INFLUENCE OF EARLY BOOKING FOR ANTENATAL CARE ON ANTENATAL AND EARLY PREGNANCY OUTCOMES AT KENYATTA NATIONAL HOSPITAL

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A DESSERTATION, SUBMITTED TO THE UNIVERSITY OF NAIROBI, DEPARTMENT OF OBSTETRICS AND GYNAECOLOGY IN PARTIAL FULFILMENT OF THE REQUIREMENTS, FOR THE AWARD OF MASTER OF MEDICINE IN OBSTETRICS AND GYNAECOLOGY

DECLARATION:

I declare that this research is my original work and has not been undertaken and presented for a degree in any other university.

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CERTIFICATE OF AUTHENTICITY:

This is to certify that this dissertation is the original work of Dr Felix Onduso Atisa, Master of Medicine student in Department of Obstetrics and Gynaecology, registration number H58/68431/2011, University of Nairobi. The research was carried out in the department of Obstetrics and Gynecology, school of medicine, college of Health Sciences. It has not been presented in any other university for award of degree.

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DEDICATION

To my dear wife Rebecca, for her love, support and encouragement throughout my studies.

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ABBREVIATIONS :

A&E: Accident and Emergency

ANC: Antenatal care

C/S: Caesarean section

C.I: Confidence interval

EDD: Expected date of delivery

FANC: Focused antenatal care

FSB: Fresh still birth

Hb: Hemoglobin

HDU: High dependency unit

HIV: Human immunodeficiency virus

ICU: Intensive care unit

KEMRI: Kenya medical research institute

KMTC: Kenya medical training college

KNH: Kenyatta national hospital

MDG: Millennium development goals

MMR: Maternal mortality ratio

MOH: Ministry of Health

MSB: Macerated still birth

OR : Odds Ratio

PPH: Post partum hemorrhage

SHO: Senior house officer

SIRCLE: Services, Implementation Research and Clinical Excellence

SPSS: Statistical Package for Social Sciences

UK: United Kingdom

UON: University of Nairobi

USA: United States of America

VDRL: Venereal disease research laboratory

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OPERATIONAL DEFINITIONS:

1) Antenatal care: Antenatal care (ANC) is the comprehensive ante partum care given to a pregnant woman and the unborn baby by a skilled health care provider in order to ensure a healthy mother and baby. This involves a coordinated approach to medical care and psychological support that begins as early as before conception and extends throughout the ante partum period. (1)
2) Antenatal Care Outcomes: These encompasses the impact of antenatal care services like health education, birth preparedness, various investigations and related interventions, early perinatal and maternal outcomes.
3) Antenatal booking: This is the first antenatal care clinic attendance by a pregnant woman.(12)
4) Birth preparedness: Encompasses birth preparedness(i.e having a birth plan, knowing expected date of delivery, knowing signs of labour, arranging for someone to take care of family during labour, knowledge about postpartum care ,infant care, breast feeding, childhood immunization, family planning) and complication readiness.(13, 24)
5) Birth plan: Entails prior planning on; desired place of delivery, preferred skilled birth attendant, birth companion, means of transport, blood donor and mobilization of funds to pay for services.(13, 24)
6) Caesarean section (CS) is defined as the delivery of a fetus through surgical incisions made through the abdominal wall and the uterine wall.(1, 23)
7) Stillbirth: A stillbirth is the birth of a newborn after 28^{th} completed week when the baby does not breathe or show any sign of life after delivery.(23)

8) Post partum haemorrhage: Any amount of bleeding from or into the genital tract following birth of the baby up to the end of puerperium which adversely affects the general condition of the patient evidenced by rise in pulse rate and falling blood pressure .Average blood loss of more than 500mls following vaginal delivery and more than 1000mls following caesarean delivery.(23)

9) Puerperium: is the period following child birth during which the body tissues, specially the pelvic organs revert back approximately to the pre-pregnant state both anatomically and physiologically. This period last for approximately six weeks.(1,23)

10) Maternal mortality: is the death of a woman while pregnant or within 42 days of termination of pregnancy , irrespective of the duration and site of the pregnancy or its management but not from accidental or incidental causes.(1,23)

11) Maternal morbidity is any illness related to pregnancy or its management anytime during ante partum, Intrapartum, and postpartum period usually up to 6 weeks after confinement.(1,23)

12) Labour is regular, progressively intense uterine contractions associated with dilation and effacement of the cervix, ultimately leading to delivery of the infant and placenta. Spontaneous labour will generally occur at term, which is defined as the period between 37 and 41 completed weeks of pregnancy. If labour occurs prior to 37 completed weeks, it is considered preterm labour.(1,23)

13) Term premature ruptured of membranes (PROM) refers to a patient who is beyond 37 weeks gestation and has presented with spontaneous rupture of membranes (ROM) prior to the onset of labour.(1,23)

14) Preterm premature rupture of membranes (PPROM) is spontaneous rupture of membranes beyond 28 weeks gestation but before 37 completed weeks .(1,23)

15) Prolonged labour – Labour is said to be prolonged when the combined duration of the first and second stage is more than 18 hours.(23)

16) Obstructed labour: This is labour where in spite of good uterine contractions, the progressive descent of the presenting part is arrested due to mechanical obstruction.(23)

17) Preterm labour: Preterm labour is defined as labour occurring after 28 weeks but before 37 weeks' gestation.(23)

18) Puerperal sepsis: An infection of the genital tract which occurs as a complication of delivery. (23)

19) Anaemia: Anaemia in pregnancy is present when the haemoglobin concentration in the peripheral blood is less than 11gm/dl.(23)

20) Diabetes mellitus: Is a chronic metabolic disorder due to either insulin deficiency or due to peripheral tissue resistance to the action of insulin.(23)

21) Pre-eclampsia: Is a multi system disorder of unknown aetiology characterised by development of hypertension of 140/90mmHg or more, with proteinuria after 20^{th} week gestation in a previously normotensive and non-proteinuric woman.(23)

22) Eclampsia: This is pre-eclampsia complicated with generalised tonic-clonic convulsions and/or coma.(23)

23) Birth Asphyxia: Refers to non-establishment of satisfactory pulmonary respiration at birth. (23)

23) Hydrops foetalis: refers to the presence of two or more of the following

Abnormal fetal fluid collections: Ascites, pleural effusion, pericardial effusion, Skin edema, and polyhydramnios. (1)

24) Neonatal death: Refers to death of an infant within 28 days after birth. (23)

25) Spontaneous vertex delivery: This refers to expulsion of a viable fetus out of the Uterus through the vagina in cephalic presentation. (23)

26) Contraception: Refers to all measures temporary or permanent, designed to prevent pregnancy due to the coital act. (23)

27) Perinatal mortality: This refers to deaths among fetuses weighing 1000g or more at birth (28 weeks gestation) that die before or during delivery or within the first 7 days of delivery. (23)

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ABSTRACT

Introduction: The value of antenatal care (ANC) includes enhanced level of knowledge in preparation for motherhood, early detection of pregnancy related complications and their corrective and preventive measures. Early booking for antenatal care (<16 weeks) in Kenya remains low, at 15%. This forms the basis for this study.

Objective: To determine whether mothers who book early experience better birth preparedness, ANC investigations and pregnancy outcomes compared to those who book late.

Study Design: A retrospective cohort study, where the exposure of interest was booking for antenatal care.

Study Setting And Site: Kenyatta National Hospital (KNH) labour ward, antenatal/post natal wards, renal unit, ICU, and HDU

Study Population: Exposed group had early booking (<16weeks) for antenatal care while the unexposed had late booking (>28weeks).

Sample Size: A total of 300 participants, 150 for each group.

