervention	Post-intervention	P
	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct-Dec 2013	
Fetal heart rate						
Adequate	73(83.0)	68(77.3)	0.373	64(72.7)	71(80.7)	0.003
Inadequate	7(8.0)	7(8.0)		13(14.8)	1(1.1)	
Grossly inadequate	7(8.0)	13(14.8)		11(12.5)	16(18.2)	

4.3.2 Progress of labour

The progress of labour was monitored and recorded on most partographs as shown in Table 4.6. The highest levels of documentation of progress of labour throughout all the four time periods, before and after introduction of free delivery services, was in monitoring cervical dilatation (range 84.1% to 94.3%). Between 70% and 85% of all partographs during the study periods had adequate information on monitoring of cervical dilatation, descent and uterine contractions.

Table 4.6: Adequacy of documentation of progress of labour using partographs in Naivasha District Hospital before and after introduction of free delivery services

	Pre-intervention	Post-intervention	P	Pre-intervention	Post-intervention	P
	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct-Dec 2013	
Cervical dilatation at admission						
Yes	83(94.3)	79(89.8)	0.265	77(87.5)	74(84.1)	0.517
No	5(5.7)	9(10.2)		11(12.5)	14(15.9)	
Monitoring of cervical dilatation						
Adequate	75(85.2)	71(80.7)	0.351	65(73.9)	72(81.8)	0.001
Inadequate	9(10.2)	8(9.1)		14(15.9)	1(1.1)	
Grossly inadequate	4(4.5)	9(10.2)		9(10.2)	15(17.0)	
Monitoring of descent						
Adequate	73(83.0)	71(80.7)	0.298	62(70.5)	72(81.8)	0.001
Inadequate	11(12.5)	8(9.1)		15(17.0)	1(1.1)	
Grossly inadequate	4(4.5)	9(10.2)		11(12.5)	15(17.0)	
Monitoring of uterine contractions						
Adequate	73(83.0)	72(81.8)	0.652	64(72.7)	71(80.7)	0.001
Inadequate	9(10.2)	7(8.0)		14(15.9)	1(1.1)	
Grossly inadequate	6(6.8)	9(10.2)		10(11.4)	16(18.2)	

4.3.3 Maternal parameters

The documentation of maternal vital signs showed wide variation with adequate BP and pulse rate monitoring improving significantly in the post intervention period. The partographs with adequately documented BP increased from between 40.9% and 50% before introduction of free delivery services to between 64.8% and 71.6% in the period after free delivery services. Similarly, adequate documentation of maternal pulse increased from between 38.6% and 43.2% to between 62.5% and 63.6%. There was no marked change in the adequate documentation of maternal temperature as shown in Table 4.7.

Table 4.7: Adequacy of documentation of maternal vital signs in the periods before and after introduction of free maternal services

	Pre-intervention	Post-intervention	P	Pre-intervention	Post-intervention	P
	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct-Dec 2013	
Maternal BP monitoring						
Adequate	44(50.0)	63(71.6)	0.012	36(40.9)	57(64.8)	<0.001
Inadequate	22(25.0)	14(15.9)		26(29.5)	5(5.7)	
Grossly inadequate	22(25.0)	11(12.5)		26(29.5)	26(29.5)	
Maternal pulse monitoring						
Adequate	38(43.2)	56(63.6)	0.017	34(38.6)	55(62.5)	0.003
Inadequate	23(26.1)	18(20.5)		22(25.0)	7(8.0)	
Grossly inadequate	27(30.7)	14(15.9)		32(36.4)	26(29.5)	
Maternal temperature monitoring						
Adequate	32(36.4)	27(30.7)	0.097	25(28.4)	27(30.7)	0.943
Inadequate	14(15.9)	26(29.5)		18(20.5)	17(19.3)	
Grossly inadequate	42(47.7)	35(39.8)		45(51.1)	44(50.0)	

4.3.4 Neonatal parameters

For documentation of newborn data partographs were inspected to determine percentages of partographs that contained information on vital status, APGAR score, birth weight and sex of baby (Table 4.8). With the exception of vital status recording there were no significant changes in documentation of newborn data on partographs in the periods before and after introduction of free delivery services. The partographs retrieved in July to September 2013 were approximately 4 times more likely to contain vital status information at birth compared with those from the corresponding period in 2012 (OR = 3.7, 95% CI 1.3 to 11.7%; p = 0.02).

Almost all partographs retrieved before and after free delivery services had APGAR scores (range, 94.3% to 98.9%) and birth weight (range, 94.3% to 98.9%) documented (Table 4.8).

