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SCHOOL OF NURSING SCIENCES

OUTCOMES OF INDUCTION OF LABOR IN WOMEN WHO DELIVERED AT KENYATTA NATIONAL HOSPITAL

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DECLARATION

This thesis is my original work and has never been presented for any degree award in any University or institution of higher learning.

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CERTIFICATE OF APPROVAL

This research work has been submitted with our approval as University Supervisors.

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DEDICATION

This work is dedicated to my dear husband, Kiprotich Limo, and our beloved son, Konel Kigen.

ACKNOWLEDGEMENTS

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ABSTRACT

Problem statement

Induction of labor has been associated with poor maternal and perinatal outcomes compared with spontaneous labor (Guerra et al, 2009). Despite this, studies show that it is the fastest growing medical procedure. Up to 25% of all deliveries at term are conducted through induction of labor (WHO, 2011)

Purpose of the study

The main purpose of the study was to determine the outcome of induction of labor in women who delivered through induction of labor, taking into consideration the demographic factors, social-economic factors, institutional factors and health indication for induction.

Study design

This was a cross- sectional institutional based study to determine the outcome of induction of labor in women at Kenyatta National Hospital. Social, demographic, health and institutional related factors were explored.

Population and sample

The study population consisted of women admitted to postnatal wards at Kenyatta National Hospital after delivery through induction of labor. A systematic sampling procedure was used to select 42 study participants.

Data collection

A structured pretested questionnaire was used to collect quantitative data and key informant interview guide for qualitative data.

Data analysis

Collected data was analyzed using the SPSS for quantitative data and Nvivo for qualitative data.

Findings

In this study it was found that the outcome of induction of labor is influenced by age, parity, gestation, type of employment and women being given information on the nature of the procedure. It was also found that parity is significant in determining the time taken between induction and delivery. The most common indication for induction was post-term and pre-

eclampsia. It was established that pain management and client information on the procedure were wanting. It was established that the rate of caesarean section after induction of labor was more than six times (38%) the rate in the country (6%). Majority of the women took more than 24 hours to deliver after induction of labor. There were minor maternal complications following induction of labor during the study but 19.5% babies developed complications that influenced the attitude of the mothers toward induction.

Recommendations

The department of reproductive health should strive to reduce the rate of caesarean (38%), time taken between induction of labor and delivery and neonatal complications. The doctors and nurses should perform pain management interventions during induction of labor. Health workers should also improve on client involvement during induction of labor.

Benefits of findings

The findings may be used by the hospital to evaluate the protocols on induction of labor. It also contributes to the body of knowledge on induction of labor and can be utilized by other researchers.

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ABREVIATIONS

WHO - World Health Organization

ICU - Intensive Care Unit

ACOG - American College of Obstetricians and Gynecologists

RCOG - Royal College of Obstetrician and Gynecologists

KDHS- Kenya Demographic Health Survey

PROM - Pre-Labor Rupture of the Membranes

PPROM - Premature Pre-labor Rupture of the Membranes

ARM - Artificial Rupture of Membranes

KNH - Kenyatta National Hospital

MDGs - Millennium Development Goals

HIV - Human Immunodeficiency Virus

QHOM - Quality Health Outcomes Model

IUGR - Intrauterine Growth Retardation

SPSS - Statistical Package for Social Scientists

KNBS - Kenya National Bureau of Statistics

NBU – New Born Unit

DM – Diabetes Mellitus

OPERATIONAL DEFINITIONS

Parity- Number of viable births, 28 weeks and above.

Gestation - The period in weeks of fetal development from conception till birth. It is part of the demographic factors influencing outcomes of induction of labor.

Education level- Level reached in school; primary, secondary or college.

Employment- a way of generating outcome; formally employed, self-employed and housewife

Pre- labor rupture of membranes- is rupture of membranes at 37 weeks and beyond and before the onset of labour

Premature- rupture of membranes- is referred to as rupture of membranes before 37 completed weeks of gestation

Post- term - Pregnancy that last more than 42 week gestation

Macrosomia- is excessive growth of the fetus and is associated with increased perinatal mortality and morbidity

Oligohydramnious- is abnormally small amount of amniotic fluid

Systems- Organization of the hospital structure to be able to function.

Policies- Set of rules to guide decision making and achieve a rational outcomes

Personnel- human resource includes doctors, nurses and others.

Spontaneous vaginal delivery- Normal delivery through birth canal

Maternal complication- undesired results experienced by women during induction of labor such as perinatal laceration, need for uterotonic agents, hysterectomy, ICU admission, hospital stay >7 days and increased need for anesthetic/analgesic procedures.

Neonatal complication- undesired results developed by babies born following induction of labor low 5-minute Apgar' score, very low birth weight, admission to neonatal ICU and delayed initiation of breastfeeding.

Caesarean delivery- Delivery through a surgical procedure where the baby is extracted through incision.

CHAPTER 1: INTRODUCTION

1.1 Background information

Induction of labor is an intervention to initiate the process of labor by artificial means after 24 weeks gestation (Fraser and Cooper, 2009). It is also defined as the process of artificially stimulating the uterus to start labor by administering oxytocin or prostaglandins to the pregnant woman or by manually rupturing the amniotic membranes (WHO, 2012). It is increasingly being done throughout the world. More and more pregnant women globally undergo induction of labor to deliver their babies. In developed countries, for instance, 25% of all deliveries at term are terminated by induction of labor (WHO, 2012). The rates of induction of labor have more than doubled from the past (AHRG, 2009, Mozurkewich et al 2009, Macdorman 2002 et al).

Induction of labor is associated with poorer maternal and perinatal outcomes when compared with spontaneous labor (Jacquemyn et al, 2012, WHO, 2012, Guerra et al, 2009). There is increased risk of caesarean section, maternal complications and neonatal complications. Maternal complications include perineal lacerations, increased use of uterotonic agents and anesthetic/analgesic agents, hysterectomy, ICU admission and hospital stay of more than 7 days. Neonatal complications include low 5-minute Apgar' score, very low birth weight, admission to neonatal ICU and delayed initiation of breastfeeding (Jacquemyn et al, 2012, Guerra et al, 2009).

Pharmacologic agents used in induction of labor increase the risk of uterine hyper-stimulation, fetal distress and cesarean birth (ACOG, 2009). The discomfort and frequency of oxytocin-induced contractions also create need for epidural analgesia/anesthesia. This in turn increases the risk of complications such as hypotension, fever, and fetal heart rate decelerations. (ACOG, 2009)

Indications for induction of labor are postdates, preeclampsia, diabetes, premature rupture of membranes, oligohydramnios among others (Fraser and Cooper, 2009, WHO, 2011, Mozurkewich et al 2009). It can also be elective which is carried out for the convenience of the mother, often to avert the possibility of delivery outside the hospital when labor is judged to be imminent and the mother is expected to have an unusually rapid birth (Fraser and Cooper, 2009).

The study aimed at determining the outcomes of induction of labor at Kenyatta National Hospital taking into consideration the social factors, demographic factors, health factors and institutional factors.

1:2 Problem statement

Induction of labor has been strongly associated with poor maternal and perinatal outcomes (Guerra et al, 2009, ACOG, 2009, WHO, 2012). It is recommended that it should be performed only when there is a clear medical indication for it, the expected benefits should outweigh its potential harms (WHO, 2012, RCOG, 2008). In practice this is not the case in that elective induction of labor, without any medical indication, is increasingly being done (Amanda et al 2008, Grivell, 2011).

Kenyatta National Hospital being the largest referral hospital handles complicated obstetric cases of which some are subjected to induction of labor (KNH information system, 2012). There are protocols on induction of labor that are being implemented in the hospital, but according to the researcher's knowledge, evaluation of the outcome of induction of labor has not been undertaken. According to the records in labor ward an average of five women are done labor induction in a day due to several indications.

Induction of labor may therefore be indirectly related to increased maternal and neonatal morbidity, which is the major health concern in the country.

1.4 Research question

What are the outcomes of labor induction among women at Kenyatta national hospital?

1.5 Objectives of the study

1.5.1 Broad objective

The objective of the study was to determine outcomes of induction of among women delivering at Kenyatta national hospital.

1.5.2 Specific objectives

1. To describe demographic factors influencing outcomes of induction of labor among the women delivering at Kenyatta National Hospital.

2. To describe the socioeconomic factors related to outcomes of induction of labor among women delivering at Kenyatta National Hospital.

3. To determine health indications influencing the outcome of induction of labor among women at Kenyatta National Hospital.

4. To determine institutional factors that influences the outcomes of induction of labor among the women delivering at Kenyatta National Hospital.

1.6 Study justification

In Kenyatta National Hospital induction of labor is a common procedure, from the records in the ward an average of five mothers are induced in a day but no evidence of evaluation of its outcomes. WHO and other studies recommend evaluation of induction of labor to determine the risks related to it (WHO, 2012, Mozurkewich et al, 2011) and this had not been undertaken in

Kenyatta National Hospital. The study will contribute to decrease in maternal and neonatal mortalities by improving the management of women undergoing induction of labor. The results can be utilized by KNH and Ministry of Health, where they may use it to review procedures and policies of induction of labor. The results will also contribute to the body of knowledge on induction of labor and can be utilized by other researchers.

1.7 Purpose of the study

The purpose was to evaluate the outcomes of induction of labor while considering clients and institutional characteristics.

CHAPTER 2: LITERATURE REVIEW

2.1 Induction of labor

Induction of labor is an intervention to initiate the process of labor by artificial means after 24 weeks gestation (Fraser and Cooper, 2009). Induction of labor is considered when the maternal or fetal condition suggests that a better outcome will be achieved by intervening in pregnancy than by allowing it to continue. The reasons are maternal problems, fetal problems and sometimes because of social issues. Induction of labor is performed when vaginal birth is the most appropriate mode of delivery and therefore it is contraindicated when otherwise. (Fraser and Cooper, 2009, WHO 2011) Conditions such as placenta praevia, malpresentation, HIV positive (not on antiretroviral therapy), active genital herpes, cord presentation or prolapsed, cephalopelvic disproportion, and fetal compromise are contraindicated in induction of labor. (Fraser and Cooper, 2009, Gabbe, 2007)

Induction of labor is one of the medical procedures that are increasingly being practiced around the world. For example, In the United states, rate of induction of labor more than doubled between the years 1980 and 2001 (AHRG, 2009, mozurkewich et al 2009). According to WHO, up to 25% of all deliveries at term involve induction of labor in developed countries, but generally lower in developing countries. However, in some settings in developing countries induction of labor is as high as those observed in developed countries (WHO, 2011). Rate of induction of labor vary from region to region. In the United States of America and United Kingdom about 20% of all deliveries are by induction of labor (ACOG, 2009, Fowele et al, 2010), while 11.4% is reported in Latin America (Guerra et al 2009). It is generally lower in African region as shown by a study done in Nigeria that reported 3% (Fowele et al, 2010, Ekele and Jaiyeola, 2002).

Kenya is among the countries that were involved in a study on prevalence of induction of labor and determinants of its use in Africa. In the study secondary analysis of the WHO global survey of maternal and newborn health of 2004 and 2005 was performed and an average rate of induction of 4.4% with a range of 1.4% to 6.8% was recorded in Africa. Pre labor rupture of membranes was the commonest indication for induction of labor. According to the study, rate of induction of labor in Kenya was found to be 3.9% (Fowele et al, 2012).

In Kenyatta National Hospital records, induction of labor is a common procedure but assessment of it has not been undertaken and this is to the knowledge of the researcher. The latest KDHS report that was done in the year 2008-2009 does not include information on induction of labor (KDHS, 2010).

The general principles related to the practice of induction of labour according to WHO 2011 are:

- Induction of labour should be performed only when there is a clear medical indication for it and the expected benefits outweigh its potential harms.
- In applying the recommendations, consideration must be given to the actual condition, wishes and preferences of each woman, with emphasis being placed on cervical status, the specific method of induction of labour and associated conditions such as parity and rupture of membranes.
- Induction of labour should be performed with caution since the procedure carries the risk of uterine hyperstimulation and rupture and fetal distress.
- Wherever induction of labour is carried out, facilities should be available for assessing maternal and fetal well-being.

- Women receiving oxytocin, misoprostol or other prostaglandins should never be left unattended.
- Failed induction of labour does not necessarily indicate caesarean section.
- Wherever possible, induction of labour should be carried out in facilities where caesarean section can be performed.

  (WHO, 2011)

2.2 Demographic factors influencing the outcome of induction of labor

Demographic factors are statistical characteristics of a population and in the study it includes age, parity, gestation and marital status. Women demographic factors have been noted to influence the outcome of birth. Maternal age has been demonstrated to cause a significant difference in the length of labor, older women having persistently longer first and second stages of labor than younger women. The differences were clinically significant primarily in the second stage for both nulliparous and multiparous women. Factors of interest that may vary by maternal age include differences in maternal habitus and fetal size, measures of general maternal health, and iatrogenic factors. (Greenberg et al, 2007)

In a study by Wilson, it was found that after the age of 35, the likelihood of a cesarean birth increases by about 5% for each additional year and this places older primiparous women being done induction of labor in the highest risk for cesarean birth (Wilson et al, 2000). Guerra et al 2009 also concluded that nulliparity and age over 35 years were risk factors during labor induction (Guerra et al, 2009).