Data Analysis: Chi square was used to determine association between birth preparedness, investigations, pregnancy outcomes and categorical variables and ANC booking. Odds ratio (OR) with 95% C.I and P-value less than 5% were used to test the strength of association

Results: Late booking was associated with lower odds of birth preparedness evidenced by: lower knowledge of expected date of delivery (OR 0.26; P=0.005; 95% CI 0.1-0.66), and lower likelihood of having a birth plan in terms of desired place of delivery, preferred skilled birth attendant, birth companion, means of transport and blood donor (OR 0.24; P=0.006; 95% CI 0.09-0.67). Late booking was also associated with lower odds of emergency preparedness like knowledge of danger signs during pregnancy (OR 0.09;P=<0.001;95% CI 0.05-0.18) and postpartum emergency preparedness like knowledge of danger signs in puerperium (OR 0.16;P=<0.001;95% CI 0.08-0.33)and during infancy (OR 0.05;P=<0.001;95% CI 0.03-0.09).Late booking was associated with lower knowledge on modern family planning methods(OR 0.17;P=0.001;95% CI 0.1-0.29), and childhood immunization (OR 0.1;P=<0.001;95% CI 0.06-0.17). Late booking was associated with lower likelihood of interventions like: Folic acid

supplementation (OR 0.02; P=<0.001; 95% CI 0.01-0.03) and iron supplementation (OR 0.39; P=0.001; 95% CI 0.23-0.66). Women with primary level of education were more likely to book late compared to those with tertiary education, (OR 1.94; p= 0.033; 95% CI 1.05-3.57). Late booking was more likely among women residing in rural areas compared to those in urban areas (OR 0.33; 95% CI 0.11-0.93, p = 0.037). Late booking was also more likely among unemployed women compared to employed women (OR 0.54; 95% CI 0.31-0.96, p = 0.036). The differences in maternal and early neonatal outcomes were not statistically significant (OR 3.18; 95% CI 1.00-10.08, P=0.05) and (OR 0.81; 95% CI 0.45-1.45; P=0.479), respectively.

CONCLUSION: Early booking for ANC tends to confer better birth preparedness, and better antenatal care interventions compared to late booking. The timing for antenatal care booking, however, seems not to influence the maternal and early neonatal outcomes.

CHAPTER 1: INTRODUCTION ANDLITERATURE REVIEW

Antenatal care (ANC) is the comprehensive ante partum care given to a pregnant woman and the unborn baby by a skilled health care provider to ensure a healthy mother and baby. This involves a coordinated approach to medical care and psychological support that begins as early as before conception and extends throughout the ante partum period (1, 2). Historically, ANC programmes have been in existence since the early part of the 20th century (3). In the United States, the first outpatient ANC clinic was established in 1911 (1). World Health Organization (WHO) recommends that, pregnant women in developing countries should seek ANC booking within the first 16 weeks of pregnancy, which is considered as early ANC booking (4, 5). Booking after 16 weeks in the second and third trimesters is generally considered late ANC booking. In the developed countries such as United Kingdom and the United States, ANC booking within the first 12 weeks of pregnancy is standard recommendation (5,6,7).

Many centers around the world use the WHO's four visit model known as the focused antenatal care [FANC] (3, 4). The proportion of women having at least four ANC visits during pregnancy is used as an indicator to monitor progress towards achievement of the Millennium Development Goal (MDG) 5 (3, 8). The proportion of pregnant women attending antenatal care in developing countries has increased from 63% in 1990 to about 81% in 2011 (9). More pregnant women have at least one ANC visit in sub Saharan Africa (69%) compared to south Asia (54%) (10). Despite this good overall uptake of ANC in sub Saharan Africa, there exists inequity, 80% of women in the richest quartile have access to three or more ANC visits, compared to 48% in the poorest quartile. A similar inconsistency exists between urban and rural women (10).

In Kenya, less than half (47%) of pregnant women have four or more ANC visits. Of these, the majority (60%) are urban compared to 44% in the rural areas (11). WHO and the Kenyan Ministry of health, recommends that a woman without complications should have four ANC visits, the first of which should take place during the first trimester that is before 16 weeks of gestation. The minimum four visits offer a comprehensive personalized antenatal Care that is spread out the entire pregnancy as follows: first visit less than16 weeks, second visit 20-24 weeks, third visit 28-32 weeks, fourth visit 36 weeks (4, 12).The four visits are content specific, meaning that even if a women comes only for one visit in the last trimester the complete package is offered to her(4, 5, 11).Early booking for antenatal care in Kenya is low, at 15%, leaving the majority (85%) of women to late booking (11). Birth preparedness and knowledge of danger signs is also low (13).The Kenyan scenario is typified by several African countries like Benin and Nigeria where pregnant women largely book late for ANC at, a mean gestation of 24 weeks (14-16).

The minimum essential package for FANC include: identification and management of obstetric complications, screening for conditions and diseases, iron and folate supplementation, tetanus immunization, deworming, intermittent prophylaxis and treatment of malaria, plan for skilled birth attendance and birth preparedness. Birth preparedness includes; knowing expected date of delivery and having a birth plan that is desired place of delivery, preferred skilled birth attendant, birth companion, means of transport, blood donor and mobilization of funds to pay for services. The other components of minimum essential package of FANC are postpartum care counseling,

infant care and breast feeding, childhood immunization, family planning and emergency preparedness (1, 4, 10, 13).

The conditions and infections screened in ANC are HIV, syphilis, rhesus isoimmunisation, hepatitis and anaemia (1, 4,10). In cases where the mother screens positive, the benefits of management are optimized by early ANC booking before the pathogenesis of the disease or infection worsens. In addition, early ANC booking enables early assessment of pelvic adequacy as a screen for cases of possible obstructed labour (1,4,and 10). Through offering this package, it would be expected that ANC would impact on mothers in terms of improved outcomes related to better knowledge, early and adequate detection and prophylaxis of obstetric complications and overall reduction of risk of morbidities and mortalities.

The main direct causes of maternal mortality in Kenya are haemorrhage, infection, hypertensive disorders in pregnancy, obstructed labour and abortion (17, 18). All these direct causes of maternal mortality are further aggravated by the three delays: delay in deciding to seek appropriate care, delay in reaching the appropriate health facility and delay in receiving adequate emergency care once at the facility. These delays may be reduced if pregnant women book for ANC early and are prepared for birth and complications, thus indirectly contributing to a reduction in maternal morbidity and mortality (1, 4, 10, 13). Increasing the number of women booking early for ANC may be one of the high impact interventions to reduce the high maternal mortality, currently estimated at 488/100000 live births in Kenya (11). In this context, it can be postulated

that late booking for ANC by most women (85%), may be one of the reasons for high maternal mortality in the Country. Late booking leads to poor birth preparedness, late detection of problems and hence missed opportunities in detecting pre-existing medical conditions such as cardiac diseases, anaemia, hypertension and diabetes mellitus, which lead to maternal morbidity and mortality (1, 4, 11, 13).