Documentation of the sex of the baby was also high before the introduction of free delivery

services (range, 92% to 96.6%) and did not change significantly after introduction of free delivery services (range, 89.8% to 95.5%).

Table 4.8: Documentation of newborn data in the periods before and after introduction of free delivery services

	Partograph		OR (95% CI)	P		Partograph		OR (95% CI)	P
	Yes	No				Yes	No		
Baby (Alive/SB) recording									
Jul-Sep 2012	72 (81.8)	16 (18.2)	1.0		Oct-Dec 2012	76 (87.4)	11 (12.6)	1.0	
Jul-Sep 2013	83 (94.3)	5 (5.7)	3.7 (1.3-10.6)	0.015	Oct-Dec 2013	81 (92.0)	7 (8.0)	1.7 (0.6-4.5)	0.311
Apgar score recorded									
Jul-Sep 2012	87 (98.9)	1 (1.1)	1.0		Oct-Dec 2012	87 (98.9)	1 (1.1)	1.0	
Jul-Sep 2013	82 (94.3)	5 (5.7)	0.2 (0.0-1.7)	0.134	Oct-Dec 2013	85 (96.6)	3 (3.4)	0.3 (0.0-3.2)	0.335
Birth weight recorded									
Jul-Sep 2012	83 (94.3)	5 (5.7)	1.0		Oct-Dec 2012	87 (98.9)	1 (1.1)	1.0	
Jul-Sep 2013	86 (97.7)	2 (2.3)	2.6 (0.5-13.7)	0.263	Oct-Dec 2013	86 (97.7)	2 (2.3)	0.5 (0.0-5.6)	0.568
Sex of the fetus recorded									
Jul-Sep 2012	85 (96.6)	3 (3.4)	1.0		Oct-Dec 2012	81 (92.0)	7 (8.0)	1.0	
Jul-Sep 2013	79 (89.8)	9 (10.2)	0.3 (0.1-1.2)	0.087	Oct-Dec 2013	84 (95.5)	4 (4.5)	1.8 (0.5-6.4)	0.356
Resuscitation done									
Jul-Sep 2012	56 (63.6)	32 (36.4)	1.0		Oct-Dec 2012	63 (71.6)	25 (28.4)	1.0	
Jul-Sep 2013	64 (72.7)	24 (27.3)	1.5 (0.8-2.9)	0.197	Oct-Dec 2013	58 (65.9)	30 (34.1)	0.8 (0.4-1.5)	0.41 7

Key:

Yes: Parameter recorded; **No:** parameter not recorded

4.3.5 Other parameters

As shown in Table 4.9 documentation of uterotonic use, placental status, and approximate blood loss was done adequately in at least 70% of the partographs that were retrieved from all four time periods, both before and after the introduction of free maternity services. However, documentation of the presence of perineal tear or episiotomy was done less frequently (range 52.2 to 72.7%) across the time periods. There was no significant change in the recording of uterotonic use after introduction of free delivery services (79.3% versus 74.7% in July-September, $p = 0.472$; and 79.5% to 72.4% in October-December, $p = 0.271$). Similarly, the recording of placental status (73.9% to 75.9% and 80.7 to 73.9% for period 1 and 2, respectively) and blood loss (90.9 to 90.8% and 87.5 to 81.8%) did not change significantly with introduction of free delivery services.

The changes in documentation of presence of perineal tears or episiotomy were not significant with proportions changing from 67% to 55.2% during the first period ($p = 0.123$) and from 67% to 72.7% for the second period ($p = 0.412$)

Table 4.9: Adequacy of filling of summary of labor parameters before and after introduction of free delivery services