Parity was also found to determine the birth outcome. Induction of labor in primiparous women was associated with higher risks of cesarean delivery compared to multiparous women (Wilson et al, 2000, Guerra et al 2009).

2.3 Socioeconomic factors influencing the outcome of induction of labor

Social factors are characteristics such as educational level, religion, ethnicity, and economic status. Maternal educational level was found to be a significant predictor for cesarean births but only for multiparous inductions, either electively or because of medical reasons. The higher the educational level, the greater the likelihood of a cesarean birth after induction of labor compared to women who delivered after spontaneous labor (Wilson et al, 2000). According to the same study, ethnicity and socioeconomic status were found to have no effect on the cesarean rate for either multiparous or primiparous women after induction of labor (Wilson et al, 2000).

In another study it was found that mothers from the poor socio-economic areas were at a greater risk for poor pregnancy outcome (Guerra et al, 2009).

2.4 Health indication for induction of labor

There are many medical circumstances which necessitate shortening the duration of pregnancy by induction of labor. Mothers may request for induction of labor for psychological or social reasons, without any clinical indication and is referred to as elective induction of labor (Fraser and Cooper, 2009).

Post term pregnancies are those that continue beyond 287days (41weeks) from the first day of the last menstrual period (RCOG, 2001). There was evidence supporting induction of labour at or beyond 41 weeks (287days) gestation, that it may reduce perinatal mortality and meconium aspiration syndrome. It was also found that induction in post term does not result in more

caesarean deliveries than serial antenatal monitoring even among women whose cervix is not favourable for induction (Mozurkewich et al, 2009). The same recommendation was provided by WHO, 2011 though the quality of evidence for the recommendation was rated as low (WHO, 2011).

Pre-labor rupture of the membranes (PROM) is rupture of membranes at 37 weeks and beyond and before the onset of labour (Fraser and cooper, 2009). Evidence shows expedited induction of labour after PROM reduces chorioamnionitis, endometritis, and admissions to a neonatal intensive care unit (Mozurkewich et al 2009, WHO, 2011). Premature pre-labor rupture of the membrane (PPROM) is referred to as rupture of membranes before 37 completed weeks of gestation (Fraser and Cooper, 2009). Induction of labor in PPROM also reduced the incidence of chorioamnionitis though the optimal gestational age for induction of labour was not established (Mozurkewich et al, 2009).

Oligohydramnios is abnormally small amount of amniotic fluid (Fraser and Cooper, 2009). The evidence was insufficient to recommend routine induction of labour in oligoydramnios (Mozurkewich et al, 2009, WHO, 2011). Induction of labor in women with diabetes in pregnancy reduces fetal macrosomia (Mozurkewich et al, 2009). WHO does not recommend induction of labor before 41weeks of gestations if diabetes is the only abnormality but the recommendation had very low quality of evidence (WHO, 2011). Induction of labor has no harmful or beneficial effects in maternal cardiac disease but a weak recommendation in pre-eclampsia and eclampsia (Mozurkewich et al, 2009).

Lastly, elective induction of labor, without any medical reason, is increasingly being done. In a study, it was found that the reason for wanting elective induction at term included woman's

physical discomfort, scheduling issues, or concern for rapid progression of labor away from the hospital and also clinician convenience. (Amanda et al, 2008) Elective induction was found to be an important risk factor for cesarean delivery (Grivell et al 2011, Simpson, 2003, Seyb et al, 1999).

2.5 Institutional factors that influence outcomes of induction of labor

Institutional factors that may influence health outcomes involves organizational systems (policies, protocols and procedures), personnel (skills, type, experience etc) hospital type (teaching, referral, community, private etc), and physical structures. The quality health outcome model indicates that interventions affect and are affected by both system and client characteristics in producing desired outcomes. Hospital size, ownership, personnel characteristics, client demographics, and technology would be among structural elements that interact with treatment intervention processes to affect health (Mitchell, 1998).

The resources available at the institution for the care of the woman and her newborn infant are factors that must be taken into consideration when indicating induction of labor. Availability of electronic fetal heart rate monitoring system may reduce adverse fetal outcomes caused by unintentional uterine hyperstimulation and unrecognized fetal hypoxia in induction of labor. (Guerra et al, 2009, Simpson, 2003)

The type of hospital affect the practices of induction of labor, in a study to establish the timing of term births or induction and cesarean delivery rates in different hospital settings, rates of inductions of labor ranged from 27-40% in nonteaching institutions and 22-32% in teaching institutions. The key finding of the study was that patients who deliver at community hospitals

are 70-80% more likely to undergo labor induction before the optimal gestational age of 39 weeks verses those at university hospitals. (Snyder, 2011)

Staffing especially of nurses is an essential factor to consider during induction of labor. The appropriate number of qualified professional registered nurses should be in attendance during cervical ripening and induction or augmentation of labor. The institution should also develop protocols and policies to guide especially the use of pharmacological agents used in induction of labor. The policies and protocols should be based on scientific evidence. (Simpson, 2002)

Pharmacological agents and mechanical methods may include prostaglandins, oxytocin, membrane sweep and artificial rupture of membrane (Fraser and Cooper, 2009). Prostanglandins are endogenous compounds found in the myomentrium, deciduas and fetal membranes during pregnancy. Administration of prostaglandins results in dissolution of collagen bundles and an increase in submucosal water content of the cervix. These changes are similar to those observed in early labor. Local administration of prostaglandins in the vagina or the endocervix is the route of choice because of fewer side effects and acceptable clinical response (Gabbe et al, 2007). Use of prostanglandin is associated with reduced likelihood of failure to deliver vaginally within 24 hours but increases the risk for hyperstimulation with and without FHR changes (Mozurkewich et al, 2011).

Oxytocin is a polypeptide hormone produced in the hypothalamus and secreted from the posterior lobe of the pituitary gland in a pulsative fashion. It is identical to its synthetic analog that when administered produces periodic uterine contractions. It is administered intravenously, as an infusion to allow continuous steady concentration (Gabbe et al, 2007). Oxytocin leads to more women having their babies within 24 hours and lower infections in pre-labor rupture of

membranes, compared with expectant management of labor. However, more women may need an epidural for pain relief compared to expectant management of labor. (Alfirevic et al, 2009)

Membrane sweep refers to digital separation of the chorioamniotic membrane from the cervix and lower uterine segment. It is presumed to cause the release of endogenous prostaglandins from adjacent membranes and decidua, as well as from the cervix. The fetal vertex should be well applied to the cervix, and the cervix should be dilated sufficiently to allow introduction of the examiner's finger (Gabbe et al, 2007). Sweeping has been found to bring labor and reduces the need for other methods of labor induction such as oxytocin or prostaglandins. The disadvantage is that it causes discomfort, some bleeding and irregular contractions (Boulvain et al, 2010).

Artificial rupture of the membranes also referred to as amniotomy is a technique involving the perforation of the chorioamniotic membranes. Before it is performed, confirmation is essential that the fetal vertex, and not the umbilical cord or other fetal part, is presenting and is well applied to the cervix. The fetal heart rate should be monitored both before and after the procedure. The amniotic fluid should also be assessed for color and amount (Gabbe et al, 2007). In a review of trials, insufficient evidence on use of amniotomy alone to induce labor was found (Bricker and Luckas, 2000).The longer interval between ARM and birth may increase the risk of infections (Blackburn, 2007).

2.6 Maternal and neonatal outcomes of induction of labor

Induction of labor has been shown to be efficient in the management of post-term pregnancy and in expediting delivery when the mother or infant is sufficiently ill to make continuation of the pregnancy hazardous (macdorman et al, 1998). It has been noted to be one of the ways of

preventing maternal complications and improving pregnancy outcomes. In a study done in Africa it was found that almost 50% reductions in stillbirths and perinatal death when induction of labor was employed in the presence of medical complications in term pregnancies (Fowele et al, 2012). Elective induction of labor at 41weeks of gestation and beyond was also associated with a decreased risk for cesarean delivery and meconium-stained amniotic fluid, though Caughey et al recommended future studies to examine elective induction of labor in settings where most obstetric care is provided (Caughey et al, 2009). Findings by stock et al, 2012 indicated that elective induction of labor at term gestation can reduce perinatal mortality in developed countries without increasing the risk of operation delivery (Stock et al, 2012)

Other studies associate induction of labor with negative maternal and perinatal outcomes. In the study done in Latin America, induction of labor was noted to result to poorer maternal and perinatal outcomes than spontaneous labor. Maternal complications included high rate of perinatal laceration, need for uterotonic agents, hysterectomy, ICU admission, Hospital stay>7 days and increased need for anaesthetic/analgesic procedures. Adverse neonatal outcomes were low 5-minute Apgar score, very low birth weight, admission to neonatal ICU and delayed initiation of breastfeeding (Jacquemyn et al, 2012, Guerra et al, 2009).

Elective induction of labor was also associated with a significantly increased cesarean delivery in nulliparous women. Women experiencing spontaneous labor had a 7.8% cesarean delivery rate, whereas women undergoing elective labor induction had a 17.5% cesarean delivery rate (seyb et al, 1999). Grivell et al 2012 also had the same conclusion that induction of labor for non-recognized indications at term is associated with an increased risk of a range of outcomes, including cesarean section.

2.7 Knowledge attitude and practices of women undergoing induction of labor

Induction of labor is a common procedure and it involves a set of interventions that presents challenges for both clinicians and mother (RCOG, 2001). Induction of labor has elicited criticism among parturient and in the women's movements, because it is thought to reduce positive mental impact of normal childbirth (Bramandat, 1994). The obstetric staff may not appreciate parturient feelings during childbirth to the same extent as the parturient themselves (Drew et al, 1989). In a study on women anticipation of and experiences with induction of labor, it was noted that mothers needed more information on causes for or practice of labor induction. Most women also wanted to influence the method and timing of induction, taking the women's opinion into consideration was found to aid adaptation to induction of labor (Nuutila et al, 1979).

Cartwringht found that women are conservative in that they tend to opt for the things they have experienced. This holds particularly for home births but also for hospital births and for having or not having epidural analgesia. It does not hold for those who had an induction, mainly because induction was perceived as "unnatural."78% of those who had had induction preferred not to have another (Cartiwright , 1977).

2.8 Theoretical framework

The Quality Health Outcome Model (QHOM) will be used as the framework in this study. QHOM was developed in 1998 to provide a framework for quality and outcomes research. QHOM addresses the integration and interaction of four constructs; systems, intervention, patient/client, and outcome. Multiple related variables influence healthcare delivery and ensuing outcomes by positing relationships with variables that not only act upon but are equally affected by other components in the model (Mitchell et al, 1998).

In this study, the QHOM has been modified to provide a valuable framework to allow the analysis of outcomes of labor considering influence of socio-demographic factors, health factors, institutional factors and client's knowledge, attitude and practice.