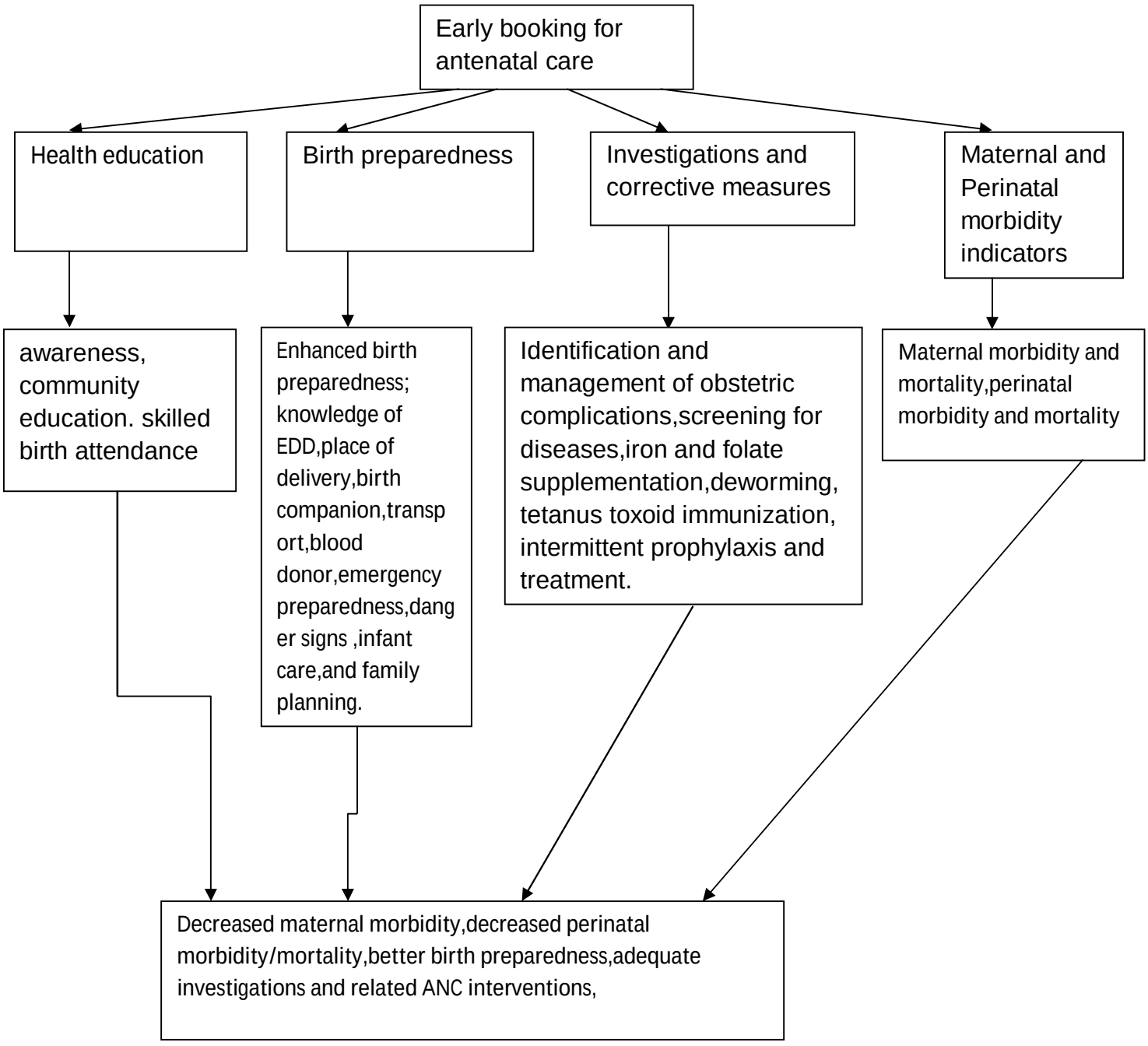
The factors that have been associated to early and late ANC booking include: mothers' age, education level, occupation, parity, inter-pregnancy interval, pre-existing medical conditions, religion and residence (5, 14, 15,16). Teenage mothers with lower parity tend to present late for ANC booking compared to older mothers with higher parity (14, 15, and 16). This has been attributed to the fact that younger women are more likely to have unplanned pregnancies and lack information and resources to access ANC. Women and or partners with secondary education plus tend to present earlier than those with primary education and below. Educated women are more enlightened about their health, have more job opportunities and thus more likely to afford health care (14-16). There is evidence that single mothers book late for ANC compared to married women, because marriage is perceived to have better social support (14-16). Women with pre-existing medical conditions like diabetes mellitus, hypertension, anemia, sickle cell disease and epilepsy generally book earlier for ANC compared to their counterparts with no known pre-existing medical conditions (4,14,15,16,19). Studies have shown that women who reside in urban areas tend to seek earlier ANC booking compared to their rural counterparts; this is attributed to difficulty accessing health facilities due to long distances in the rural areas (14, 15, 19, 20).

Early ANC booking has a positive impact on neonatal outcomes. A study in 1915 by Whtridge Williams showed that 40% (282/705) perinatal deaths could have been prevented by perinatal care in John Hopkins hospital (1). Current evidence concurs with Whtridge Williams' evidence of 1915, that failure to obtain prenatal care is associated with more than threefold increased risk of preterm birth and fetal death (1). In addition, Schramm in 1992 showed that ANC is cost effective; for each dollar spent for prenatal care an estimated 1.49 dollars is saved in newborn post partum costs (1).

In Kenya prematurity and low birth weight are the most common causes of perinatal and neonatal morbidity and mortality at 30%, followed by neonatal infections and birth asphyxia at 27% (17, 18).Kenya's perinatal mortality rate remains high at 37 per 1000 pregnancies (11). Maternal conditions predisposing to prematurity and low birth weight can be detected and prevented with timely antenatal care (1, 4, 10, and 12). With an effective and well-utilized antenatal service, corticosteroid therapy to mitigate effects of prematurity can be administered in a timely manner to women at risk of preterm delivery (21). Risks and complications associated with post term pregnancy can also be prevented by early booking for ANC (22). Clinical methods for assessment of gestational age of the fetus coupled with a careful enquiry into menstrual history can be effective in accurately determining the gestational maturity and expected date of delivery, thus preventing post term pregnancy. This can only be achieved if women attend ANC early (22).

Antenatal care plays a major role in determining pregnancy outcome. A lot of emphasis has been put on educating pregnant women on the need to make four ANC visits, and progress has been made towards achieving this. However, many women do not know when to make the first booking visit. This has contributed to the small percentage of women that make the WHO recommended early visit of 16 weeks and below. In many instances, pregnant women present for ANC for the first time when they experience a complication for instance, vaginal bleeding, and vaginal discharge, drainage of liquor, decrease in fetal movements or absence of fetal movements. Anecdotal evidence from Kenyatta National Hospital shows that some women attend ANC just to book for a delivery place. This shows a need to educate more pregnant women on timely and early booking to detect and prevent complications, acquire adequate health education on birth preparedness and offer iron and folate supplementation, among other benefits.

Figure 1: Conceptual framework:



NARRATIVE:

Early booking for antenatal care services offers pregnant women several advantages, among them: early detection of dangers signs and obstetric complications, early detection and prevention of disease transmission from mother to child, timely micronutrient supplementation like iron and folic acid to prevent anaemia and neural tube defects respectively, birth preparedness and an early linkage to formal health care delivery system for long term follow-up and management. All these benefits may contribute towards a reduction of maternal and neonatal morbidity and mortality.

Heightened knowledge, especially in relation to health education may impact on decreased morbidity and mortality. Community education would enhance early booking and improve on maternal and neonatal outcomes, thus enhancing achievement of MDG 4 and 5.

JUSTIFICATION

The maternal mortality ratio in Kenya has remained high at 590/100000, 414/100000 and 488/100000 according to KDHS of 1998, 2003 and 2008 respectively, despite measures and programmes in place to address maternal health care. This does not suggest a failure in these interventions, but a possible existence of gaps in service delivery and utilization like quality of care provided, timing of ANC booking, number of ANC visits made and people's attitudes and knowledge towards these services. For example, an increase in the number of women seeking antenatal care from a medical professional should lead to a drop in MMR; however this has not been the case. No studies have been done to evaluate late booking for ANC as a possible gap. More

women still make fewer visits than the expected four or more. However, the timing of ANC booking is one of the most glaring gaps in the chain of service delivery, with more than 85% of women booking late. This forms the basis for this study.

There is a paucity of evidence on the association between early booking and antenatal care outcomes in Kenya. Early attendance of antenatal clinic theoretically has the outcome of better birth preparedness, adequate investigations and timely related interventions, improvement of morbidity indicators like decrease of maternal and neonatal morbidity. This study proposes to analyze the impact of early and late booking on antenatal care outcomes at Kenyatta National Hospital (KNH). A demonstration of better antenatal care outcomes with early booking could translate to a call for programme interventions that will encourage more women to make early booking and regular visits throughout pregnancy. The overall impact will be improved maternal and neonatal morbidity indicators, better birth preparedness through education, adequate investigations and timely corrective measures, thus contributing positively towards attainment of MDG 4 and 5.

RESEARCH QUESTION:

Does early booking for ANC confer better antenatal and early pregnancy outcomes compared to late booking among parturients in KNH?

NULL HYPOTHESIS:

Early booking for antenatal care does not confer better antenatal and early pregnancy outcomes compared to late booking among parturients in KNH.

BROAD OBJECTIVE:

To determine whether mothers who book early for antenatal care experience better antenatal and early pregnancy outcomes compared to those who book late.

SPECIFIC OBJECTIVES:

Among women delivering in KNH labour ward, who had early booking for ANC compared to those who had late booking:

1. To determine whether there is better birth preparedness
2. To determine whether there is better investigations and related interventions
3. To determine the incidence of maternal morbidity
4. To determine the incidence of early perinatal morbidity and mortality

CHAPTER2: METHODOLOGY

Study Design: This was a retrospective cohort study where the exposure of interest was booking for antenatal clinic at KNH. The exposed group was pregnant women in KNH who had early ANC booking (<16 weeks gestation), while the unexposed group were those women who had late ANC booking (>28 weeks gestation). Enrolment of patients was carried out in KNH labour ward, after delivery and followed up to 72 hours post delivery, in order to document early perinatal and maternal outcomes. This was a retrospective cohort study because the exposure of interest that is, ANC booking and outcomes of interest had occurred prior to recruitment of participants. Further, information about participants' prior investigations during ANC attendance and other aspects of care provided was retrieved from the participants' medical records (ANC cards) retrospectively. Adequacy of birth preparedness, adequacy of investigations and related interventions and pregnancy outcome were compared between the exposed and unexposed groups. This study was conducted in the month of August, 2014 over a period of three weeks.

