DEMAND FOR EMERGENCY CAESAREAN DELIVERYAT KENYATTA NATIONAL HOSPITAL: FREE MATERNAL HEALTH CARE PROGRAM

BY

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DECLARATION

Student's Declaration

"This project is my original work and has not been presented for a Degree in any other University"

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Supervisor's Approval

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

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ABBREVIATIONS

AIDS	Acquired Immunodeficiency Syndrome
ANC	Ante-Natal Care
BMC	Biomed Central
CDF	Cumulative Density Function
CO	Clinical Officer
CS	Caesarian Section
EmCS	Emergency Caesarian Section
EmOc	Emergency Obstetric Care
GoK	Government of Kenya
HIV	Human Immunodeficiency Syndrome
ICF	Inter-City Fund
KDHS	Kenya Demographic and Health Survey
Kg	Kilogram
KHHEUS	Kenya Household Health Expenditure and Utilization Survey
KHSSP	Kenya Health Sector Strategic and Investment Plan
KHSSP	Kenya Health Sector Strategic Plan
KNH	Kenyatta National Hospital
KShs	Kenya Shillings
MDG	Millennium Development Goals
MMR	Maternal Mortality Rate
MNH	Maternal and Newborn Health
MOH	Ministry of Health
NO	Nursing Officer
NCHS	National Center for Health Statistics
NGO	Non-Governmental Organization
NHA	National Health Accounts
NHIF	National Hospital Insurance Fund
SHO	Senior House Officer
SNO	Senior Nursing Officer
TBA	Traditional Birth Attendant

UNFPA	United Nations Population Agency
UNICEF	United Nations Emergency Children's Fund
WHO	World Health Organization

ABSTRACT

The Millennium Development Goal number five - to improve maternal health status by reducing maternal mortality and morbidity rate (MMR) by 75% by the year 2015. Unfortunately, Kenya is among the countries with MMR of more than 100 among other 23 countries in sub-Saharan Africa (Ministry of Health, 2013a). Locally, a number of initiatives are being implemented to reduce MMR. Notably: the jubilee manifesto of free maternal care in public hospitals and beyond- zero campaign by her Excellency the first lady – Margret Kenyatta. As a result, there has been an increased demand for caesarian section due to the large number of women seeking care in government hospitals despite the challenges of inadequate resource allocation. Globally, Caesarian Section (CS) rates currently stands at 15% with the rates progressively increasing in developed and developing countries (Lauer et al., 2010).

The rate of caesarian section in Kenya is 6% though it is proportionately higher in private hospitals. This high rate has been correlated with higher rates of maternal morbidity and mortality. As country, there is an urgent need to come up with policies and practices that can help in reducing or maintaining this rate. With this in mind, a cross-sectional retrospective study was undertaken at The Kenyatta National Hospital (KNH) to determine the demand for emergency caesarean delivery from 1st January, 2014 to 31st December, 2014 using purposive and systematic random sampling of 371 files at KNH registry.

Data was entered into stata software from where binary logistic regression analysis was conducted to make inferences about the demand for emergency caesarian section. Prior to this, the researcher sought for the approval from Research Committee of University of Nairobi and Kenyatta National Hospital. The results were presented in pictorial diagrams of tables, bar graphs, and pie charts.

GLOSSARY

Asymmetric Information   Is an Insurance terminology in which parties involved in a contractual a transaction have a differing amounts of relevant information.

Budget Constraint   This is an imaginary line that depicts points representing combinations of goods that the consumer is just able to afford in a market.

Caesarian section   Is a surgery undertaken to deliver a baby due to expected or unexpected towards the end of pregnancy.

Coinsurance   Is the proportion of costs paid by the beneficiary of a health insurance policy at the point of service.

Demand Function   The relationship between quantity demanded and the price. This can be studied either as individual demand as market demand.

Elasticity   This is the percentage change in the dependent variable resulting from a percentage change in the independent variable depicting a market response of a good/service.

Elective Caesarian Section   Is a CS that takes place before the onset of labour as a result of either medical, obstetrical or non – obstetrical reasons.

Emergency caesarean delivery   Is the CS that takes place after the onset and during the process of labour because of complications related to the mother or the baby or both.