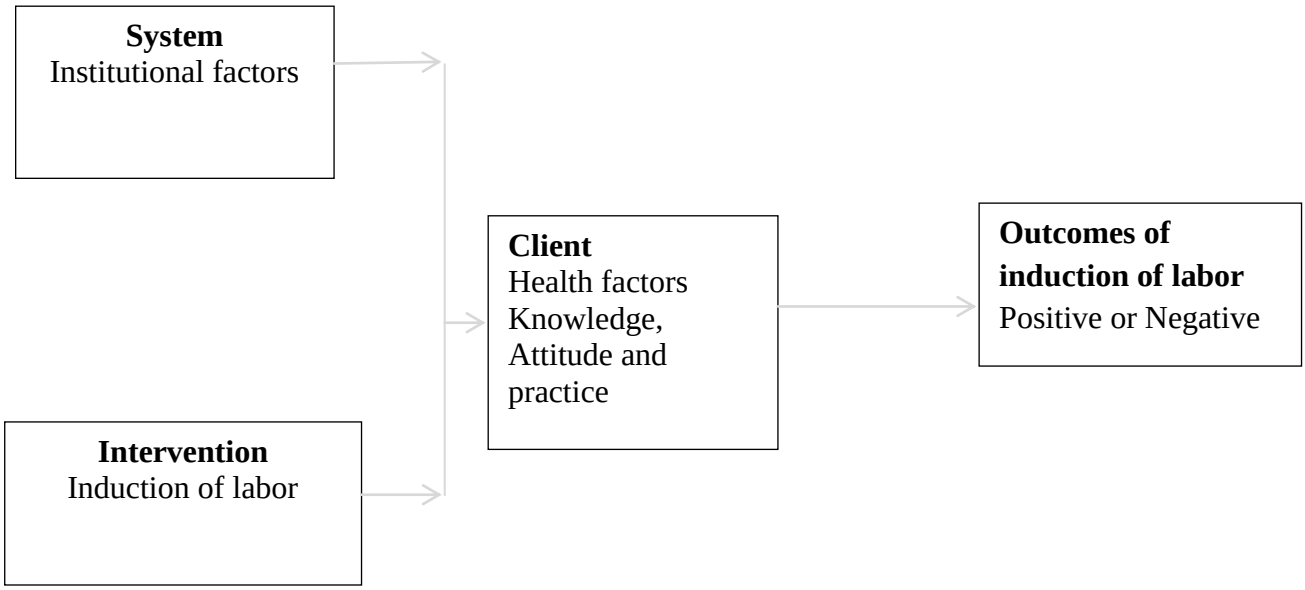
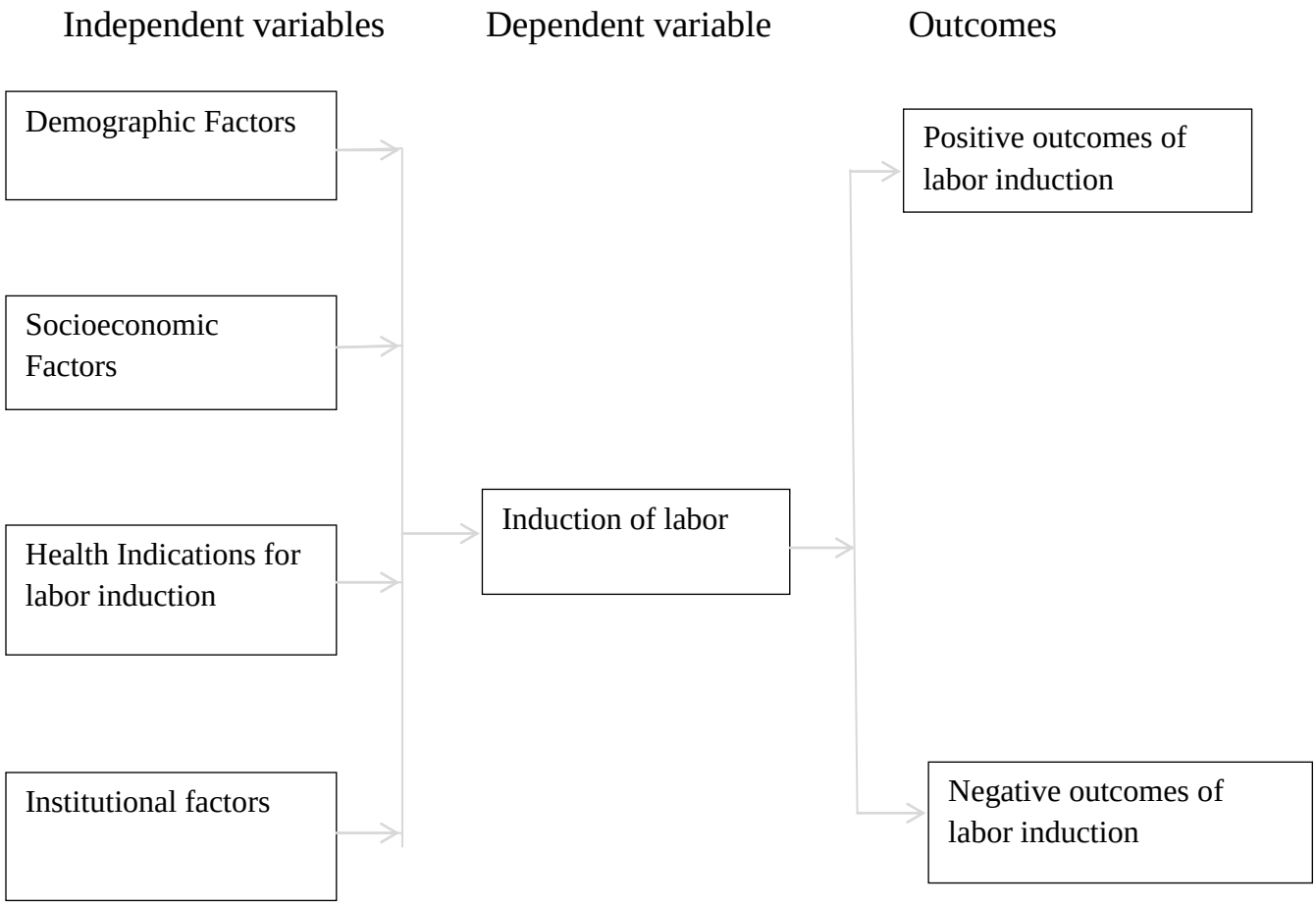


Figure 2.1 Modified QHOM of induction of labor

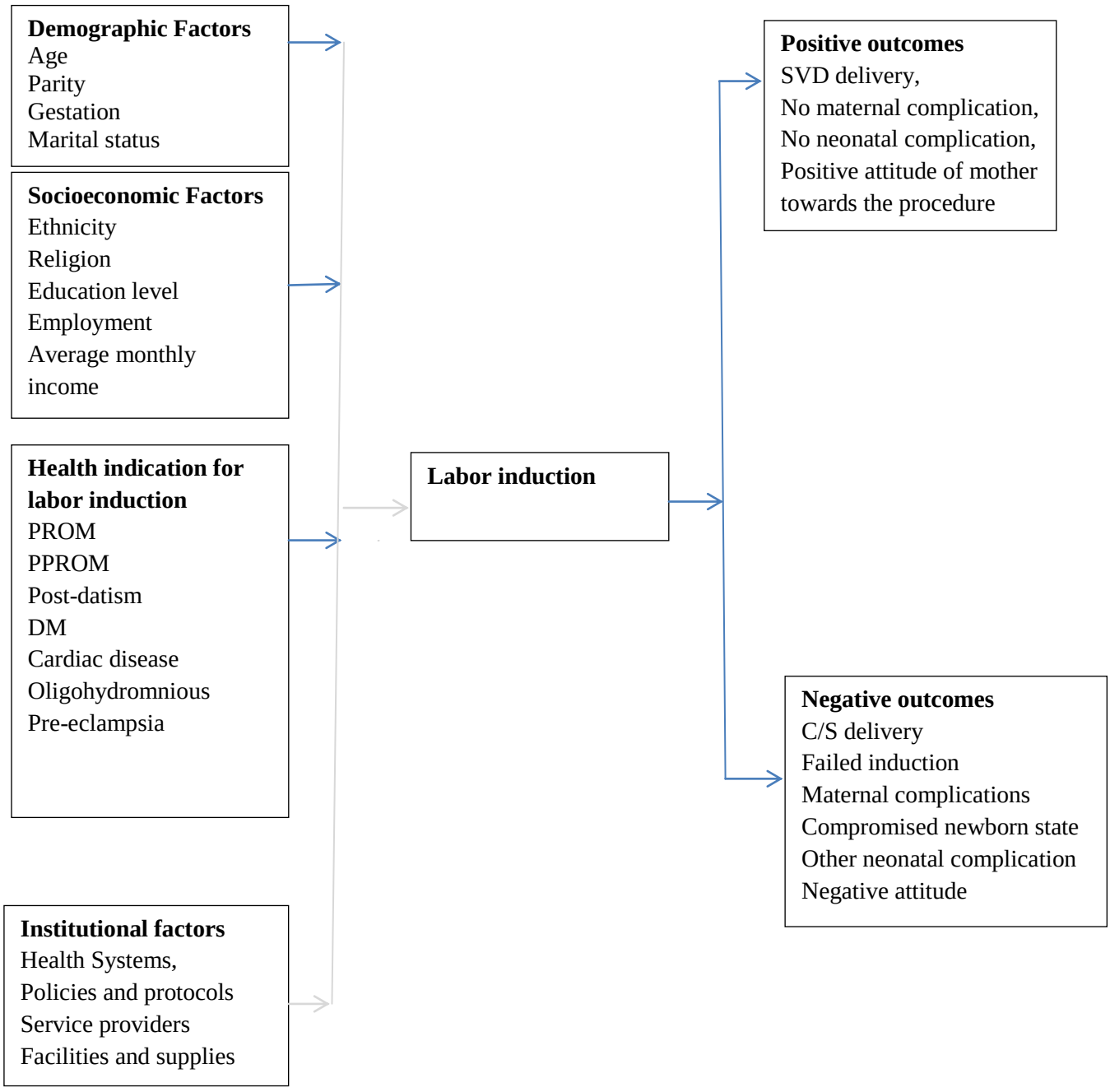
2.9 Conceptual framework



The conceptual framework means that demographic factors, social factors and institutional factors influence the outcomes of labor induction. Also the circumstance that necessitates labor induction influences the end result.

2.10 Operational framework

Independent variables dependent variable outcome variable



3.11 Definition of key variables

Demographic Factors – Statistical characteristics of a population includes age, parity, gestation and marital status.

Socio-economic Factors – Factors such as educational level, religion, ethnicity, and economic status that influence outcomes of induction of labor

Health indication for labor induction – Are medical factors that necessitate termination of pregnancy by induction of labor. It is an independent variable that influences outcomes of induction of labor.

Institutional Factors – Factors such as staff, organizational systems, and organizational physical structures. It is an independent variable that influences outcomes of induction of labor.

Positive outcomes – Desirable results after induction of labor, includes vaginal delivery, hospital delivery within 12hrs, good Apgar score among others.

Negative outcomes – undesirable results of induction of labor, such as uterine hyperstimulation, prolonged labor, antepartum and postpartum hemorrhage, caesarean section, complication of the baby.

CHAPTER 3: METHODOLOGY

3.1 Study design

This was a descriptive cross- sectional institutional based qualitative and quantitative study which determined the outcomes of induction of labor among mothers delivering at Kenyatta national hospital.

3.2 Study area

The study was conducted in Kenyatta National Hospital postnatal wards. KNH is the largest teaching and referral hospital in Kenya and is situated in Nairobi Upper Hill area. Kenyatta National Hospital has a capacity of 1800 beds, over 6000 staff members, an average annual outpatient attendance of 600,000 visits and an average annual inpatient attendance of 89,000 patients. The hospital maternity has a capacity of 127 beds and an average of 979 deliveries per months of which an estimate of 150 deliveries are through induction of labor (KNH Health information department, 2012). Being a referral, the hospital, handles many complicated obstetric cases and a variety of patients, suitable for the study.

3.3 study population

The study population consisted of 42 women who had undergone induction of labor at Kenyatta National Hospital post natal wards.

3.4 Inclusion criteria

- Women delivered through induction of labor at maternity wards at Kenyatta National Hospital.
- Women delivered at gestational age of 28 weeks and above
- Women of all parities

3.5 Exclusion criteria

- Women delivered through expected spontaneous vaginal delivery

- Women delivered before 28 weeks of gestation
- Women who declined to consent

3.6 Sample size determination

The sample size was determined using the following formula:

(Fisher et al 1998)

$$n=\frac{1.96^2 \times p(1-p)}{d^2}$$

$$n=\frac{1.962 \times 0.039(1-0.039)}{0.05^2}$$

n= 58

Description:

n = required sample size

1.96 = confidence level at 95% (standard value of 1.96)

p = estimated prevalence of induction of labor 3.9%, (Fowele et al 2012).

d = margin of error at 5% (standard value of 0.05)

According to the records in Kenyatta National Hospital labor ward 150 women are done labor induction per month. During the one month of data collection an estimated population size of 150 was expected.

Because estimated population was less than 10,000, the following adjustment factor was used;

Nf = n/1+ (n/N) (Mugenda and Mugenda, 2003)

Where:

Nf = desired sample for a population less than 10,000

n = sample size for a population greater than 10,000 (58 as per the above calculation of sample)

N = estimated population size=150

Therefore the desired sample was

$$\mathbf{Nf} = {}^{58}/_{1 + (58/150)}$$

= 41.8

= 42

3.7 Sampling method

A systematic random sampling procedure was used to choose the study participants. Systematic sampling is a statistical method involving the selection of elements from an ordered sampling frame. The sampling starts by selecting the first subject from a serialized list of subjects by using computer generated random numbers. Every k^{th} subject in the frame from this first patient is selected, where *k* is the sampling interval, until the sample size is achieved.

3.8 Sampling interval

Sampling interval was calculated from the following formula;

$$k = \frac{N}{n}$$

Where:

k is the sampling interval

n is the sample size, and

N is the population size

During the month of data collection, estimate of 150 women were expected to be done labor induction from where 42 subjects were selected randomly.

By substitution therefore:

$$k = 150/42$$

$$= 3.57$$

$$= 4$$

Therefore, from the first selected subject, every fourth subject was included in the study until subject size was achieved.

3.9 Identification, recruitment and selection of participants

The nurses who were admitting the mothers/women to the postnatal wards during the period of data collection assisted with identification of the participants. The principal investigator together with the research assistants worked closely with the admitting nurse in the postnatal ward during the period. The clients who meet the selection criteria were allocated numbers as they were admitted. Every 4^{th} consenting subject from the first randomly selected subject was included in the study.

4 key informants were selected from among persons responsible for the care of the participants and this includes nurses and doctors. Each was interviewed individually using the key informant's interview.

3.10 Recruitment and training of research assistants

Research assistance were recruited and trained. Nurses with bachelor's degree working or undertaking internship at Kenyatta National Hospital were considered. They were trained on the data collection and ethical issues. Confidentiality, respect and safety of the participants was emphasized.

3.11 Study instruments

Questionnaire and key informant guide were used as study instruments to collect data. The questionnaire contained structured questions addressing demographic factors, social factors, institutional factors, indications of induction of labor and outcomes of induction of labor. Questionnaire was administered by the research assistants. Key informant interview guide was used to collect qualitative data.

3.12 Pre-testing of study instruments

The pre-testing of data collection tool was done at Mbagathi District hospital because the study population had the same characteristics. The purpose was to test the feasibility of the study and necessary corrections were undertaken.