Study site and setting:

This study was carried out at Kenyatta National Hospital's (KNH) Labour ward, ante-natal and post-natal wards, renal unit, Intensive Care Unit (ICU) and High Dependency Unit (HDU). KNH, being a national hospital covers a wide geographical area and is a high volume hospital; therefore the study population is mixed in terms of socio-economics and area of residence.

KNH is located in Upper Hill area, Nairobi, the capital of Kenya, Nairobi County. It is the major referral hospital for the whole country with a bed capacity of 2500 patients. About 1,200 deliveries are conducted in KNH every month. It is the largest hospital in East and Central Africa and serves as the teaching hospital for the University Of Nairobi School Of Medicine and the Kenya Medical Training College (KMTC).

Labour ward has an acute room where severely ill antenatal and post-natal patients are managed and it is adequately equipped to handle obstetric emergencies. Adjacent to labour ward are two maternity theatres, where most emergency and elective obstetric operations are carried out. Antenatal and post-natal admissions are managed in wards GFA, GFB and 1A. Routinely, women who had vaginal delivery are discharged from the hospital after 24 hours. On the other had women who had a caesarean section are discharge after 72 hours. Patients with complications may stay longer depending on the severity of their complication.

The labour ward is staffed by Resident Senior House Officers(SHO) enrolled in post-graduate training in Obstetrics and Gynecology 24 hours every day, Medical officer interns, Clinical officer interns, Clinical officers undergoing post-graduate diploma course in obstetrics and gynecology and highly trained midwives. Twelve hourly ward rounds are conducted by Senior Registrars and on-call Consultants. Acutely ill patients are reviewed on need basis with consultations with other specialties as required.

Patients in need of intensive care are transferred to ICU or HDU as their condition demands after consultation with the ICU team. Patients transferred to ICU are managed by both the ICU and Obstetrics teams. Those with renal complications are reviewed by a renal team and worked up for dialysis if necessary.

Antenatal care services are offered at the ANC clinics that run daily from Monday to Thursday. Postnatal clinics are conducted every Friday. These clinics are run by a team of Consultants, Registrars and highly trained Nursing Officers. Antenatal care services at KNH follow the FANC model and is content specific. The ANC package includes ANC profiles like Blood grouping, Hemoglobin level, HIV and VDRL testing, counseling on birth preparedness and birth plan, folate and iron supplementation, deworming, and tetanus immunization. There is also an outpatient gynecology consultation room at A&E department where obstetric and gynaecologic emergencies are reviewed, stabilized and admitted as per need on a 24hour basis. Patients are admitted to labour ward directly or through these clinics. The annual MMR at KNH is about 890/100,000 live births while the monthly perinatal mortality rate ranges between 140/1000 live births (KNH monthly mortality meetings records).

Study population:

The study population was made up of pregnant women who had early booking (<16weeks) for antenatal care and those who had late booking (>28 weeks) regardless of where the ANC was. Enrolment of patients was carried out in KNH labour ward. All eligible patients were followed up for 72 hours after delivery.

Inclusion criteria:

- Early booking for ANC.(< 16 weeks), this was the exposed group
- Late booking for ANC.(> 28 weeks), this was the unexposed group
- Those who gave informed consent
- No known co-morbidity necessitating early booking

Exclusion criteria:

- Women who delivered elsewhere and referred to KNH labour ward for various reasons.
- Pregnant women admitted to labour ward for delivery but had ANC booking between 17weeks and 27 weeks.
- Patients who had medical co morbidities that include chronic hypertension, diabetes mellitus, sickle cell disease and cardiac disease among others
- Patients with bad obstetric history

Sample size:

The sample size required in each group (early ANC booking and late ANC booking) was calculated using the formula:

$$n = \frac{\left\{\left(Z_{1+Z_2}\right)^2 2P\left(1-\overline{P}\right)\right\}}{(P_1-P_2)^2}$$

P_1 = baseline poor antenatal care outcome (perinatal mortality rate),in percentage.

P_2 = projected poor antenatal care outcome (perinatal mortality rate)

With early booking for antenatal care, in percentage.

$$\overline{P} = \frac{P_{1+P_2}}{2}$$

Z_1 = standard normal deviation (SND)

Z_2 = Power

The poor antenatal care outcome (perinatal mortality rate) for KNH was: 151/1000 (15%) {Monthly mortality report for KNH April 2012}

The projected perinatal mortality rate is: 30/1000 (3%)

Therefore: p_1 =15% =0.15

P_2 =30% =0.03

P_1-p_2 =0.12

Z_1 =1.96

Z_2 (95%) =1.64

$\overline{P} = \frac{0.15 + 0.03}{2} = 0.09$

$1 - \overline{P} = 1 - 0.09 = 0.91$

$n = \frac{12.96 \times 2 \times 0.09 \times 0.91}{0.12 \times 0.12}$

n = 147.42 = 150.

Therefore, the sample size was 150 participants for the exposed group and 150 participants for the unexposed group, total 300 participants.

Sampling procedure

Consecutive sampling was used. This was done daily from 7.00am to 11.00pm, and all the first 150 patients in each group who fulfilled the eligibility criteria and gave consent were enrolled till the sample size of 300 was reached.

Recruitment :

Pregnant women admitted to labour ward for delivery either term or preterm were identified from admission registers daily between 7.00am and 11.00pm. Consent was obtained from those who fulfilled the inclusion criteria, mothers recruited immediately after delivery and information entered in the questionnaire. They were followed up to 72 hours post delivery. Women still in-patient beyond 72 hours post delivery were considered as prolonged hospital stay.

Follow up was limited to in-patients only and they were followed up by the investigator and /or assistant during identification, recruitment and follow up rounds to the post natal wards, ICU, HDU or renal unit. In case of a maternal death, follow up ended at that, and information recorded appropriately in the questionnaire. There was no follow up after hospital discharge.

Neonates were also followed up for 72 hours post delivery. Those who were still admitted beyond 72 hours were considered as prolonged hospital stay.

Data Variables:

Dependent variables were:

Antenatal care outcomes: Birth preparedness(expected date of delivery, preferred place of birth, skilled birth attendant, birth companion, transport, blood donor, funds for services, danger signs),ANC investigations, ANC interventions

Maternal outcomes: Modes of delivery, nature of labour, PPH, ruptured uterus, acute kidney injury, puerperal sepsis, eclampsia, ICU admission.

Neonatal outcomes: Birth weight, FSB, MSB, birth asphyxia, NBU admission, congenital anomalies, hydrops fetalis, neonatal death

Independent variables were:

Maternal: Age, level of education, marital status, occupation, spouse's education level, spouse's occupation, residence, parity, inter-pregnancy interval, timing of ANC booking.

Data collection and management:

Data was collected using a structured pretested questionnaire shown in appendix 1. The questionnaire collected data in the following domains: socio-demographic information, obstetric and medical history, antenatal profile, maternal and neonatal outcomes, modes of delivery, birth preparedness, investigations and related ANC interventions and information on health education based on objectives. Patient's medical records and antenatal care cards with data provided additional information on ANC utilization during the ante partum period, Intrapartum and the eventual postpartum outcomes up to 72 hours post delivery. The de-identifiable data was entered into Microsoft access data base with inbuilt consistency and validation checks. Data was cleaned and stored in a password protected external storage device. Data was only accessible to the principal investigator, statistician and supervisors.

There was one research assistant, a clinical officer, trained by the principal investigator on patient enrolment and administration of the questionnaire. The questionnaire was administered by the principal investigator and the research assistant. The questionnaire

was administered directly to the patient or to the next of kin if the patient was unable to communicate upon consenting.

Quality control:

There was an eligibility checklist at enrolment to ensure only participants who fit the inclusion criteria were selected for the study. The questionnaire also had similar questions asked in different ways to ensure good quality data. The questionnaire was pre-tested and data cleaning was done by the principal investigator. The de-identified data was entered into Microsoft access data base with inbuilt consistency and validation checks.

Data analysis and presentation:

Data analysis was conducted using the statistical package for social sciences version 17.0(SPSS Inc, Chicago; ill, USA).

Summaries of demographic characteristics, patient's obstetric, medical and antenatal profile characteristics, modes of delivery, maternal and neonatal outcomes, level of birth preparedness and adequacy of investigations and related interventions were done. These were presented descriptively in form of means or medians for continuous variables and proportions for categorical variables.