	Adequate recording		OR (95% CI)	P		Adequate recording		OR (95%CI)	P
	Yes	No				Yes	No		
Uterotonic use									
Jul-Sep 2012	69 (79.3)	18 (20.7)	1.0		Oct-Dec 2012	70 (79.5)	18 (20.5)	1.0	
Jul-Sep 2013	65 (74.7)	22 (25.3)	0.8 (0.4-1.6)	0.472	Oct-Dec 2013	63 (72.4)	24 (27.6)	0.7 (0.3-1.4)	0.271
Placental Status (complete/incomplete) recording									
Jul-Sep 2012	65 (73.9)	23 (26.1)	1.0		Oct-Dec 2012	71 (80.7)	17 (19.3)	1.0	
Jul-Sep 2013	66 (75.9)	21 (24.1)	1.1 (0.6-2.2)	0.728	Oct-Dec 2013	65 (73.9)	23 (26.1)	0.7 (0.3-1.4)	0.282
Approximate blood loss recording									
Jul-Sep 2012	80 (90.9)	8 (9.1)	1.0		Oct-Dec 2012	77 (87.5)	11 (12.5)	1.0	
Jul-Sep 2013	79 (90.8)	8 (9.2)	1.0 (0.4-2.8)	1.000	Oct-Dec 2013	72 (81.8)	16 (18.2)	0.6 (0.3-1.5)	0.298
Presence of perineal tear/episiotomy recording									
Jul-Sep 2012	59 (67.0)	29 (33.0)	1.0		Oct-Dec 2012	59 (67.0)	29 (33.0)	1.0	
Jul-Sep 2013	48 (55.2)	39 (44.8)	0.6 (0.3-1.1)	0.123	Oct-Dec 2013	64 (72.7)	24 (27.3)	1.3 (0.7-2.5)	0.412

4.4 INTERVENTION CHARACTERISTICS

Based on a holistic evaluation of the partograph between 8% and 10.2% of partographs from the period before introduction of free delivery services had an indication of the need for intervention. These percentages changed to between 7.1% and 14.3% in the post free delivery services period and these changes were not statistically significant ($p = 0.964$ and 0.418 , respectively).

Interventions were appropriate (100%) both in the period before and after introduction of free delivery services. In cases where intervention was needed there was evidence of timely intervention in 75% and 100% of cases in the period before free delivery services. In the post intervention period these percentages changes to 80% and 90.9% representing non-significant changes (Table 4.10).

Table 4.10: Intervention based on partograph findings before and after introduction of free delivery services

	Intervention		OR (95%CI)	P		Intervention		OR (95%CI)	P
	Yes	No				Yes	No		
Intervention needed									
Jul-Sep 2012	7 (8.0)	81 (92.0)	1.0		Oct-Dec 2012	9 (10.2)	79 (89.8)	1.0	
Jul-Sep 2013	6 (7.1)	79 (92.9)	1.0 (0.3-3.1)	0.964	Oct-Dec 2013	12 (14.3)	72 (85.7)	1.5 (0.6-3.7)	0.418
Appropriate intervention									
Jul-Sep 2012	7(100)	0	N/A		Oct-Dec 2012	9(100)	0	N/A	
Jul-Sep 2013	6(100)	0	N/A	N/A	Oct-Dec 2013	12(100)	0	N/A	N/A
Timely intervention	Yes	No				Yes	No		
Jul-Sep 2012	6 (75.0)	2 (25.0)	1.0		Oct-Dec 2012	5 (100.0)	0 (0.0)	1.0	
Jul-Sep 2013	4 (80.0)	1 (20.0)	1.3 (0.1-20.1)	0.835	Oct-Dec 2013	10 (90.9)	1 (9.1)	N/A	N/A

4.5 OUTCOME

Out of all partographs retrieved in the period before free delivery services between 89.8% and 93.2% indicated that deliveries were conducted through SVD. In the post intervention period SVD accounted for between 78.4% and 90.9% of all deliveries (Table 4.11). The second most common type of delivery in both periods was emergency CS that accounted for 6.8% to 10.2% of deliveries before free maternity services and 5.7% to 15.9% of deliveries after free maternal services.

Table 4.11: Maternal delivery outcomes in the periods before and after introduction of free delivery services

	Jul-Sep 2012	Jul-Sep 2013		Oct-Dec 2012	Oct- Dec 2013	
Spontaneous vaginal delivery	79(89.8)	80(90.9)	0.208	82(93.2)	69(78.4)	0.063
Assisted vaginal delivery	0(0.0)	0(0.0)		0(0.0)	1(1.1)	
Emergency caesarean section	9(10.2)	5(5.7)		6(6.8)	14(15.9)	
Not indicated	0(0.0)	2(2.3)		0(0.0)	2(2.3)	

The rate of caesarean section documented in partographs before introduction of free delivery services was between 6.8% and 10.2% (Table 4.12). After the introduction of free delivery services these rates changed to 5.7% for period 1 ($p = 0.301$) and to 15.9% for period 2 ($p = 0.047$).