3.13 Data collection, cleaning and entry

Quantitative data was collected using questionnaires and was then coded using standards coding methods and entered into SPSS computer package for analysis at the end of the data collection period. Key informant guide was used to collect qualitative data which was then grouped into themes and used to validate quantitative data. 4 key informants were selected from among persons responsible for the care of the participants. This included two nurses and two doctors and each was interviewed individually using the key informant's guideline. Strict data collection method was observed and all the data were complete.

3.14 Data analysis and presentation

Collected data was entered into Statistical Package for Social Scientists (SPSS version 18) and Nvivo computer package and analyzed using descriptive and inferential statistics. Descriptive included tables, graphs and pie charts, and inferential were p-values, t-test and odds ratios.

3.15 Ethical considerations

Ethical approval from university of Nairobi/Kenyatta national hospital research and ethical committee was granted. Study participants gave informed consent and participated without being induced or coaxed. Confidentiality, integrity, respect and dignity of the subjects were ensured. They were at liberty to withdraw without being victimized. Permission from the Director of the Hospital and the assistant Director, Reproductive Health services were given and also the unit in-charges were informed prior to study initiation.

3.16 Study limitations

The study was conducted in a small population in Kenyatta National Hospital and the results may not be representative of the entire country. It is hoped that more studies will be done to validate the results. Personal bias may not have been completely eliminated but proper training of research assistants helped in minimizing this.

3.17 Dissemination plan

The results will be disseminated through seminars, publishing in peer reviewed journal and reports given to the Kenyatta National Hospital, Ministry of Health and Ministry of Education.

CHAPTER 4: RESULTS

4.1 Introduction

A total of 42 women who had delivered after being done induction of labor were interviewed and their respective questionnaires filled. Two doctors and two nurses were also interviewed using the key informant interview guide to validate the data. The main objective of the study was to determine outcomes of induction of labor among the participants. In the study it was shown that 62% of women were successfully induced, that is they delivered through vaginal delivery after being done induction of labor. The remaining 38% were done cesarean section because of failure of induction. The relationship between the success of induction, and demographic factors, socio-economic factors, institutional factors and health indication for inductions of labor were determined. In addition, the relationship between parity and gestational age, and hours taken between induction of labor and delivery were also determined. Lastly, the influence of maternal and neonatal complications after induction of labor, on women attitude towards the procedure was also noted.

4.2 Outcome of induction of labor

4.2.1 Success of induction of labor

The pie chart below shows that 62% of women were successfully induced, that is they delivered through vaginal delivery after being done induction of labor. The remaining 38% were done cesarean section because of failure of induction of labor.

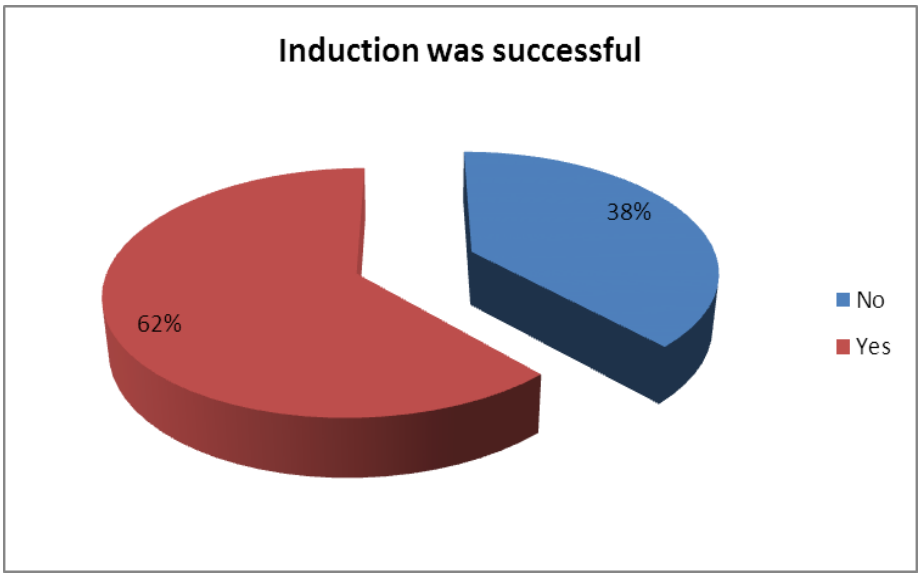


Figure 4.1: Success of induction of labor

4.6.2 Time taken between induction of labor and delivery

The time taken between induction and delivery was above 24 hours (33.3%), 13-24 hours (26.3%), 8-12 hours (23.8%) and lastly 16.7% took 8-12 hours as shown in figure 4.2

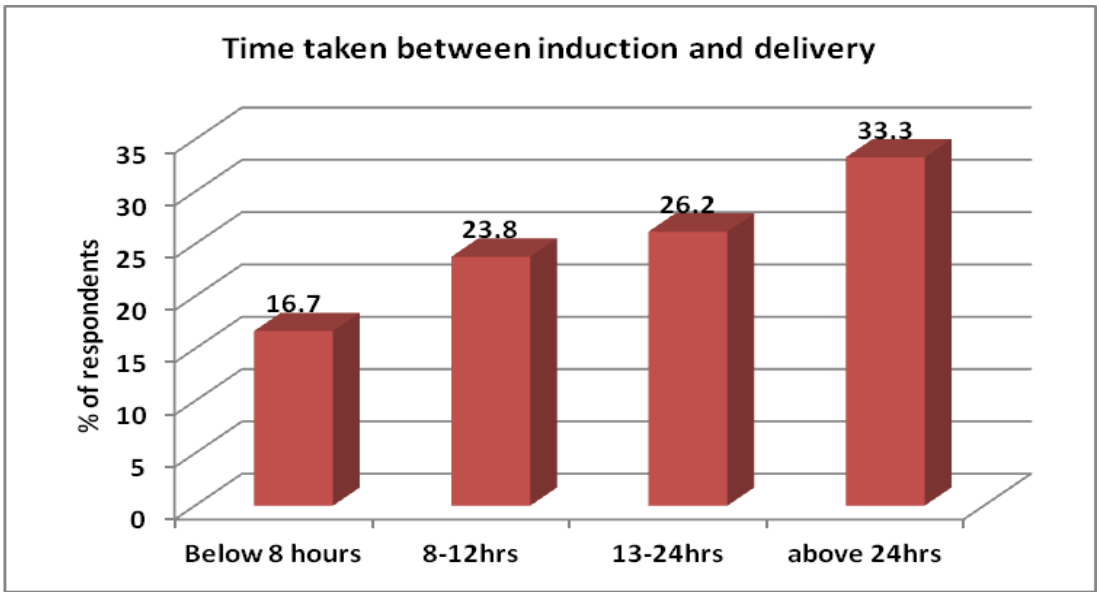


Figure 4.2: Distribution of hours taken between induction and delivery

4.3 Demographic factors influencing outcome induction of labor

4.3.1 Age

Majority of the participants (64.3%) were aged between 21-30 years old, 26.2% were between 31- 35 years, 20 years and below were 4.8% and above 35years were also 4.8 years. The number of the participants decreased below 20 years and above 35 years (figure 4.3). It was shown that 30 years and below were almost 2 times more likely to be successfully induced than above 30 years (OR=0.614, p=0.350).

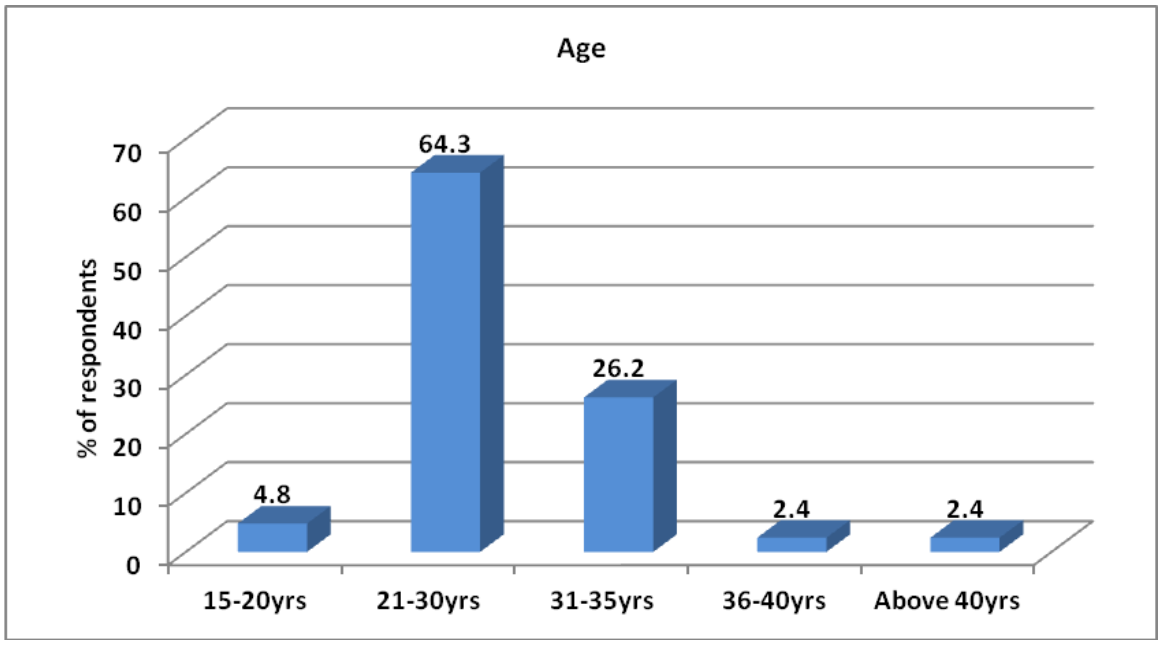


Figure 4.3: Age Distribution among the participants

4.3.2 Marital status

The participants were married (83%) and single (17%).Table 4.2 shows that there was no statistically significant association between marital status and the success of induction of labor (p=0.161)

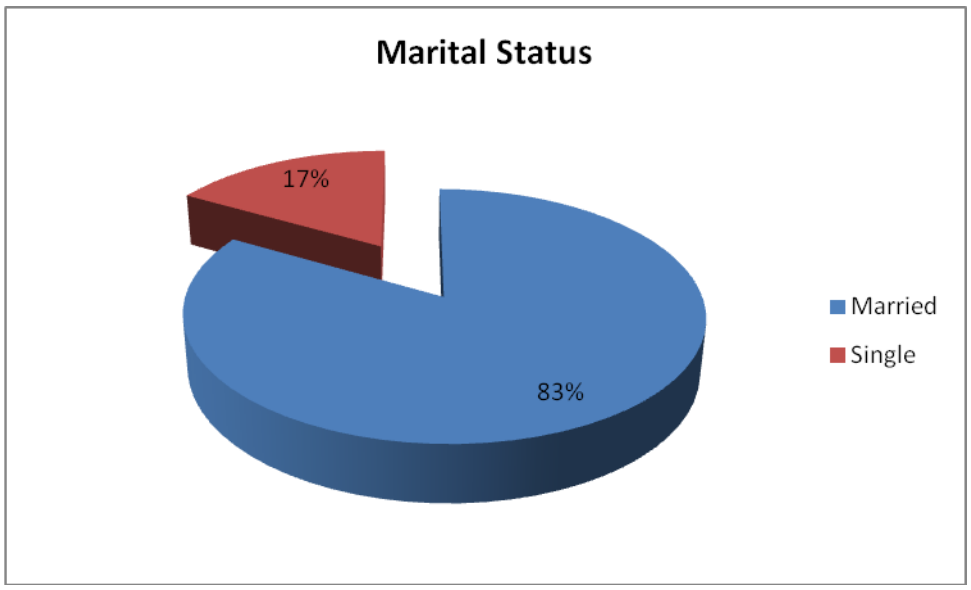


Figure 4.4: Marital status

4.3.3 Parity

The number of children having been delivered by the participants ranged from zero to three. The highest numbers of participants were primiparus women (47.6%) and the least number had delivered three children (4.8%). It was noted that number of participants decreased with increase in parity as shown by figure 4.5. Number of children delivered was not significant in determining the success of induction of labor (p=0.470) but table 4.3 shows that it is significant in determining the time taken between induction and delivery (p=0.05).