The incidence of maternal and neonatal morbidities/mortalities, level of birth preparedness and adequacy of investigations and interventions among those who had early booking for antenatal care and those who booked late were determined. These outcomes were presented as percentages. Maternal and neonatal outcomes were considered poor if they were associated with any morbidity or mortality and good if there was no associated morbidity or mortality. Proportions for categorical variables were

compared using a Chi square test. Continuous variables were analyzed using a Student t-test. The strength of association was determined through odds ratio (OR) with 95% C.I. Association was considered significant if the P-value was less than 5%.

Data was presented in tables, graphs and figures.

Ethical considerations:

This research was approved by the ethics and research committee of Kenyatta National Hospital and University of Nairobi (appendix 3). Information obtained from the patient and/or patient's file was kept confidential and used for purposes of the study. Informed consent was sought from the patient/relative before recruitment into the study (appendix 2). No names or data identifying particular patients were collected.

Study limitations:

- Long term maternal and neonatal outcomes could not be determined as follow up was limited to 72 hours post delivery. However, this did not affect the interpretation of the study findings the study results were limited to immediate post delivery intra-hospital outcomes.
- Post-partum complications occurring after the patients discharge but within 72 hours post delivery may have been missed because follow-up was limited to in-patients. Effort was made to enable the participants to contact the principal investigator on phone to ensure follow up is extended to cover a total of 72 hours even after discharge. Thus, upon discharge, the participants were given the principal investigator's phone number and encouraged to report to him any complications that may arise within 72 hours post delivery while at home. No complications were reported.

- Very ill patients were not be able to provide full information, this was obtained from the next of kin where available, and from hospital and antenatal card records.
- Patients discharged at 24 hours after vaginal delivery were not called for outcomes up to 72 hours.
- There was a mixture of patients who attended ANC in KNH and outside KNH .
- Intrapartum confounders that may impact on maternal and early neonatal outcomes were not controlled for.

CHAPTER 3: RESULTS

A total of 300 women were eligible and analyzed. Of these, 150 women were in the exposed group (early ANC booking) while the other 150 were in the unexposed group (late ANC booking) with a mean ageof26.4 years and 26.5 years respectively.

3.1 Descriptive results

Table 1: Socio-demographic characteristics of women booked for ANC in KNH, 2014, by timing of ANC booking

CHARACTERISTICS		Early booking N=150	Late booking N=150	OR (95% CI)	P value
Maternal age group (years)	< 20	8(5.3)	9(6.0)	1.00	
	20-24	54(36.0)	52(34.7)	1.34(0.4-4.46)	0.593
	25-29	52(34.7)	51(34.0)	1.31(0.45-3.79)	0.617
	30-34	24(16.0)	27(18.0)	1.14(0.37-3.54)	0.817
	35-39	8(5.3)	9(6.0)	1.14(0.29-4.51)	0.849
	>=40	4(2.7)	2(1.3)	2.57(0.36-18.33)	0.346
Formal education	Primary	32(21.3)	38(25.3)	1.00	
	Secondary	51(34.0)	70(46.7)	0.87(0.48-1.57)	0.632
	Tertiary	67(44.7)	42(28.0)	1.94(1.05-3.57)	0.033
Spouses' education	Primary	13(8.7)	16(10.7)	1.00	
	Secondary	38(25.3)	55(36.7)	0.85(0.37-1.97)	0.705
	Tertiary	78(52.0)	57(38.0)	1.68(0.75-3.78)	0.206
Marital status	Single	23(15.3)	22(14.7)	1.00	
	Married	127(84.7)	128(85.3)	0.95(0.5-1.79)	0.872
Occupation	Employed	51(34.0)	35(23.3)	1.00	
	Unemployed	48(32.0)	63(42.0)	0.54(0.31-0.96)	0.036
	Others	51(34.0)	52(34.7)	0.67(0.38-1.2)	0.182
Spouses' occupation	Employed	83(55.3)	80(53.3)	1.00	
	Unemployed	4(2.7)	1(0.7)	3.86(0.42-35.24)	0.232
	Others	42(28.0)	47(31.3)	0.86(0.51-1.44)	0.572
Residence	Rural	14(9.3)	5(3.3)	1.00	
	Urban	136(90.7)	145(96.7)	0.33(0.11-0.93)	0.037

The demographic characteristics of mothers in the early and late booking groups are shown in table 1. ANC clients in the two groups were similar in terms of age, marital status, spousal education and spousal occupation (all p values > 0.05).Late booking was more likely among women residing in rural areas compared to those in urban areas (OR 0.33; 95% CI 0.11-0.93, p = 0.037). Late booking was also more likely among unemployed women compared to employed women (OR 0.54; 95% CI 0.31-0.96, p = 0.036).

Table 2: Obstetric and antenatal profile of women booked for ANC in KNH, 2014, by timing of ANC Booking

Obstetric and ANC Profile	Early booking N=150	Late booking N=150	Total	OR(95%CI)	P value
Inter-pregnancy interval					
< 1 year	5(3.3)	0(0)	5(1.7)	NA	
1-2 years	12(8)	14(9.3)	26(8.7)	1.0	
> 2 years	61(40.7)	81(54)	142(47.3)	0.9(0.3-2.2)	0.763
Primigravidae	72(48)	55(36.7)	127(42.3)	1.5(0.6-3.9)	0.342
VDRL					
Negative	146(97.3)	147(99.3)	293(98.3)	1.0	
Positive	2(1.3)	0(0)	2(0.7)	NA	
Not done	2(1.3)	1(0.7)	3(1)	2.0(0.1-120)	0.562
HIV status					
Negative	141(94.6)	143(95.3)	284(95)	1.0	
Positive	6(4)	7(4.7)	13(4.4)	0.9(0.2-3.1)	0.81
Not done	2(1.3)	0(0)	2(0.7)	NA	
Previous CS(>1)	24(16)	30(20)	54(18)	0.8(0.4-1.5)	0.483

From table 2, there were no significant differences in obstetric and antenatal care profile characteristics between those who booked early and those who booked late. Only 2 and 3 women did not have HIV test and VDRL done respectively. Previous birth had a

higher insignificant likelihood of booking late compared to primigravidae (OR 1.5; P=0.342; 95% CI 0.6-3.9).

3.2 Objective 1 - Birth preparedness among women who booked for ANC at KNH by timing of booking

Table 3: Birth preparedness of women who booked for ANC in KNH, 2014, by timing of ANC booking

Birth preparedness		Early N=150	Late N=150	OR	95 % CI		P value
Knowledge about :							
Danger signs in infancy	Yes	112(74.7)	19(12.7)	1.00			
	No	38(25.3)	131(87.3)	0.05	0.03	0.09	<0.001
Danger signs in puerperium	Yes	50(33.3)	11(7.3)	1.00			
	No	100(66.7)	139(92.7)	0.16	0.08	0.33	<0.001
Danger signs in pregnancy	Yes	136(90.7)	71(47.3)	1.00			
	No	14(9.3)	79(52.7)	0.09	0.05	0.18	<0.001
Exclusive breast feeding	Yes	146(97.3)	144(96.0)	1.00			
	No	4(2.7)	6(4.0)	0.49	0.12	2.01	0.324
Expected date of delivery	Yes	144(96.0)	129(86.0)	1.00			
	No	6(4.0)	21(14.0)	0.26	0.1	0.66	0.005
Family planning methods	Yes	120(80.0)	61(40.7)	1.00			
	No	30(20.0)	89(59.3)	0.17	0.1	0.29	<0.001
Immunization schedule	Yes	108(71.7)	31(20.7)	1.00			
	No	42(28.3)	119(79.3)	0.10	0.06	0.17	<0.001
Birth plan							
	Yes	143(95.4)	130(86.7)	1.00			
	No	7(4.6)	20(13.3)	0.24	0.09	0.67	0.006

Late booking was associated with lower odds of birth preparedness evidenced by: lower knowledge of expected date of delivery (OR 0.26; P=0.005; 95% CI 0.1-0.66), and lower likelihood of having a birth plan (OR 0.24; P=0.006; 95% CI 0.09-0.67).The birth plan entailed the following aspects: desired place of delivery, preferred health care

provider, birth companion, means of transport, blood donor, and funds set aside for payment of services. Late booking was also associated with lower odds of emergency preparedness like knowledge of danger signs during pregnancy (OR 0.09; P=<0.001; 95% CI 0.05-0.18) and postpartum emergency preparedness like knowledge of danger signs in puerperium (OR 0.16; P=<0.001; 95% CI 0.08-0.33) and during infancy (OR 0.05; P=<0.001; 95% CI 0.03-0.09). Late booking was associated with lower knowledge on modern family planning methods(OR 0.17; P=0.001; 95% CI 0.1-0.29), and childhood immunization (OR 0.1; P=<0.001; 95% CI 0.06-0.17). Knowledge about exclusive breast feeding was not influenced by timing of booking (OR 0.49; P=O.324; CI 0.12-2.01)