Table 4.12: Documented caesarean section rates before and after introduction of free delivery services

		Yes	No	OR (95%CI)	P		Yes	No	OR (95%CI)	P
Emergency CS	Jul-Sep 2012	9 (10.2)	79 (89.8)	1.0		Oct-Dec 2012	6 (6.8)	82 (93.2)	1.0	
Emergency CS	Jul-Sep 2013	5 (5.7)	83 (94.3)	0.5(0.2-0.7)	0.301	Oct-Dec 2013	14 (15.9)	74 (86.1)	2.8 (1.0-7.6)	0.047

4.5.1 APGAR score

Table 4.13 shows that there was no change in the rate of “good” apgar scores in the immediate period after initiation of free delivery services (remained at 80.7%) but there was a slight decline in the short term period (90.9% to 81.8%). The rate of “bad” apgar scores slightly rose in the immediate term (5.7% to 8.0%) and also rose slightly in the short term (3.4% to 6.8%)

Table 4.13: Newborn outcomes during the periods before and after introduction of free delivery services

	Jul-Sep 2012	Jul-Sep 2013	Oct-Dec 2012	Oct-Dec 2013	Chi	P value
APGAR score at 5 minutes						
Good	71(80.7)	71(80.7)	80(90.9)	72(81.8)	13.1	0.159
Borderline	11(12.5)	4(4.5)	4(4.5)	4(4.5)		
Bad	5(5.7)	7(8.0)	3(3.4)	6(6.8)		
APGAR score not indicated	1(1.1)	5(5.7)	1(1.1)	3(3.4)		

Table 4.14 shows a summary of the current study findings. The current study findings compare well with the previous study findings even though showing a marked improvement on recording of all partograph parameters except maternal temperature.

Table 4.14: Summary of current study findings

Region	Ethiopia- Amhara Region	Kenya	Kenya	Kenya-Naivasha District Hosp.
Study	FantuAbebe et al (2013) Cross- sectional study	Qureshi et al (2012) cross- sectional study	Sircle survey (2013)	Current Study (Oct- Dec 2013)
Findings				
Cervical Dilation monitoring	60.3%	70-97%	73%	81.8%
Contractions	60.3%	30-80%	72%	80.7%
FHR	79.3%	53-90%	71%	80.7%
Descent	41.3%	53-90%	65%	81.8%
Maternal PR	32.8%	43-77%	59%	62.5%
Liquor	51.7%	13-80%	48%	-
Moulding	-	13-43%	36%	-
Maternal Temp	-	-	42%	30.7%
Maternal Resp. Rate	-	-	31%	-

CHAPTER FIVE

DISCUSSION

5.0 Facility Deliveries

Dzakpasu (2013) et al.¹⁹ systematic review findings on the impact of user fees showed that facility deliveries tended to increase with user fee exemption. Similar findings were noted at Naivasha District Hospital, after waivering of delivery costs. There was an approximately 16.8% increase in facility deliveries in the immediate term (July-September 2013) at Naivaisha District Hospital after introduction of free delivery services and an even higher increase of approximately 25% in the short term (October-December 2013).

These findings also correlate with the KDHS 2014 findings (Figure 5.1) which show an increase in number of deliveries attended by a skilled provider (from 44% to 62%) and number of deliveries attended at a health facility (from 43% to 61%).

The increase in facility deliveries could be explained by the elimination of cost as a factor in primary delay in seeking health care.