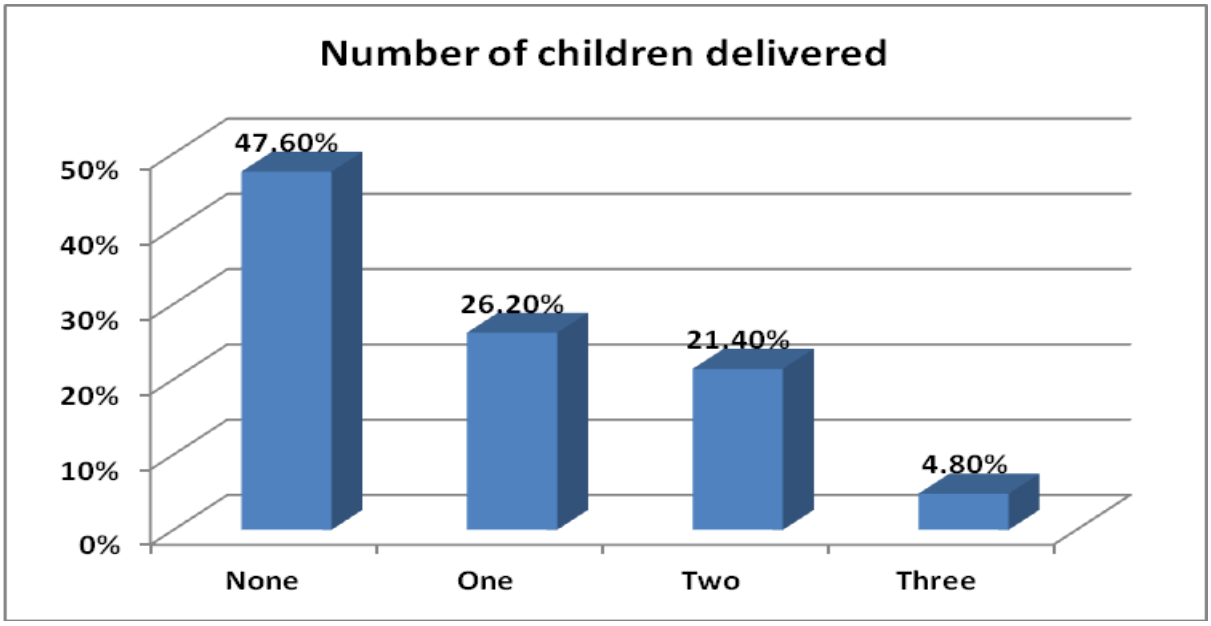


Figure 4.5: Distribution of parity

4.3.4 Gestation

Majority of the participants were induced at term (83.3%) compared to preterm who were 16.7%. There was no statistically significant association between gestational period and the outcome of induction of labor as shown by table 4.2 (p=0.454).Term gestation are approximately 5 times more likely to take more than 12 hours to deliver after induction compared to preterm gestation (table 4.3).

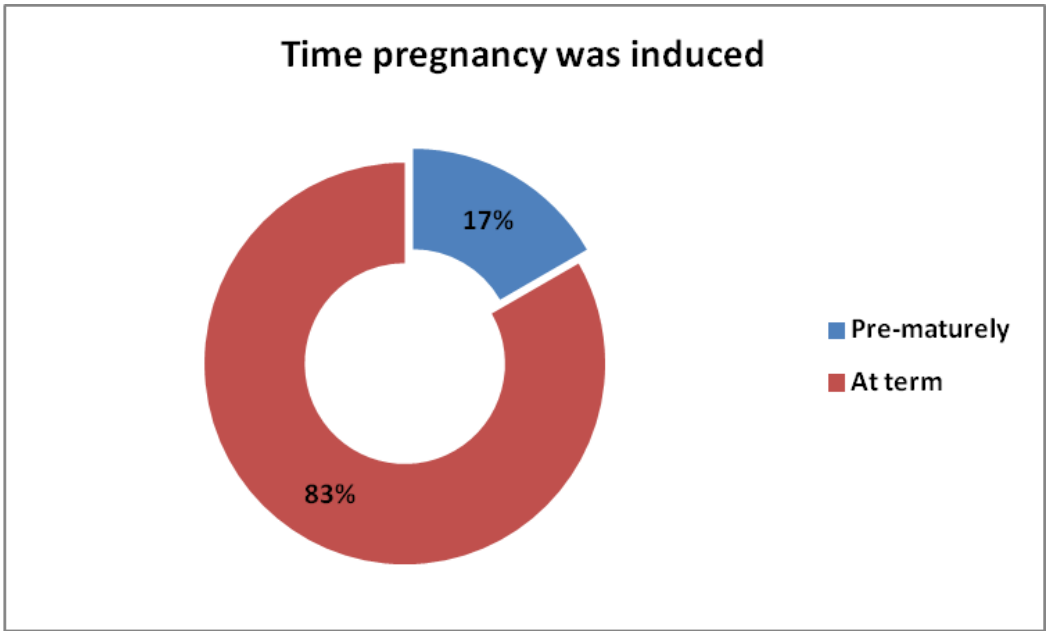


Figure 4.6: Gestation at induction of labor

Table 4.1: Distribution of demographic factors of the population

Variable	Number	Percentage
Age		
15-20yrs	2	4.8
21-30yrs	27	64.3
31-35yrs	11	26.2
36-40yrs	1	2.4
Above 40yrs	1	2.4
Marital status		
Married	35	83.3
Single	7	16.7
Parity		
None	20	47.6
One	11	26.2
Two	9	21.4
Three	2	4.8
Gestation		
Pre-term	7	16.7
Term	35	83.3

Table 4.2: Influence of demographic factors on outcome of induction of labor

Variable	Labor induced successfully		χ^2	Odds ratio	P-value
	Yes N(%)	No N(%)			
Age					
≤30 years	19(65.5)	10(34.5)	0.518	1	0.350
>30 years	7(53.8)	6(46.2)		0.614	
Marital status					
Married	20(57.1)	15(42.9)	2.01	1	0.161
Single	6(85.7)	1(14.3)		4.50	
Parity					
None	13(65)	7(35)	0.155	1	0.470
One or more child	13(59.1)	9(40.9)		0.778	
Gestation					
Pre-term	5(71.4)	2(28.6)	0.323	1	0.454
Term	21(60)	14(40)		0.6	

Table 4.3: Relationship between parity and gestation, and hours taken between induction and delivery

Variable	Hours taken between induction and delivery		χ^2	Odds ratio	P-value
	12 hours or less N(%)	More than 12 hours N(%)			
Parity					
None	5(25)	15(75)	3.80	1	0.05
One or more	12(54.5)	10(45.5)		0.278	
Gestation					
Pre-term	5(71.4)	2(28.6)	3.34	1	0.099
Term	12(34.3)	23(65.7)		4.792	

The results from key informers showed that age of the mother as well us marital status did not influence the outcome of induction of labor

In terms of parity, the nurses said,

“Primigravida takes longer time to deliver and are more likely to fail compared to multiparous”.

And the doctors also had almost the same opinion,

“The higher the parity the positive the outcome”

Both the nurses and doctors agreed that mothers with term pregnancies are more likely to have positive outcome compared to premature pregnancy.

4.4 Socio-economic factors influencing the outcome of induction of labor

4.4.1 Religion

73.8% of the participants were protestant, 21.4% were catholic and the rest were Muslims. There was no statistically significant association between religion and the outcome of induction of labor (p=0.528)

4.4.2 Level of education

Majority of the participants had attained an education level of college (47.6%) and Secondary (40.5%) and the remaining (11.9%) had attained primary education. There was no statistically significant association between education and the outcome of induction of labor (p=0.295)

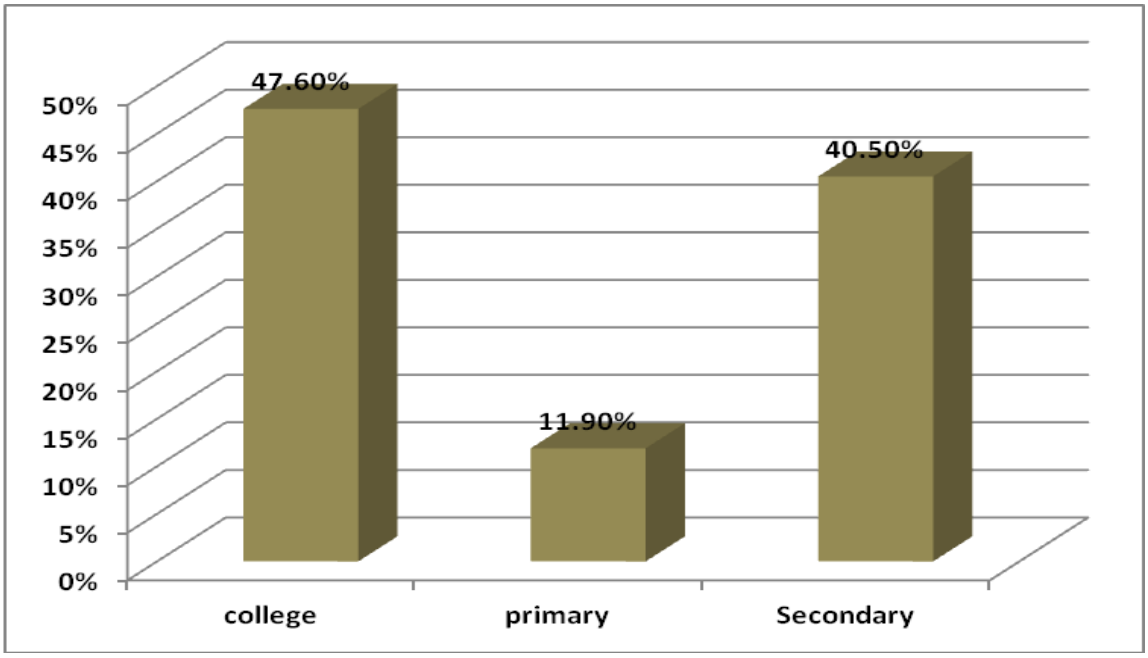


Figure 4.7: Distribution of level of education

4.4.3 Employment

Majority of the participnts were self employed (42.9%). Others were formally employed (35.7%), housewife (19.0%) and house help (2.4%). Table 4.5 shows that there was a significant relationship between type of employment and the outcome of induction (p=0.047).

4.4.4 Average monthly income

Almost half of the participants (47.6%) earned a monthly income of less than Kshs 20 000. Only 2.4% earned above Kshs 40 000 and 19.0% were housewife hence no income. There was no statistically significant association between monthly income and the outcome of induction of labor (p=0.18)

4.4.5 Believe on induction of labor

In this study it was found that nearly all (97.6%) participant believed in labor induction, only 2.4% participant reported that it was against their religion (Muslim) to be induced. There was no statistically significant association between believing and not believing on induction with the success of induction p=0.381 (table 4.5).

Table 4.4: Distribution of socio-economic characteristics of the participants

Variable	Number	Percentage
Religion		
Catholic	9	21.4
Muslim	2	4.8
protestant	31	73.8
Education level		
college	20	47.6
primary	5	11.9
Secondary	17	40.5
Employment		
Formally employed	15	35.7
House help	1	2.4
Housewife	8	19.0
Self employed	18	42.9
Average monthly income		
Above 40000	1	2.4
Between 20000-40000	13	31.0
less than 20000	20	47.6
N/A	8	19.0
Community belief in labor induction		
No	1	2.4
Yes	41	97.6

Table 4.5: Relationship between socio-economic characteristics and success of induction of labor

Variable	Labor induced successfully		χ^2	Odds ratio	P-value
	Yes N(%)	No N(%)			
Religion					
Catholic	7(77.8)	2(22.2)		1	
Muslim	1(50)	1(50)	1.276	0.286	0.528
Protestant	18(58.1)	13(41.9)		0.396	
Education					
College	10(50)	10(50)		1	
Primary	4(80)	1(20)	2.44	4.00	0.295
Secondary	12(70.6)	5(29.4)		2.40	
Occupation					
Formally employed	12(80)	3(20)		1	
Housewife	5(55.6)	4(44.4)	3.88	0.313	0.047
Self employed	9(50)	9(50)		0.250	
Income					
Above 40,000	0	1(100)		-	
Between 20,000-40,000	7(53.8)	6(46.2)	3.433	1.167	0.18
Less than 20,000	15(75)	5(25)		3.00	
Community belief in labor induction					
No	0	1(100)	1.665	-	0.381
Yes	26(63.4)	15(36.6)		-	

The key informers reported that religion of the women did not influence induction of labor in any way.

Education of the women according to the nurses was didn't influence induction of labor but according to the doctors, "The more educated the mother is, the more the need for information on induction before she accepts the procedure to be done and vise versa"

Looking at their occupation and average monthly income "Majority of the clients we serve are middle class and they easily accept the intervention when ask to be induced" the nurses said and

the doctors also had nearly the same perspective, “From experience the occupation and average monthly income of the mother does not influence induction of labor in any way”

4.5 Health indication for induction of labor

4.5.1 Reasons for induction

Nearly all the participants 95.2% knew the reason why they were done induction of labor. Only 4.8% of the participants reported that they did not know why they were induced. The participants who knew why they were induced were able to report the specific reasons. More than half 59.5% of them were done induction of labor as a result of post-term (beyond 41 completed weeks of gestations). The other reasons were pre-eclampsia (19.0%), abdominal pains without cervical dilatation (9.5%), prelabor rapture of membrane (2.4%), premature pre labor rupture of membranes (2.4%), and fetal death (2.4%) as shown in table 4.6.

Table 4.6 Reasons for induction

Reason	**Number**	**Percentage**
Abdominal pains but no cervical dilatation	4	9.5
fetal death	1	2.4
post-term	25	59.5
Pre-eclampsia	8	19.0
Prelabor rapture of membrane	1	2.4
Premature pre labor rupture of membranes	1	2.4

Table 4.7: Relationship between reason for induction and success of induction of labor

Reason for induction	Labor induced successfully		χ^2	Odds ratio	P-value
	Yes	No			
Post-term	2(25)	6(75)		3.469	
Pre-eclampsia	15(60)	10(40)	1.607	5.957	0.445
Others	3(42.9)	4(57.1)		1	

The nurses and doctors were in agreement that most common condition being induced are postdates and preeclampsia. They said that others were intrauterine fetal death, pre-labor rupture of the membranes and diabetes. Most of them they claimed resulted in positive outcome; they were all aware of a few women being done induction of labor because of false labor.