3.3 Objective 2 - Investigations and related interventions among women who booked for ANC at KNH by timing of booking

Table 4: Investigations and interventions of women who booked for ANC in KNH, 2014, by timing of ANC booking

Investigations and interventions		Early N=150	Late N=150	OR	95 % CI		P value
Blood grouping	Not done	3(2.0)	0(0.0)	NA			
	Done	147(98.0)	150(100.0)		NA	NA	NA
Deworming	Not done	17(11.3)	12(8.3)	1.00			
	Done	133(88.7)	138(91.7)	0.63	0.28	1.39	0.252
Folic acid supplementation	Given	133(88.7)	18(12.0)	1.00			
	Not given	17(11.3)	132(88.0)	0.02	0.01	0.03	<0.001
Hemoglobin (During ANC)	Not done	6(4.0)	3(2.0)	1.00			
	Done	144(96.0)	147(98.0)	0.49	0.1	2.35	0.319
HIV testing	Not done	3(2.0)	0(0.0)	NA			
	Done	147(98.0)	150(100.0)	NA		NA	NA
Iron supplementation	Given	123(82.0)	96(64.0)	1.00			
	Not given	27(18.0)	54(36.0)	0.39	0.23	0.66	0.001
Tetanus toxoid	Given	147(98.0)	146(97.3)	1.00			
	Not given	3(2.0)	4(2.7)	0.66	0.11	3.99	0.649
VDRL	Not done	2(1.3)	3(2.0)	1.00			
	Done	148(98.7)	147(98.0)	1.51	0.17	18.3	0.654

Iron supplementation and folic acid supplementation during the antenatal period was associated with timing of booking for ANC care (table 4). Women who booked late were less likely to receive folate and iron supplementation (OR 0.02;P=<0.001;95% CI 0.01-0.03) and (OR 0.39;P=0.001;95% CI 0.23-0.66),respectively.

3.3 Objective 3 - Maternal outcomes of women who booked for ANC in KNH by timing of booking

Table 5: Mode of delivery of women who booked for ANC at KNH, 2014, by timing of ANC booking

Mode of Delivery		Early N=150	Late N=150	OR	95 % CI		P value
	SVD	93(62.0)	81(54.0)	1.00			
	Assisted	0(0.0)	2(1.3)	NA			
	Caesarean	57(38.0)	67(44.7)	0.69	0.43	1.12	0.137

The mode of delivery was not significantly associated with timing of ANC booking (table 5). Most women in both groups had a SVD (54.7% in those who booked early versus 54% in those who booked late). Slightly more women who booked late delivered via caesarean section (44.7%), compared to those who booked early (31.3%). This difference was not significant (OR 0.63; p=0.137; 95% CI 0.43-1.12).

Table 6: Maternal Outcomes of women who booked for ANC in KNH, 2014, by timing of ANC booking

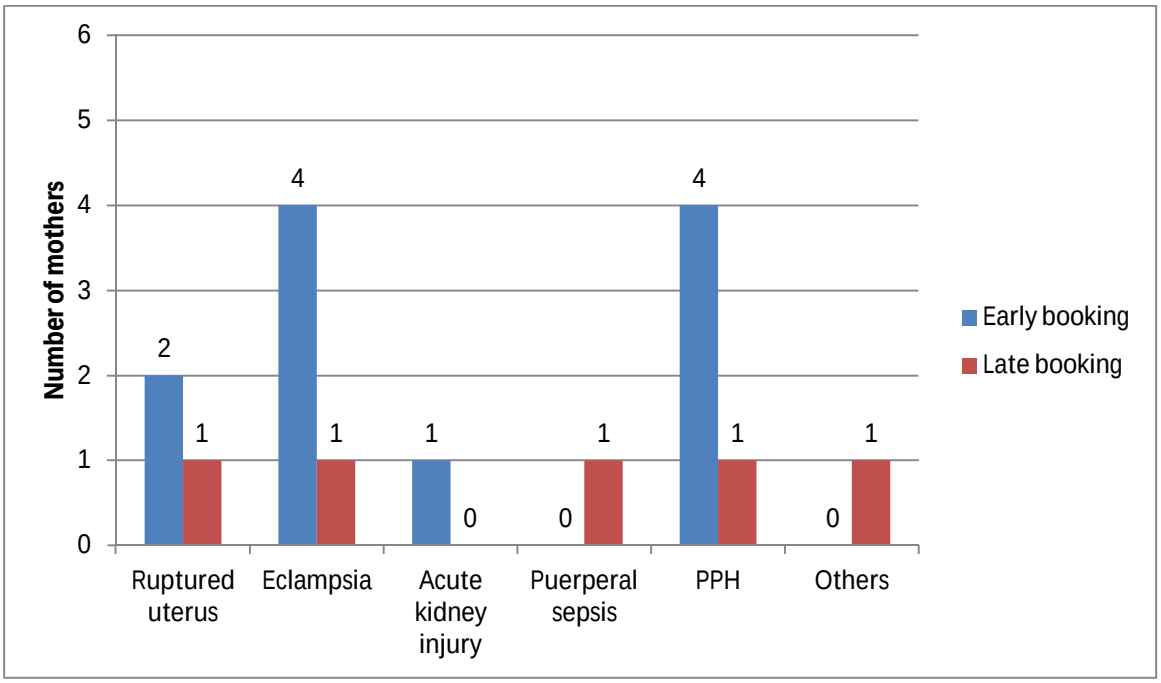
Outcomes		Early N=150	Late N=150	OR	95 % CI		P value
Labour	Obstructed	23(15.2)	28(18.7)	1.00			
	Prolonged	33(22.2)	28(18.7)	1.42	0.66	3.06	0.366
	Preterm	31(20.6)	18(12.0)	2.07	0.91	4.7	0.081
	Term	63(42.0)	76(50.6)	1.02	0.52	1.97	0.965
Maternal outcome	Good	138(92.0)	146(97.3)	1.00			
	Poor	12(8.0)	4(2.7)	3.18	1.00	10.08	0.05

There was no significant difference in the nature of labour between those who booked early and those who booked late (table 6). Among those who booked early, 40% had term labour compared to 50.7% of those who booked late; P=0.965.The percentages of mothers with prolonged and preterm labour were found to be slightly higher among those that booked early compared to those that booked late, while obstructed labour

was slightly higher among those with late booking, but these differences were not significant.

Maternal outcomes were generally good among early (91.3%) and late booking (96.7%), OR = 3.18; 95% CI 1.00-10.08. The difference was not statistically significant; P=0.05.

Figure 1:Absolute numbers of poor maternal outcomes of women who booked for ANC in KNH, 2014, by timing of ANC booking



From figure 1 above, three mothers had ruptured uterus, two booked early while one booked late. Four mothers who had booked early developed eclampsia compared to one who booked late. One mother who booked early developed acute kidney injury. One mother who booked late developed puerperal sepsis, while four women who booked early developed post partum hemorrhage. The two mothers with ruptured uterus both had previous caesarean section, therefore, likely to book early, and were predisposed to this outcome. Two of the mothers who developed eclampsia had lost at

least one prior pregnancy, therefore, likely to book early, while the other two were young (one of them a teenager) primigravidae, who were predisposed to this outcome. The mother who developed acute kidney injury had also lost one prior pregnancy and was likely to book early. All four mothers in the exposed group who developed PPH, had prolonged labour, out of which, two had had prior pregnancy losses, thus, likely to book early.