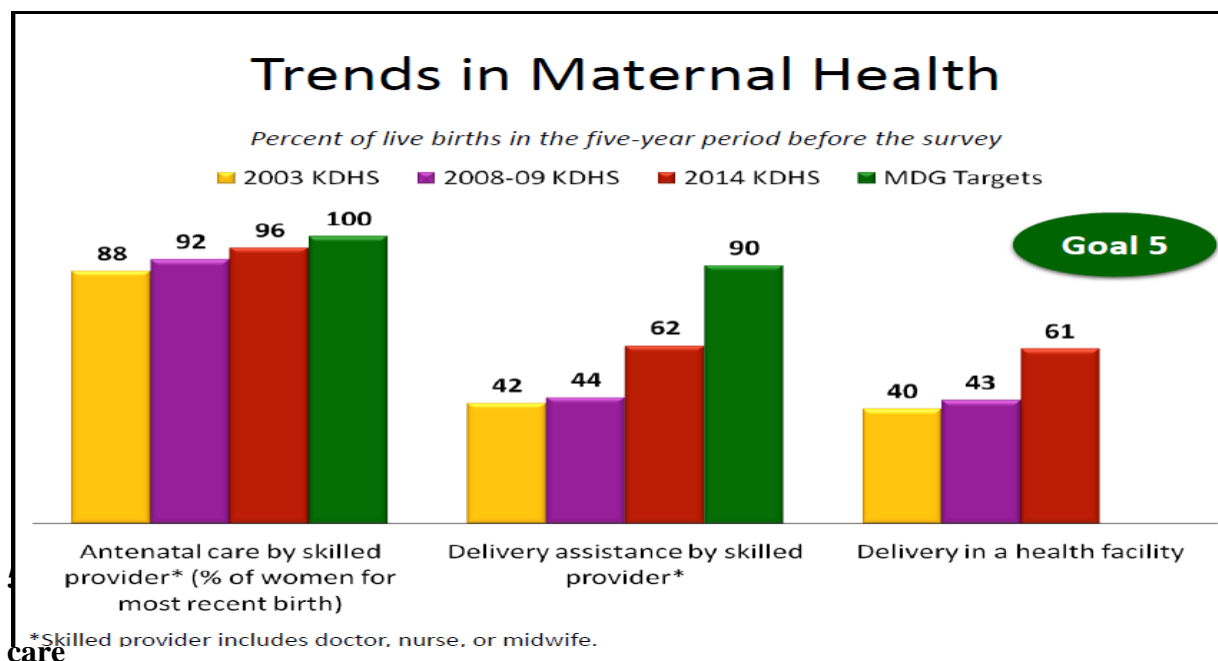


Figure 5.4: Trend in delivery by skilled provider and delivery at a health center (KDHS,

5.1 Completeness of Partographs

Overall most of the partographs were not complete. The completeness of partographs was <40% in all time intervals. There was also a decrease in partograph completeness in the immediate term after introduction of free delivery services (28.4% to 10.2%) and in the short term (36.4% to 20.5%). Various factors may have contributed to this, the most significant of which might have been increase in facility deliveries without commensurate increase in resource inputs. The free delivery services policy was implemented immediately, without prior structural out-lay of resources (both human and physical) on the ground hence most facilities may not have been able to cope with the policy needs in the immediate and the short term. Other factors that might have contributed to this include: lack of knowledge and negative attitude as per the significance of the partograph as a decision making tool; and lack of team work. Another might have been lack of quality control and feedback mechanisms as per partograph utility.

5.2 Adequacy of filling of Partograph parameters

Fetal Heart Rate (FHR): Overall adequacy of filling of this parameter was good (>70%). In most studies (Table 4.14), FHR has traditionally been filled relatively well. This might be because of its perceived importance over other parameters by health care providers. There was a slight decrease in the immediate term (maybe again due to the abruptness in which the policy was implemented and also the increase in facility deliveries without commensurate resources out-lay on the ground). There was a statistically significant increase in the short term (might have been due to adaptation/recovery of the resources to the new facility delivery levels after the initial slump).

Progress of labor parameters: These have also been generally well filled even from prior studies (Table 4.14). Key findings in the progress of labor parameters were: Overall adequacy of filling was good (>70%). Generally, there was a slight decrease in the immediate term however it was not statistically significant. There was a statistically significant average increase in the short term. These parameters like FHR have been traditionally perceived as important and thus are generally well filled.

The decrease in monitoring of these parameters in the immediate term could have been due to the initial impetus of increased facility deliveries but with stabilization of the new delivery figures, the staff might have adapted to the new levels and thus even leading to an improvement in their recordings.

Maternal parameters: Overall recording of maternal parameters was generally not good (<65%) on most parameters. Maternal BP: Improved both in the immediate and short term after free delivery services. Maternal PR: Improved both in the immediate and short term after free delivery services. Maternal Temperature: Overall recording was bad (<30%); no

major statistically significant changes in the immediate and short term in terms of maternal temperature recording.

Recording of maternal parameters has been traditionally low, even in prior studies. This is mostly due to the misconceived lack of significance to the overall outcome that these parameters usually carry.

Neonatal parameters: Overall recording of these parameters was excellent (>90%) except the parameter: “resuscitation done”. This is mostly due to the fact that the details of this section are mandatory for transfer of the patient to the next attendant and also due to the fact that these details are needed for the birth notification process to be initiated. So a good number of partographs had these parameters filled.

5.3 Intervention characteristics

Of the partographs that needed intervention, the appropriateness of the intervention was excellent (100%) in almost all the cases. The timeliness of intervention in all time periods was generally good (>75%). There were no significant variations in appropriateness and timeliness of intervention between the periods before and after free delivery services.

5.4 Outcome

Key findings were: there was a statistically significant increase in the Emergency CS rate in the short term (6.8% to 15.9%). This may have been largely contributed by the increase in facility deliveries at Naivasha District Hospital. An increase in CS rate might mean a concomitant increase in the financial burden of delivery that GoK might have to bear to sustain free delivery services policy.