4.6 Institutional factors influencing the outcome of labor

4.6.1 Involvement of women on the decision for labor induction

Majority (83.3%) indicated that they were involved in decision making towards induction of labor. Almost all reported that they were involved in the decision for induction by being consulted before the procedure and a few were in addition given a chance to ask questions (figure 4.8). None requested for the procedure and also none signed a written consent before the procedure. The results in table 4.8 shows that there was no difference in whether you were involved in decision making and induction success (p=0.161).

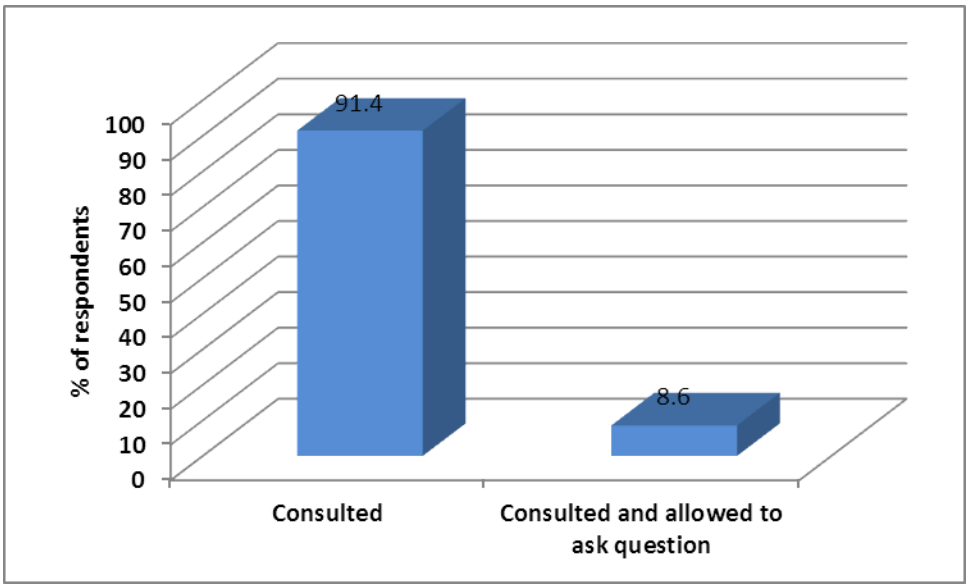


Figure 4.8

4.6.2 Information given to the women on nature of the procedure

Majority (69.0%) of the respondents reported to have been given full information about the nature of the procedure but on further clarification it was found that many were told what the procedure involves and instruction to follow. Only 3.4% was given full information which included what the procedure involves, the side-effects, the benefits, and instruction to follow. Table 4.8 shows that being given information on the procedure of induction is significantly associated with the outcome (p= 0.007).

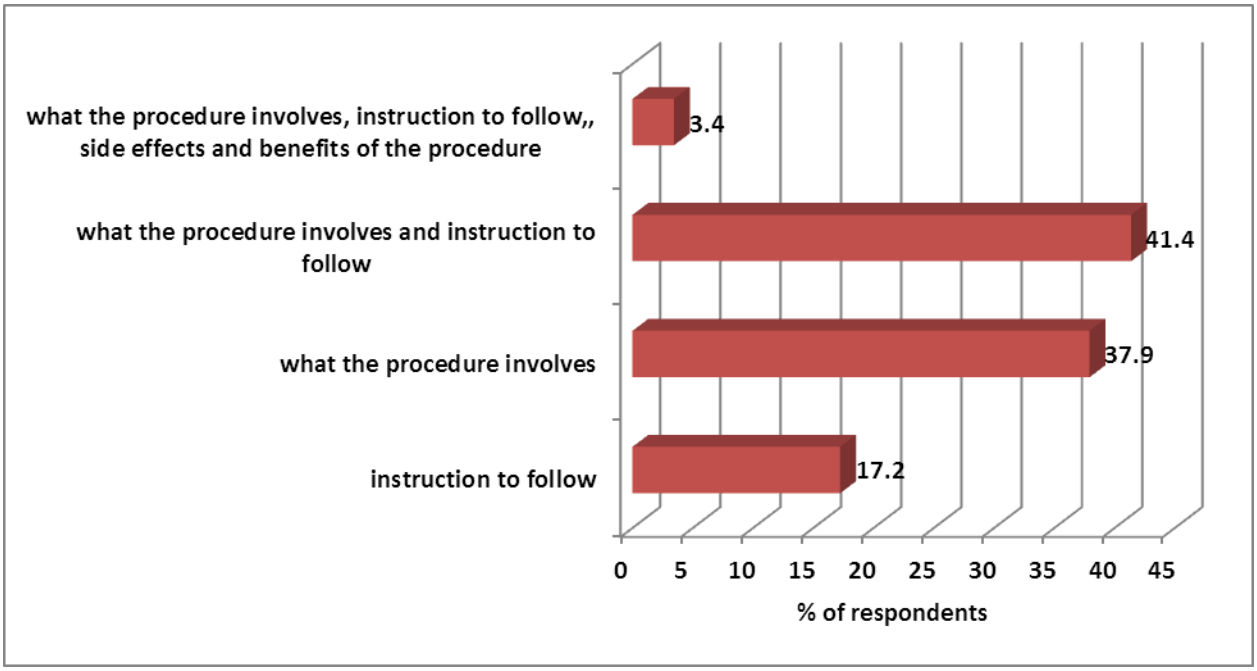


Figure 4.9: Distribution of information given to the women on nature of the procedure

4.6.3 Support given during induction of labor

Majority of the respondents mentioned that the kind of support they received was regular examination (54.8%) then combination of regular examination and information on progress (16.7%). Table 4.8 shows that being supported during induction was not significant in determining the success of induction of labor.

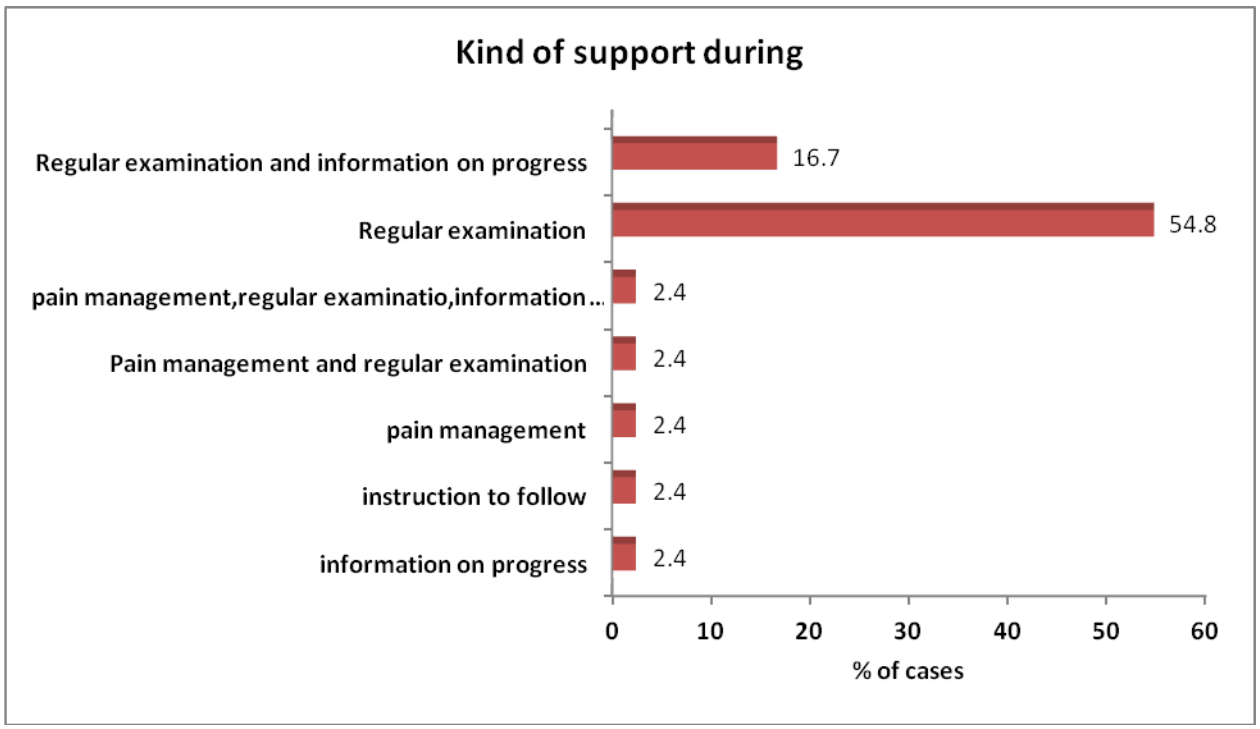


Figure 4.10: Distribution of the kind of support given during induction of labor

Table 4.8: Institutional factors influencing the outcome of induction of labor

Variable	Labor induced successfully		χ^2	Odds ratio	P-value
	Yes	No			
Involved in decision making					
No	6(85.7)	1(14.3)	2.019	1	0.161
Yes	15(42.9)	20(57.1)		0.222	
Given enough support					
No	5(83.3)	1(16.7)	1.476	1	0.228
Yes	20(57.1)	15(42.9)		0.267	
Informed about nature of procedure					
yes	14(48.3%)	15(51.7%)	7.380	0.078	0.007
No	12(92.3%)	1(7.7%)		1	

The doctors were aware that there were protocols on induction of labor but had not seen the written document. One of them said,

“I am aware of the protocols on induction of labor but I have not seen the written document; I understand that it is available at the in-charge office. We get the update on the procedure through continuous medical education and we ensure that there is an indication before performing the procedure.”

But the nurses were not aware of the existence of the protocols,

“I am not aware of the protocols on induction of labor and we usually follow the doctor’s instruction on how to manage the induced patients” one of them said.

The nurses explained that the drug commonly used was the vagiprost 25 (prostaglandin E1) micrograms which is readily available in the hospital pharmacy and though could not remember the name of an alternative drug, they were aware of its existence and that it was expensive.

“I cannot remember the other type but I just know that it is expensive and if there is need the client is given a prescription to buy”

The doctor also said, “Prostaglandin E1 was commonly used and available and although Prostaglandin E2 works faster, it was expensive and currently not available at the hospital, if there was need the clients are given prescription to buy. This was recommended for Pre-eclampsia cases and preterm”

On clients’ involvement on the procedure of induction of labor the nurses said, “We explain to the clients verbally and we know if they have agreed when they say ‘Sawa’.”

“We inform the clients that it is the best option. We rarely give information on side-effects and from my experience I have encountered only one client who developed the expected side-effects” exclaimed one of the doctors.

They said that most of the equipment used in induction of labor were available

“Sterile gloves are available”

"Vaginal examination pack available but most of the time not used because it is time consuming to get it from the CSSD especially when the nurses are few"

"Fetoscope is available"

"Cardiotopography machine is available but not commonly used unless in case of high risk but is recommended for all before induction of labor"

Both agreed that there was shortage of nursing staff for proper monitoring and administration of the inducing drugs but they do their best. The doctors believe that this result to clients not being given the induction drugs on time.

4.7 Complication of induction of labor

4.7.1 Complication of the mother following induction of labor

Majority (69%) of the women did not report any complication after induction of labor and the few (31%) reported perineal tears and being done episiotomy (figure 4.12).Those who develop complications were almost two times less likely to agree to be induced in future compared to those who did not developed complications (OR=1.8).

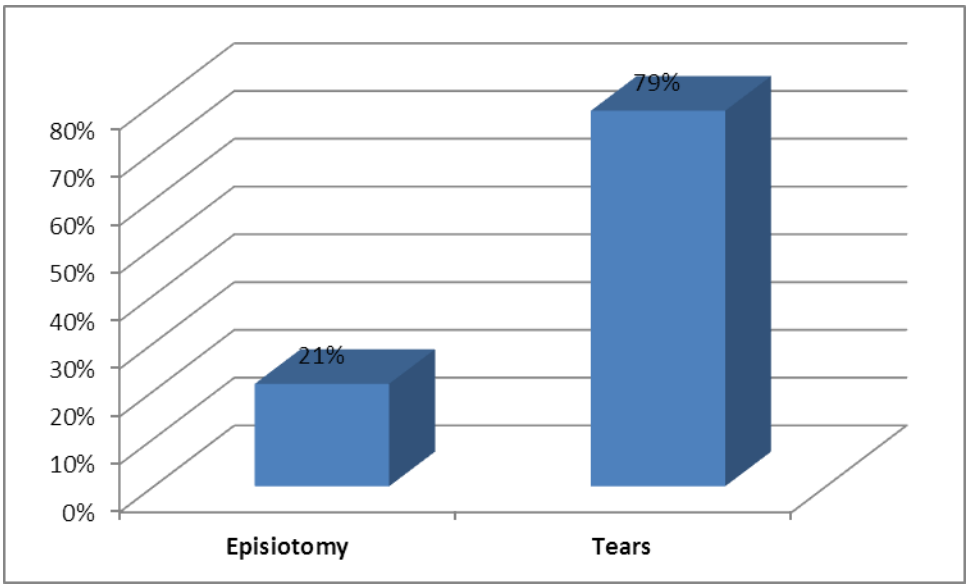


Figure 4.11 Distribution of complications developed by women

4.7.2 Complication of the baby delivered through induction of labor

Figure 4.12 shows that 7 babies were reported to have developed complications which were respiratory problems (3), jaundice (1), fetal death (1) and did not cry immediately after birth (2). Development of complication by the baby was significantly associated with preference for induction in future p=0.032 (table 4.10), mothers whose babies developed problems preferred not to be induced in future compared to those whose babies did not developed complications.