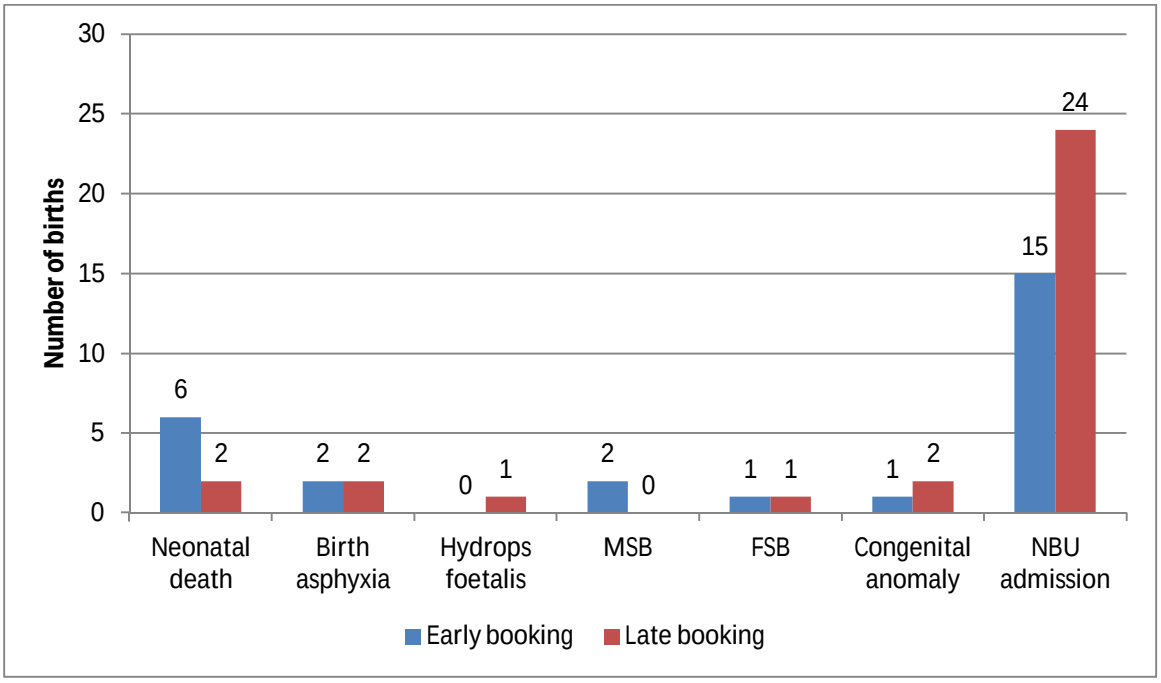
3.4 Objective 4 –Early neonatal outcomes of women who booked for ANC in KNH by timing of booking

Table 7: Early neonatal outcomes of women who booked for ANC in KNH,2014, by timing of ANC booking

Outcomes		Early N=150	Late N=150	OR	95 % CI		P value
Birth weight	< 1500 g	10(6.7)	12(8.0)	1.00			
	1501-2500 g	30(20.0)	32(21.3)	1.12	0.42	2.99	0.817
	>2500 g	110(73.3)	106(70.7)	1.25	0.52	3.00	0.625
Neonatal outcome	Good	122(81.3)	118(78.7)	1.00			
	Poor	26(17.3)	31(20.7)	0.81	0.45	1.45	0.479

Although poor neonatal outcomes were slightly higher among women who booked late (20.7%) compared to those who booked early(17.3%), this difference was not statistically significant (OR 0.81;95% CI 0.45-1.45;P=0.479). No significant difference in birth weight above 2500gm was noted among those who booked early(73.3%) and those who booked late(70.7%);P 0.625. However, low birth weight was slightly higher among neonates born to mothers who booked late (28.7%) compared to those who booked early (26%). This difference was, however, not significant, P 0.817, (table 7).

Figure 2: Absolute numbers of poor early neonatal Outcomes of women who booked for ANC in KNH, 2014, by timing of ANC booking



There were 6 neonatal deaths among those who booked early and 2 among those who booked late, birth asphyxia were 2 in each group, one hydrops foetalis in late booked group, 2 MSB in the early booked group and one FSB in each group. Although NBU admissions were more among the late booked, 24 (16%) compared to the early booked group, 15 (10%), this difference was not statistically significant (x^2=2.4,df=1,P=0.122) (figure 2).

CHAPTER 4: DISCUSSION

The main findings of this study are that early antenatal booking compared to late booking is associated with a high education level, employment and residing in an urban area of the pregnant woman. Women who book early for antenatal care are more likely to be birth prepared, counseled on family planning and childhood immunization. Women booking early were also more likely to have iron and folate supplementation compared to those who booked late. There were no significant differences in antenatal investigations and pregnancy outcomes.

Educated women are generally more knowledgeable and more aware of their health needs, culminating to better health seeking behaviors. Similarly employment confers economic empowerment to women enabling them to seek health care early. Urban areas have better awareness and infrastructure, with access roads compared to rural areas, thus making health facilities more accessible. With this convenience, women in urban areas tend to book earlier compared to those in rural areas. Earlier studies on factors influencing early booking for antenatal care have demonstrated similar findings (14, 15, 19, and 20).

Women who booked early were found to be better birth prepared compared to those who booked late. They had better knowledge on various danger signs in pregnancy, peurperium and infancy, more knowledgeable on birth plan, childhood immunization and family planning. Iron and folate supplementation was also better among women who booked early. These findings are attributed to the fact that women who booked early had longer contact time with health care providers, enabling them ample time to discuss

various aspects of maternal and child health and interventions like iron and folate supplementation given. With better knowledge, women are more empowered, thus likely to seek health care in a timely manner before pathogenesis of any disease condition worsens (1, 4, 10). Birth preparedness is a safe motherhood strategy whose objective is to promote timely use of skilled maternal and neonatal care during child birth or obstetric emergencies by reducing delays at the first, second and third levels (24).

There was no significant difference in antenatal investigations like: HIV testing, VDRL, Blood group and Hemoglobin level between the early booked and late booked groups. These are content specific tests that are readily available regardless of the timing of ANC booking; therefore, their uptake was high in both groups. However, those who booked early had the advantage of appropriate timely interventions being undertaken if they tested positive, thus stopping the disease pathogenesis early (1, 4, and 10).

Maternal and neonatal outcomes are the eventual products of the various measures taken during ANC to ensure a safe pregnancy and birth. There was no significant difference in maternal and early neonatal outcomes between the early booked and late booked groups. Antenatal care does not directly address the direct causes of maternal and neonatal morbidity and mortality. Conceptually, maternal and fetal outcomes are impacted by Intrapartum factors that are not necessarily the consequence of antenatal care alone. Maternal outcomes were generally good among the early booked and the late booked, at 91.3% and 96.7% respectively. Although more women who booked early seem to have developed more poor maternal outcomes, this finding was not significant

and could not be generalizable. Most of these women may have had prior poor obstetric outcomes, therefore, tended to book early, or they may have been more predisposed to poor outcomes whether they booked early or not. Most of the poor neonatal outcomes in those who booked early could have also been out of mothers with prior poor obstetric outcomes, therefore, likely to book early.

Some of the limitations of this study are with generalizability. The study was done in an urban setting, therefore, findings may not be directly generalized to rural settings where the majority of Kenyan population seeks healthcare services. However, the findings on the additional benefits of early timing of ANC initiation are likely to apply even to rural settings with either high or low ANC coverage. The main utility of findings, however remain in addressing questions unique to urban centers where ANC coverage is already high and focus is now turning on timing of ANC enrollment.

CONCLUSION

Early booking for ANC confers better antenatal care outcomes, in terms of birth preparedness and interventions compared to late booking. Women who booked early tended to be more knowledgeable in terms of: having a birth plan, expected date of delivery, danger signs during pregnancy, danger signs during puerperium, danger signs in infancy, childhood immunization and knowledge about modern family planning methods .Interventions like iron and folate supplementation were better in early booking compared to late booking .There was no significant difference in maternal and early neonatal outcomes between early and late booking for ANC.

RECOMMENDATION

Early booking for antenatal care is beneficial and plays a key role in enhancing birth preparedness in readiness for motherhood. Recommendations based on this study are:

- Establishment of programmes that will promote, encourage and sustain early booking for ANC, before 16 weeks.
- Increase public awareness on the benefits of early booking for ANC. Since early booking is an initiative of the client, it's prudent that the public should be made aware of the benefits accrued by early and consistent ANC attendance.
- Enhance education and economic empowerment of women. Since better education and socio-economic status are positively associated with early booking, long term measures to enhance education and economic empowerment of women should be enforced by government.