There were also increases in the “Bad” Apgar scores both in the immediate and short term but these changes were not statistically significant. This is in tandem with neonatal mortality KDHS 2014 findings, which have fairly remained stable (apart from 2014 findings which reported a significant drop from 31% to 22%), despite a significant increase in facility deliveries over the years.

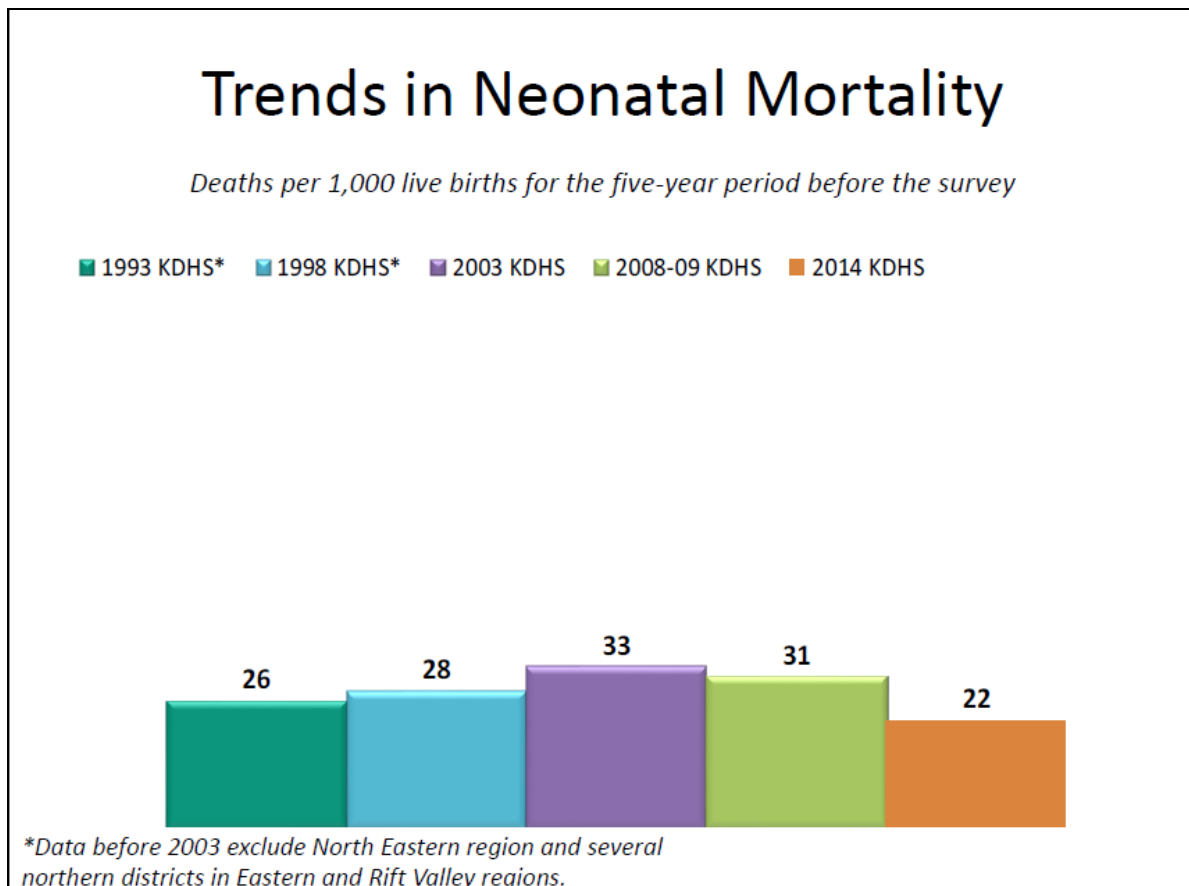


Figure 5.5: Trends in Neonatal Mortality (KDHS, 2014)

CONCLUSION

Facility Delivery at Naivasha District Hospital increased both in the immediate and short term period after introduction of the free delivery services policy on 1st June 2013. Overall completeness of the partographs decreased both in the immediate and short term after introduction of free delivery services. There was also an increase in CS rate. However, there were no significant changes in terms of adequacy of filling of most of the parameters, intervention characteristics and outcomes in terms of APGAR score at 5 minutes after initiation of the free delivery services policy.

In conclusion, initiation of free delivery services is a good initiative; it has increased access to skilled delivery care through decrease in the cost factor of primary delay; but it has also led to some compromises in quality of care (overall completeness of partographs), in this case. Despite the compromises noted, the study overall shows that there is no marked effect in the adequacy of filling of most parameters in the immediate and short term period after initiation of free delivery services policy.