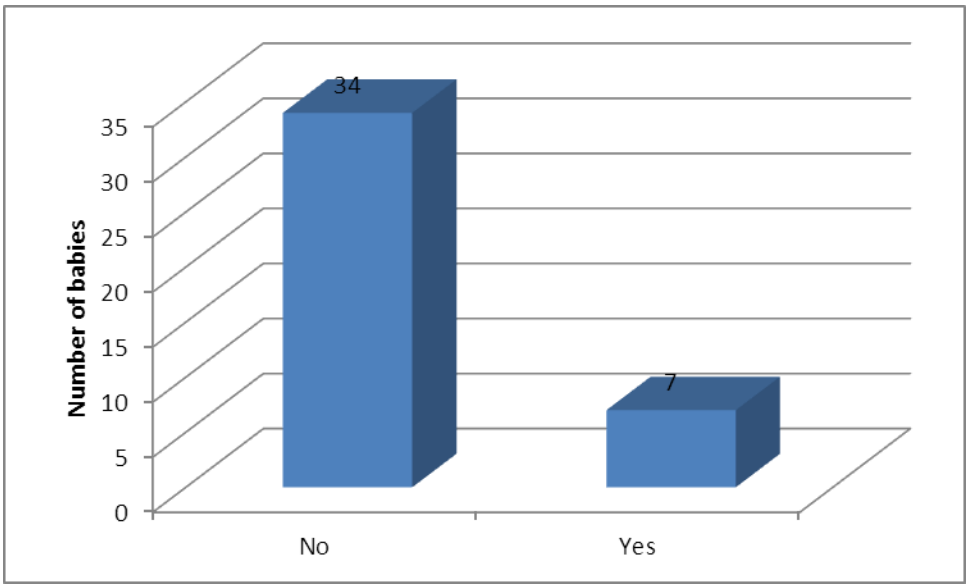


Figure 4.12

4.6.5 Attitude towards induction of labor

Figure 4.13 shows that 60% would not mind induction in future but 40% prefer not to be induced. Table 4.11 shows that success of induction is not statistically significant with women preference of being induced in future but those who succeeded are nearly 3 times likely to agree to be induced in future (OR= 2.893).

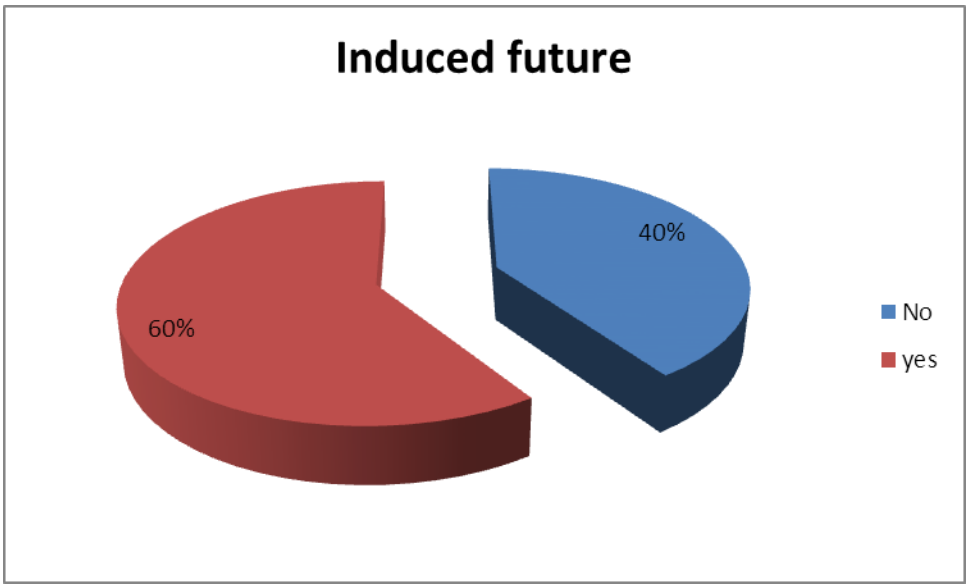


Figure 4.13: Preference to be done induction in future

Table 4.9: Relationship between mothers complication and being induced in future

Mothers complications	**Prefer to be induced in future**		χ^2	**Odds ratio**	**P-value**
	Yes	**No**			
Yes	9(69.2%)	4(30.8%)	0.736	1.8	0.228
No	16(55.2%)	15(42.9%)		1	

Table 4.10: Association between baby complication and preference of being induced in future

Baby complication	**Prefer to be induced in future**		χ^2	**Odds ratio**	**P-value**
	Yes	**No**			
Yes	1(57.1%)	6(42.9%)	4.6086	0.24	0.032
No	20(58.8)	14(41.2)		1	

Table 4.11: Relation of preference to be induced in future and success of induction

Induced in future	**Labor induced successfully**		χ^2	**Odds ratio**	**P-value**
	Yes	**No**			
Yes	18(72%)	7(28%)	2.669	2.893	0.102
No	8(47.1%)	9(52.9%)		1	

CHAPTER 5: DISCUSSION, CONCLUSSION AND RECOMMENDATION

Introduction

This chapter contains the discussion of the results where comparison with other studies has been undertaken, and it also contains conclusion and recommendations. Relationship between outcome of induction of labor and demographic factors, socioeconomic factors, health indication and finally institutional factors are discussed respectively.

Discussion

In this study caesarean section rate after induction of labor was 38% and majority of the women took more than 24 hours to deliver after induction of labor. The rate of caesarean section is much high than the average rate in the country that was recorded by KDHS 2008 (6%). It was found that majority of women who were induced were between the age of 21-30 years and numbers decreased both below 20 years and above 30 years. According to KDHS 2008 the number of women delivering at this age bracket of 12-30 years is higher and therefore may be the reason why many were induced compared to the other ages. In this study age of 30 years and below were almost 2 times more likely to be successfully induced than above 30 years (OR= 0.614). Contrary, the nurses and doctors pointed out that age did not influence the outcome of induction of labor but some studies found that age of 35years and above were risk factor in induction of labor (Wilson et al, 2000 and Guerra et al 2009).

Most (83.3%) of the women were married and nearly half (47.6%) were primiparous. The primiparous were found to be prone to induction of labor compared to the other parities and the rate of induction decreased with increase in parity. The same was found in other studies on influence of parity on the obstetric performance of mothers, where labor induction rate among the primiparous mothers was significantly higher than that among the multiparous group (Wilson

et al 2000, Chan and Lao, 1999). Parity was found to be significant in determining the time taken between induction and delivery (p=0.05) and the key informers also reported the same, that primiparous took longer time to deliver after induction. It was found that term gestation are approximately 5 times more likely to take more than 12 hours to deliver after induction compared to preterm gestation.

Level of education, religion and average monthly income were statistically not significant in determining the success of induction of labor. Though most of the women had attained college (47.6%) and secondary (40.5%) level of education, 66.6% of them earned less than Kshs 20,000 per month and 19% were housewives (unemployed). These may indicate that the participant shared almost the same economic characteristics which can be further justified by them attending KNH which is considered cheaper compared to other private hospital offering the same services. It was noted that there was significant association between the type of employment and the success of induction of labor. Formally employed mothers were more successfully done induction of labor, unlike the self employed mothers (p=0.047). Nearly all the mothers did not have believes against induction of labor. Wilson et al found that socioeconomic status has no effect on the cesarean rate for either multiparous or primiparous women after induction of labor (Wilson et al, 2000). Key informers also reported that most of the socioeconomic factors did not influence induction outcome.

This study found that nearly all the women (95.2%) knew why they were done induction of labor and this indicates that the health workers informed the women the reason why they were undergoing induction of labor. The study shows that the most common reason for induction of labor in the hospital was post-term followed by pre-eclampsia and both contributed to nearly

80% of the indication. The same was reported by obstetrics and gynecology clinics of North America in 2005. It is in contrast with a study done in Latin America where pre-mature rupture of membranes was found to be the most common (Guerra, 2009). It was noted that some women were induced due to abdominal pains without cervical dilatation which indicated false labor and it is not one of the recommended indications for induction of labor (WHO, 2011). These results on health indication was confirmed by the key informers who reported that the most common indication for induction of labor were post-term and pre-eclampsia.

In this study it was found that most of the women reported to have been involved in the decision toward labor induction but none signed a written consent and a few were allowed to ask questions. Majority (79.3%) who reported to have been given information on the procedure were told what the procedure involves and instruction to follow but information on the benefits and side effects was mostly left out. This is contrary to recommendation by ACOG which states that efforts should be made to provide pregnant women with accurate information about the risks and benefits of induction of labor (ACOG, 2000).It was found that being informed on the nature of the procedure was significantly associated with the success of induction of labor ($p= 0.007$). This is true in that active patient involvement has beneficial effects on both treatment outcomes and patient ratings of the quality of care (Arnetz et al, 2004). Majority of the respondents mentioned that the kind of support they received was regular examination (54.8%) then combination of regular examination and information on progress (16.7%) but was found not significant in determining the success of induction of labor ($p= 0.228$). The study found that pain management was minimally (2.4%) being undertaken during induction of labor. From the key informant interview it was confirmed that women give verbal consent before the procedure and it was also noted that minimal information on the procedure is provided to them.

In the study there was no major maternal complication after induction during the study. Minor reported complications were perineal tear and episiotomies. These results relate to findings from two studies which found that induction of labor was not associated with maternal risks (Fowele et al, 2012, Stock et al, 2012). The women who develop complications were almost two times less likely to agree to be induced in future compared to those who did not develop complications (OR=1.8).The babies who developed complication after induction of labor were 19.5% and the complications were respiratory problems (n=3), jaundice (n=1), fetal death (n=1) and not crying immediately after birth (n=2). The baby's complications determined the women attitude towards induction of labor. Development of complications by the baby was significantly associated with being induced in future (p=0.032), mothers whose babies developed problems preferred not to be induced in future compared to those whose babies did not developed complications. In the study majority (60%) would not mind induction in future but 40% prefer not to be induced. Those who preferred not to be induced reported that it was more painful (29%), does not work for them (41%), it was not natural (18%), and it resulted to baby's complications (12%).

Conclusion

In this study it was found that the outcome of induction of labor is influenced by age, parity, gestation, type of employment and women being given information on the nature of the procedure. It was also found that parity is significant in determining the time taken between induction and delivery. The most common indication for induction is post-term and pre-eclampsia. It was established that pain management and client information on the procedure were wanting. It was established that the rate of caesarean section after induction of labor was more than six times (38%) the rate in the country (6%). Majority of the women took more than 24 hours to deliver after induction of labor. There was no major maternal complication following

induction of labor during the study and 19.5% babies developed complications that influenced the attitude of the mothers toward induction. Lastly, it was noted that some women were done induction of labor due to false labor which is not one of indication of induction.

Recommendations

The department of reproductive health in the hospital should strive to bring down the rate of caesarean (38%), reduce the time taken between induction of labor and delivery and complications following induction of labor.

The doctors and nurses should improve on pain management and client information on induction of labor.

Health worker should improve on client involvement during induction of labor.