TIME FRAME : (NOV 2012 - NOV 2014)

ACTIVITY	NOVEMBER 2012-MARCH2014	APRIL 2014-JULY2014	AUGUST 2014	SEPTEMBER 2014	OCTOBER 2014
Concept paper and proposal development					
Ethical approval					
Data collection					
Data analysis					
Report writing and presentation of results					

Budget

ITEM	UNIT COST (ksh)	TOTAL (ksh)	SOURCE
Printing and binding services	1	10,000	Personal salary and savings
Administration of Questionnaire	80/questionnaire	24,OOO	//
Transport and fuel	20,000	20,000	//
Airtime/communication charges	5,000	5,000	//
Statistician / data analysis	20,000	20,000	//
GRAND TOTAL		79,000	//

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Appendix 1: QUESTIONNAIRE

1. What is your age? ☐

2. What is your marital status?

Single ☐

Married ☐

Separated ☐

Widowed ☐

3. What is the age of your husband/spouse?

4. What is your level of education?

Primary ☐

Secondary ☐

Tertiary ☐

5. What is your husband's/spouse's level of education?

Primary ☐

Secondary ☐

Tertiary ☐

6. What is your occupation?

Employed ☐

Unemployed ☐

Others ☐

7. What is the occupation of your husband/spouse?

Employed ☐

Unemployed ☐

Others ☐

8. What is your usual residence?

Rural area ☐

Urban area ☐

9. What was your gestation at ANC booking?

<16 weeks ☐

>28 weeks ☐

10. How many ANC visits did you have?

1 ☐

2 ☐

3 ☐

4 ☐

>4 ☐

11. How many pregnancies have you carried beyond 28 weeks gestation?

1-2 ☐

3-4 ☐

>5 ☐

12. Have you ever lost any pregnancy below 28 weeks gestation?

Yes ☐

No ☐

13. Have you ever had any previous caesarean section?

Yes ☐

No ☐

14. What was the interval between you current pregnancy and previous pregnancy?

<1 year ☐

1-2 years ☐

>2years ☐

N/A ☐

15. Antenatal profile characteristics (to be gotten from ANC booklet/card)

Hb: <10g/dl ☐

>10g/dl ☐

VDRL: Negative ☐

Positive ☐

HIV: Positive ☐

CD4 count done (YES / NO)

Viral load done (YES / NO)

PMTCT option: 1. none

2. Option A

3. Option B

4. Option B plus

HIV: Negative ☐

Blood group: Rhesus positive ☐

Rhesus Negative ☐

ICT done (YES / NO)

Anti-D given (YES / NO)

Folic acid in 1st trimester given (YES/NO)

Iron supplementation given (YES / NO)

Deworming done (YES / NO)

Tetanus toxoid given (YES / NO)

16. Did you have any of the following medical conditions prior to your current pregnancy?

- Diabetes mellitus ☐
- Hypertension ☐
- Epilepsy ☐
- Sickle cell disease ☐
- Anaemia ☐
- Asthma ☐
- Others ☐

17. What was your mode of delivery?

- Spontaneous vertex delivery ☐
- Assisted vaginal delivery ☐
- Elective caesarean section ☐
- Emergency caesarean section ☐

18. How was your labour during this pregnancy?

- Obstructed labour ☐
- Prolonged labour ☐
- Preterm labour ☐
- Normal ☐

19. What was the maternal outcome from this pregnancy?

- Good ☐
- Poor [Specify]: ☐
  - Ruptured uterus ☐
  - Eclampsia ☐
  - Acute kidney injury ☐
  - ICU admission ☐
  - Puerperal sepsis ☐
  - PPH ☐

Maternal death ☐

Others ☐

20. What was the neonatal outcome from this pregnancy?

Good ☐

Poor [Specify]: Neonatal Death ☐

MSB ☐

FSB ☐

Congenital Anomalies ☐

Birth Asphyxia ☐

Hydrops foetalis ☐

NBU admission ☐

Others ☐

21. What was the birth weight?

<1500g ☐

1501-2500g ☐

> 2500g ☐

22. Did you know your EDD? Yes ☐

No ☐

23. Did you have a birth plan? (Desired place of birth, preferred skilled birth attendant, birth companion, means of transport, blood donor, funds set aside for services).

Yes (if she can mention at least three) ☐

No (if she can't mention at least three) ☐

24. What is the duration of exclusive breast feeding?

Six months ☐

Don't know ☐

25. Do you know the danger signs during pregnancy?

Yes (if she can mention at least three) ☐

No (if she can't mention at least three) ☐

26. Do you know the danger signs during peurperium?

Yes (if she can mention at least three) ☐

No (if she can't mention at least three) ☐

27. Do you know the danger signs during infancy?

Yes (if she can mention at least three) ☐

No (if she can't mention at least three) ☐

28. Do you know the childhood immunization schedule?

Yes (if she can mention at least three correctly) ☐

No (if she can't mention at least three correctly) ☐

29. Do you know the family planning methods available?

Yes (if she can mention at least three) ☐

No (if she can't mention at least three) ☐

30. What was your hemoglobin level at term or /at delivery

>10gm/dl ☐

8-9 gm/dl ☐

<8 gm/dl ☐

Not know ☐

Appendix 2: INFORMED CONSENT FORM

STUDY TITLE: Influence of early booking for antenatal care on antenatal and early pregnancy outcomes at KNH.

INVESTIGATOR'S CONTACT:

DR. FELIX ATISA
Department of Obstetrics and Gynecology

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Telephone number: 0720246118

The Chairperson, KNH-ERB

Prof. GUANTAI

P.O BOX 20723-00202, Nairobi, Kenya

Telephone number 27263600 Ext 44102

PARTICIPANTS NUMBER: ☐

Part I: Information Sheet

INTRODUCTION:

Hello my name is Felix Atisa, from The University of Nairobi and Kenyatta National Hospital. I am conducting a study on influence of early booking on outcomes of antenatal care at KNH. I would like to ask you question regarding your antenatal care attendance, collect some information from your ANC card and lastly follow you up 72 hours post delivery to document the outcome of your pregnancy.

I will explain to you what this study is all about and ask you for permission to continue talking with you. If you don't want to participate in this study you can leave at any time. If you agree to participate in this study you will sign this form.

PURPOSE OF STUDY

In Kenya only 15% of pregnant women attend the recommended early first ANC visit before 16 weeks. The purpose of this study is to evaluate the influence of early booking on antenatal care outcomes at KNH. This will enable us establish if there are any significant benefits like birth preparedness, adequate investigations and interventions and improved maternal/neonatal indicators of morbidity.

BENEFITS

You attended ANC booking early or late, there will be no direct benefits to you. By participating in this study you will help us evaluate your outcome in terms of maternal and neonatal outcomes and birth preparedness, and compare between those who made early and late bookings .A significant difference demonstrated will enable us put more emphasis on early booking thus improve pregnancy outcomes in future.

RISKS

There are no risks involved from participating in the study. All tests for example hemoglobin level, urinalysis etc and treatment you receive will be the usual care that anyone whether attended late or early booking received.

EXPECTATIONS

By agreeing to participate you are expected to answer questions regarding your biodata, medical and obstetric history. You are also, agreeing to let the study team obtain information from your medical records about any tests and treatment you receive and pregnancy outcome.

CONFIDENTIALITY

The information you provide will be recorded on forms with no names or any information

That will identify you and this is what will be used to analyze the information we receive and report findings. Only the researchers will know your number and will lock that information up.

VOLUNTARY PARTICIPATION

You are free to participate or not participate in this study. You can also stop participation at any time. Your decision will not affect the type of care you receive. You are also free to ask questions now and at any other time.

Who to Contact:

You can ask me questions now or later. You can ask the nurses associated with this study questions, or you can call Dr Felix Atisa, Telephone number 0720246118 Email: felixatisa @yahoo.com

If you have any complaint or concerns about this study kindly contact, the chairperson of the Ethics Board on 2726300 ext.44102.

Part II. Consent

I have read the information, or it has been read to me. I have had the opportunity to ask questions about it and my questions have been answered to my satisfaction. I consent voluntarily to participate in this study

Name of Participant_____

Signature of Participant _____

Date _____

Day/month/year

If illiterate:

A literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the study team). Participants who are illiterate should include their thumb-print as well.

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent freely.

*Name of witness*_____ *AND Thumb print of participant*

Signature of witness _____

Date _____

Day/month/year

Statement by the researcher/person taking consent

I have accurately read out the information sheet to the potential participant, and to the best of my ability made sure that the participant understands the objective of the research project.

I confirm that the participant was given an opportunity to ask questions about the nature and manner of the study and questions asked by the participant have been answered correctly and to the best of my ability. I confirm that the individual has not been coerced into giving consent, and the consent has been given freely and voluntarily.

Name of Researcher/person taking the consent_____

Signature of Researcher /person taking the consent_____

Date _____

Day/month/year