RECOMMENDATIONS

1. The free delivery services policy needs to be backed up with commensurate resources to cope with the increased number of facility deliveries
2. Emphasis on training and quality control in terms of the process indicators-ensure compliance to set guidelines of partograph utilization will contribute to improved maternal and perinatal health outcomes
3. A multicenter study encompassing the long term effect of free delivery services should be considered in future to try and gain a more wholistic picture of the impact of the free delivery services policy on the quality of skilled healthcare delivered.

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APPENDIX

APPENDIX I: PARTOGRAPH TOOL

PARTOGRAPH KCN/000

Name _____ Age _____ Gravida _____ Para _____ IP No. _____
 Date of admission _____ Time of admission _____ Ruptured membranes _____ hrs on admission _____

Fetal Heart Rate	
Leopold's 4th Maneuver (Moulding)	
Gravid (Diagrams)	
Diagrams of Head (IP)	
Time	1 2 3 4 5 6 7 8 9 10 11 12
Contractions per 10 mins	
Oxytocin (Units)	
Oxytocin (drops)	
Drugs given & IV Flasks	
Pulse	
Blood Pressure	
Temperature	
Resp	
Urine	
protein	
acetone	
volume	

1st Stage	Induction labour: Yes / No	Duration: _____ Hrs	No. of VE: _____
2nd Stage	Mode of delivery: _____	Duration: _____ Mins	
3rd Stage	AMTSL: Y / N	Uterotonic: Oxytocin/Other: _____	Placenta: Complete / Incomplete
	Placental tear/Episiotomy Repair: Y / N	Maternal Obs: BP: _____ Pulse: _____ Temp: _____ RR: _____	Placenta Wt: _____ g Blood Loss: _____ ml
	Baby: Alive / SB	Apgar score: 1 min _____ 5 min _____	Birth Weight: _____ g Sex: M / F
	Resuscitation: Y / N	Vit K / other drugs: _____	Head Circumference: _____ cm Baby Length: _____ cm
	Delivered by: _____	Time and date of delivery: _____	

APPENDIX II: QUESTIONNAIRE

SECTION A

Please enter the following information about the specific partograph:

Patient Identifier (e.g. IP number):.....

Age:.....

Parity:

Gravida:.....

Date that partograph was filled (Enter the date of delivery).....

SECTION B

Instruction: Please Tick as appropriate

Variable: Completeness

1. Categorize the **completeness** of the partograph based on the four parameters (Fetal Monitoring/Progress of Labour/Maternal monitoring/Outcome)

- Complete
- Incomplete
- Blank

Variable: Adequacy of filling

1. Categorize the quality of the Fetal Heart Rate Monitoring:

- Adequate
- Inadequate
- Grossly inadequate

2. Initial cervical dilatation recorded?

Yes

No

3. Categorize the monitoring of cervical dilatation:

Adequate

Inadequate

Grossly inadequate

4. Categorize the quality of monitoring of “descent”:

Adequate

Inadequate

Grossly inadequate

5. Categorize the monitoring of “uterine contractions”:

Adequate

Inadequate

Grossly inadequate

6. Categorize the monitoring of “Maternal Blood Pressure”:

Adequate

Inadequate

Grossly inadequate

7. Categorize the monitoring of “Maternal Pulse Rate”:

Adequate

Inadequate

Grossly inadequate

8. Categorize the monitoring of “Maternal Temperature”:

Adequate

Inadequate

Grossly inadequate

9. Membrane intact/ruptured recording:

Yes

No

10. Recording of whether uterotonic (oxytocin or other) was used done:

Yes

No

11. Placenta status(complete/incomplete) recorded:

Yes

No

12. Approximate Blood loss recorded:

Yes

No

13. Presence of perineal tear/episiotomy recorded:

Yes

No

14. Baby alive/still birth recorded:

Yes

No

15. Apgar Score recorded:

Yes

No

16. Birth weight recorded:

Yes

No

17. Sex of the fetus recorded:

Yes

No

18. Whether resuscitation done recorded:

Yes

No

19. Person who delivered the patient recorded:

Yes

No

20. Time and Date of delivery recorded:

Yes

No

Variable: Intervention characteristics

1. As per the wholistic evaluation of the partograph, was intervention needed?

Yes

No

If intervention was needed, proceed to (2), if answer “No”, proceed to (IV)