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TIME FRAME

Duration in weeks/ Activity	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Problem Identification	■															
Proposal writing		■														
Seeking consent from ethical committee			■	■												
Recruitment and training of research assistants					■											
Pre-testing of study tools						■										
Administration of tools							■	■	■	■						
Data cleaning and entry											■					
Data analysis												■	■			
Report writing and presentation														■	■	
Compilation of final report/dissemination																■

BUDGET

ITEM	UNIT COST	QUANTITY	TOTAL COST
HUMAN RESOURCE			
a) Training of research assistants			
Research assistants allowance (4)	500	4x2x500	4,000
Principal researcher (1)	1000	1x2x1000	2,000
b) Pre-testing of data tools			
Research assistants allowance (2)	500	2x2x500	2,000
Principal researcher (1)	1000	1x2x1000	2,000
c) Data collection			
Research assistants allowance (2)	500	2x5x4x500	20,000
Principal researcher (1)	1000	1x5x4x1000	10,000
Sub- total			**40,000**
MATERIAL AND SUPPLIERS			
Biro pens(1 doz)	250	1x250	250
Pencils(1 doz)	60	1x60	60
Rubbers (3)	20	3x20	60
Folders(3)	150	3x150	450
Field books(3)	100	300	3000
Stapler and staples	600	1x600	600
Sub- total			**4,420**
PROPOSAL AND THESIS			

Proposal typing and printing (50 pages)	20	50x20	1000
Photocopying 5 copies (250 pages)	3	250x3	750
Photocopying of Data Tools	3	250x3	750
Data analysis	30,000	30,000	30,000
Typing and printing of final report	20	20x65	1,300
Photocopying final report (5 copies)	3	5x3x65	975
Binding of final report (5 copies)	1000	5x1000	5000
Sub-total			**39,775**
GRAND TOTAL			**84,195**

APPENDICES

APPENDIX I: QUESTIONNAIRE

STUDY TOPIC: OUTCOMES OF LABOUR INDUCTION AMONG MOTHERS DELIVERING AT KENYATTA NATIONAL HOSPITAL

QUESTIONNAIRE NO_____

A. DEMOGRAPHIC FACTORS

1. What is your age in completed years?

   15-20yrs ☐

   21-30yrs ☐

   31-35yrs ☐

   36-40yrs ☐

   Above 40yrs ☐

2. What is your marital Status?

   Single ☐

   Married ☐

   Divorced ☐

   Separated ☐

3. How many children have you delivered?

   None ☐

   1 Child ☐

   2 Children ☐

   3 Children ☐

   4 Children ☐

   More than 4 children ☐

4. At what time of pregnancy were you induced?

At term ☐

Pre-maturely ☐

B. SOCIOECONOMIC FACTORS

1. What is your religion?

   Catholic ☐

   Protestant ☐

   Muslim ☐

   Others ☐

   Specify_____

2. What is the highest level of education that you achieved?

   Primary ☐

   Secondary ☐

   College ☐

   None ☐

3. How do you earn your living?

   Formally employed ☐

   Self employed ☐

   Housewife ☐

   Others Specify_____

4. What is your average monthly income?

   Less than 20,000 ☐

   Between 20,000 and 40,000 ☐

   Above 40,000 ☐

5. From which ethnic group do you come?

Specify_____

6. Does your community beliefs in labor induction?

Yes ☐

No ☐

7. If the answer in the above is No, give a reason?

Specify_____

C. HEALTH INDICATORS FOR LABOR INDUCTION

1. Do you know why you were induced?

Yes ☐

No ☐

2. If the answer in the above is yes, what was the reason?

Post-term ☐

Pre-labor rupture of membrane ☐

Premature pre-labor rupture of membranes ☐

Pre-eclampsia ☐

Diabetes ☐

Fetal death ☐

Macrosomia ☐

Oligohydramnios ☐

Elective Induction of labour ☐

Others (specify)_____

D. INSTITUTIONAL FACTORS

1. Were you involved in decision for labor induction?

Yes ☐ No ☐

2. If the answer in the above is yes, in which way were you involved? (tick more than if applicable)

You are the one who requested for labor induction ☐

You were consulted before induction ☐

You signed a written consent ☐

You were allowed to ask questions ☐

Others Specify_____

3. Were you fully informed about the nature of the procedure?

Yes ☐

No ☐

4. If the answer in the above is yes, what information were you given?

What the procedure involves ☐

The side-effects of the procedure ☐

The benefits of the procedure ☐

Instruction to follow ☐

Others Specify_____

5. While you were being induced, did you get enough support?

Yes ☐

No ☐

6. If the answer in the above is yes, what kind support were you given?

Pain management ☐

Regular examination ☐

Information on progress ☐

Others Specify_____

E. OUTCOMES FOR INDUCTION OF LABOR

1. Where you successfully induced?

Yes ☐

No ☐

2. If the answer in the above is No, how were you delivered?

   Specify_____

3. What was the approximate time you took between induction and delivery?

   Below 8 hours ☐

   8 to 12 hours ☐

   13 to 24 hours ☐

   Above 24 hours ☐

4. Did you develop any complication?

   Yes ☐

   No ☐

5. If the answer in the above is yes, what was the complication?
   Specify a). _____
   b). _____
   c). _____

6. Did the baby develop any complication?

   Yes ☐

   No ☐

7. If the answer in the above is yes, what was the complication?
   Specify a). _____
   b). _____
   c). _____

8. If you happen to be pregnant in future, will you like to be induced?

   Yes ☐

   No ☐

9. If the answer in the above is NO, what is your reason?

   Specify_____

APPENDIX II: PARTICIPANT INFORMED CONSENT FORM

TITLE: Outcomes of labor induction among mothers delivering at Kenyatta National Hospital

INTRODUCTION

I am a postgraduate student at Nairobi University school of Nursing pursuing a master's degree, undertaking the study on outcomes of induction of labor among mothers delivering at Kenyatta National Hospital.

OBJECTIVES OF THE STUDY

The main objective of the study is to determine outcomes of labor induction among mothers delivering at Kenyatta national hospital.

BENEFITS

The benefits of the study are that the results may be used by the hospital and ministry of health to come up with ways to improve the management of mothers undergoing induction of labor.

RISKS

There is no direct or indirect risk for being included in the study and it is of voluntary in nature.

VOLUNTARISM

Participation is voluntary, you have a right to withdraw at any stage of the study and there is no victimization for withdrawal. All services are offered to all clients without discrimination.

PROCEDURE

The procedure involves identification of clients delivered through induction of labor and selecting them randomly. All clients have an equal chance of being selected. Data will then be collected using interviews where questionnaires will be filled, group discussions done and information from key informant sort. Information collected will not bear clients names but instead it will be coded.

Kindly you are free to ask questions concerning the subject.

You may conduct the following in case of a concern;

Masan Evalyne Jesang,
Principle Researcher
University of Nairobi, School Nursing Sciences
Phone: 0720220735
Email: evalyne.masan@gmail.com

The Chairperson,
KNH Ethics & Research,
P.O. Box 20723-00202,
Nairobi

CONSENT FORM

I_____ do hereby consent to be interviewed for inclusion in the study of outcomes of induction of labor at Kenyatta National Hospital. I confirm that I have been informed about the study risks, benefits, procedures and voluntary nature of the study and fully understand my right of withdrawal any time.I have had a chance to ask questions and my questions have been answered to my satisfaction.

I give my informed consent without any coercion whatsoever.

Sign_____ Witness_____

Date_____ Date _____

FOMU YA KUKUBALI KUHUSISHWA

Mimi_____ nakubali kuhusishwa kwa utafiti kuhusu kuzaa kwa kutumia mbinu za kuanzisha uchungu wa kuzaa. Nathibitisha yakwamba nimeelezwa kuhusu utafiti huu na naelewa haki yangu ya kuondoka kwa utafiti wakati wowote. Nimepewa nafasi kuuliza maswali na yamejibiwa kwa ukamilifu.

Natia sahihi hii bila tashwishwi yeyote au kulazimishwa kwokwote.

Sahihi_____ Tarehe_____

Shahidi_____ Tarehe_____

APPENDIX III: KEY INFOMANT INTERVIEW

My name is Masan Evalyne Jesang. I am a postgraduate student at Nairobi University school of Nursing pursuing a master's degree, undertaking the study on outcomes of induction of labor among mothers delivering at Kenyatta National Hospital. The specific objectives of the study are to determine demographic, social, health, institutional factors related to outcomes of induction of labor. The benefits of the study are that the results may be used by the hospital and ministry of health to come up with ways to improve the management of mothers undergoing induction of labor.

We would like to ask you a few questions about your experiences in this intervention of induction of labour. We believe there is no right or wrong answer, the answers you give here will be confidential and whatever you say will not be linked or associated with you. In addition, only the people participating on this study will have access to the information from this discussion.

Type of health worker:

Nurse ☐

Doctor ☐

Initials: _____ Date :_____

1. What are the demographic factors that influence outcomes of induction of labor?
2. What are the socioecomic factors that influence on the outcomes of induction of labor?
3. What are the health indicators related to outcomes of induction of labor?
4. What are the institutional factors that influence the outcomes of induction of labor?

APPENDIX IV: LETTER TO KENYATTA NATIONAL HOSPITAL/UNIVERSITY OF NAIROBI RESEARCH AND ETHICAL COMMITTEE

Masan Evalyne Jesang

University of Nairobi

School Nursing Science

The Chairperson,

KNH Ethics & Research,

P.O. Box 20723-00202,

Nairobi

1st Feb, 2013.

Dear Sir/Madam,

RE: RESEARCH AUTHORISATION REQUEST

I am a postgraduate student pursuing a Master's Degree in Nursing (Midwifery). I wish to request permission to carry out research on, "Outcomes of induction of labor among mothers delivering at Kenyatta National Hospital." The study will be carried out at postnatal wards of Kenyatta National Hospital.

The research findings may be used to improve maternal and neonatal care during induction of labor. Your consideration will be highly appreciated.

Thank you.

Yours faithfully,

Masan Evalyne Jesang

0720220735

Evalyne.masan@gmail.com

APPENDIX VII: LETTER TO KENYATTA NATIONAL HOSPITAL ASSISTANT DIRECTOR, REPRODUCTIVE HEALTH SERVICES

Masan Evalyne Jesang

University of Nairobi

School Nursing Science

Assistant Director, Reproductive Health Sciences,

Kenyatta National Hospital,

P.O. Box 20723-00202,

Nairobi

1st Feb, 2013.

Dear Sir/Madam,

RE: REQUEST FOR PERMISSION TO CARRY OUT ACADEMIC RESEARCH IN DEPARTMENT

I am a postgraduate student pursuing a Master's Degree in Nursing (Midwifery). I wish to request permission to carry out research on, "Outcomes of induction of labor among mothers delivering at Kenyatta National Hospital."

The study will take at least three months.

The research findings may be used to improve maternal and neonatal care during induction of labor. Your consideration will be highly appreciated.

Thank you.

Yours faithfully,

Masan Evalyne Jesang

0720220735

Evalyne.masan@gmail.com

APPENDIX VIII: LETTER OF APPROVAL FROM KHN/UON ETHICAL RESEARCH COMMITTEE

UNIVERSITY OF NAIROBI
COLLEGE OF HEALTH SCIENCES
P O BOX 19676 Code 00202
Telegrams: varsity
(254-020) 2726300 Ext 44355

KNH/UON-ERC
Email: uonknh_erc@uonbi.ac.ke
Website: www.uonbi.ac.ke
Link:www.uonbi.ac.ke/activities/KNHUoN

KENYATTA NATIONAL HOSPI
P O BOX 20723 Code 00202
Tel: 726300-9
Fax: 725272
Telegrams: MEDSUP, Nairobi

Ref: KNH-ERC/A/196

11th July, 2013

Masan Jesang Evalyne
School of Nursing Sciences
College of Health Sciences
University of Nairobi.

Dear Evalyne

RESEARCH PROPOSAL: OUTCOMES OF LABOUR INDUCTION AMONG MOTHERS DELIVERING AT KENYATTA NATIONAL HOSPITAL (P77/03/2013)

This is to inform you that the KNH/UoN-Ethics & Research Committee (KNH/UoN-ERC) has reviewed and **approved** your above proposal. The approval periods are 11th July, 2013 to 10th July, 2014.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be use
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH/Uc ERC before implementation.
c) Death and life threatening problems and severe adverse events (SAEs) or unexpected adverse events whether related or unrelated to the study must be reported to the KNH/UoN ERC within 72 hours of notification.
d) Any changes, anticipated or otherwise that may increase the risks or affect safety or welfare of study participants and others or affect the integrity of the research must be reported to KNH/UoN ERC within hours.
e) Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. (*Attach a comprehensive progress report to support the renewal*).
f) Clearance for export of biological specimens must be obtained from KNH/UoN-Ethics & Research Committee for each batch of shipment.
g) Submission of an *executive summary* report within 90 days upon completion of the study
This information will form part of the data base that will be consulted in future when processing related research studies so as to minimize chances of study duplication and/or plagiarism.

For more details consult the KNH/UoN ERC website **www.uonbi.ac.ke/activities/KNHUoN.**

Yours sincerely

PROF. M. L. CHINDIA
SECRETARY, KNH/UON-ERC

c.c. Prof. A.N. Guantai, Chairperson, KNH/UoN-ERC
The Deputy Director CS, KNH
AD, Health Information, KNH
The Principal, College of Health Sciences, UoN
The Director, School of Nursing Sciences, UoN
Supervisors: Dr. Blasio Osogo Omuga, Mrs. Miriam C. A. Wagoro

APPENDIX IX: LETTER OF APPROVAL FROM KENYATTA NATIONAL HOSPITAL DEPARTMENT OF REPRODUCTIVE HEALTH

17TH JULY 2013

19-7-2013
APPROVED
ong'ei

FROM: MASAN EVALYNE
MSCN STUDENT REG NO: 56/68923/2011
SCHOOL OF NURSING
UNIVERSITY OF NAIROBI

TO: ASSISTANT DIRECTOR REPRODUCTIVE HEALTH
KENYATTA NATIONAL HOSPITAL

Dear Sir,

RE: REQUEST LETTER FOR RESEARCH APPROVAL

I am a postgraduate nursing student undertaking research on OUTCOMES OF INDUCTION OF LABOUR AMONG WOMEN DELIVERING AT KENYATTA NATIONAL HOSPITAL. The research will be conducted in reproductive health department in postnatal wards.

I am requesting for a letter of approval from your department.

Attached please find copy of letter of approval from the ethical committee (KNH/UON-ERC) and the approved proposal.

Your faithfully,

MASAN EVALYNE
TEL-0720220735

APPENDIX X: LOCATION OF KENYATTA NATIONAL HOSPITAL