2. Was intervention done?

Yes

No

If answer is “Yes”, proceed to (3)(4), if answer “No”, proceed to (IV)

3. Was intervention appropriate?

- Yes
- No

4. Was intervention timely?

- Yes
- No

Variable: Outcome

1. Categorize the fetal outcome as per the Apgar score at 5 min:

- Good
- Borderline
- Bad
- Apgar score not indicated

2. What was the delivery outcome?

- Spontaneous Vaginal Delivery
- Assisted Vaginal Delivery
- Emergency Caesarian Section
- Not indicated

APPENDIX III: DUMMY TABLE FOR RESULTS

		Period After Free Delivery Services				Period Before initiation of Free Delivery Services			
		July-Sep 2013		Oct-Dec 2013		Jul-Sep 2012		Oct-Dec 2012	
		No	%	No	%	No	%	No	%
Completeness	Complete								
	Incomplete								
	Blank								
Adequacy of Filling									
1. FHR	Adequate								
	Inadequate								
	Grossly Inadequate								
2. Initial Cervical dilatation	Yes								
	No								
3. Cervical dilatation plotting	Adequate								
	Inadequate								
	Grossly inadequate								
4. Cervical Descent plotting	Adequate								
	Inadequate								
	Grossly inadequate								

		Period After Free Delivery Services				Period Before initiation of Free Delivery Services			
		July-Sep 2013		Oct-Dec 2013		Jul-Sep 2012		Oct-Dec 2012	
		No	%	No	%	No	%	No	%
Adequacy of Filling									
5. Uterine Contractions Plotting	Adequate								
	Inadequate								
	Grossly Inadequate								
6. Maternal BP Plotting	Adequate								
	Inadequate								
	Grossly inadequate								
7. Maternal Pulse Rate Plotting	Adequate								
	Inadequate								
	Grossly inadequate								
8. Maternal Temp Plotting	Adequate								
	Inadequate								
	Grossly inadequate								
9. Membrane Status (Ruptured/Intact)	Yes								
	No								

		Period After Free Delivery Services				Period Before initiation of Free Delivery Services			
		July-Sep 2013		Oct-Dec 2013		Jul-Sep 2012		Oct-Dec 2012	
		No	%	No	%	No	%	No	%
Adequacy of Filling									
10. Uterotonic use	Yes								
	No								
11. Placental Status(complete/incomplete) recording	Yes								
	No								
12. Approximate blood loss recording	Yes								
	No								
13. Presence of perineal tear/episiotomy recording	Yes								
	No								
14. Baby (Alive/SB) recording	Yes								
	No								
15. Apgar score recorded	Yes								
	No								
16. Birth weight recorded	Yes								
	No								
17. Sex of the fetus recorded	Yes								
	No								

		Period After Free Delivery Services				Period Before initiation of Free Delivery Services			
		July-Sep 2013		Oct-Dec 2013		Jul-Sep 2012		Oct-Dec 2012	
		No	%	No	%	No	%	No	%
Intervention Characteristics									
1. Intervention needed	Yes								
	No								
2. Intervention Done where needed	Yes								
	No								
3. Intervention appropriate where was needed	Yes								
	No								
4. Intervention timely where was needed	Yes								
	No								
Outcome									
1. Apgar Score at 5 mins	Good								
	Borderline								
	Bad								
2. Delivery Outcome	SVD								
	Assisted Vaginal								
	Emergency CS								

APPENDIX III: TIMELINE

ACTIVITY	Apr-Sep 2014	Oct-Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015	May 2015	June 2015
Proposal writing and presentation								
Ethical committee approval								
Pretesting of data collecting tools								
Data collection								
Data consolidation and analysis								
Compilation of report								

APPENDIX IV: BUDGET

ITEM	QUANTITY	UNIT PRICE	TOTAL (KSH)
Biro pens	10	20	200
Pencils	6	10	60
Box files	1	150	150
Spring file	6	100	600
Sharpener	6	150	900
Erasers	6	20	120
Stapler	1	500	500
Paper punch	1	600	600
Staple remover	1	250	250
Notebook	1	100	100
Printing	10	10	100
Photocopy	110*5 pages	2	1,100
Photocopy forms	110*5 pages	2	1,100
Sensitization	2 days	3000	6,000
Motivation pay	110	300	33,000
Communication	-	-	6,000
Data statistician	1	30,000	30,000
Transport	-	20,000	20,000
Final book	4	1,500	6,000
<u>Grand total</u>			<u>106,780</u>

APPENDIX V: KNH ETHICAL APPROVAL LETTER