Emergency Obstetric Care   Is the provision or availability of accessible quality maternal health services contain the resulting complications of pregnancy and childbirth.

Health Care   Are goods and services used which are used to as inputs to produce health.

Maternal Care   Refers to all aspects of peri-partum care of a pregnant woman (before, during and after care to a mother and the child up to six weeks)

Maternal Mortality   Is the death of a pregnant woman or death within 42 days of abortion from any etiology that is resulting from but not from incidental or accidental causes.

Production Function   This is the relationship between the maximum output and the corresponding input factor that can be produced at any combination.

Regression Analysis   This is defined as a statistical analysis that depicts a dependent variable to be explained and one or more explanatory variables in an equation form.

CHAPTER ONE
INTRODUCTION

1.1 Background

Every year approximately 120 million pregnancies occur worldwide (Lauer et al., 2010). Out of these, more than fifty million suffer from serious pregnancy related illnesses or morbidity and a minimum of 1.2 million infants die from complications of delivery (Lauer et al. 2010).

In Kenya, based on World Health Organization (WHO) report, one in every 36 women die from pregnancy related complications (Ministry of Health, 2013). Currently, maternal mortality rate in Kenya is approximately, 488 deaths per 100000 live births which are well above the Millennium Development Goals (MDG) target of 147 per 100000 by 2015 (Ministry of Health, 2013a). This is partly due to low access and uptake of key maternal health interventions. KDHS 2008-09 indicates that only 44% of the births are supervised by skilled birth attendant in Kenya. Of these, 6% are delivered by caesarian section.

Poor access to basic maternity care was identified as a fundamental reason for the high rates of peri-partum death, perinatal death and the disability in low and middle income countries, (Hotchkiss R. D., et al., 2005). As a result, three delays have been recognized to affect the survival of both the mother and the newborns: delay in recognizing the problems and deciding to seek care as a result of family members, spiritual or cultural beliefs; delays in transportation to reach the facilities as result of lack of transport or funds and distance or travel time to reach the facility. Lastly is the delay in getting an appropriate medical intervention at the facility, (Ministry of Health, 2012). Other contributing factors are; underlying maternal health (nutritional status), low level of education, lack of income and employment, low social and legal status of women (Hotchkiss R. D., et al., 2005).

On 1st June, 2013, the Government of Kenya through the Jubilee manifesto rolled-out free maternal services policy in all public institutions. As a result, there was an upsurge in the number of women seeking maternal health care services, (Ministry of Health, 2013b). And in the first month alone, there was approximately 100 per cent increase in demand of these services at Kenyatta National Hospital and other health facilities country wide, (Bourbonnais Nicole, 2013).

Free maternal health care though a noble idea has been noted to have a number of challenges which include; inadequate resources in terms of government funds allocations which are still way below the 15% of the Abuja declaration (Bourbonnais Nicole, 2013). The 5.7% allocated to health budget of which 60 billion is allocated to counties are not entirely used on health but are diverted to other competing priorities like salaries and infrastructure. The stake holders in health have the fear that this lack of sufficient funds has the potential to derail the success of the program (Bourbonnais Nicole, 2013).

Other notable challenges are; infrastructure, equipment, and staffing. In term of staffing, nursing ratio stand at 7 nurses per 4000 residents which are below the World Bank recommendation of 14 per 4000 (Bourbonnais Nicole, 2013). There is overcrowding in the wards which results in premature discharge to create room for others while some deliver on floors or normal beds (Bourbonnais Nicole, 2013).

Similarly, access to facilities has also been identified as a challenge facing the free maternal care due to insufficient number of facilities, the distance, and inadequate transport infrastructure. Quality of services offered in these facilities is a concern due to insufficiently trained health workers, cultural insensitivity, and inadequate compensation for the staff (Ministry of Health, 2013a).

Cesarean Section

Cesarean Section (CS) is an obstetrical intervention carried out by a sequential cut through the abdomen and gravid uterus to deliver the baby. The modern procedure was first performed in 1881 by a German gynecologist Ferdinand Adolf Kehrer. Caesarian section can be classified based on either the timing of the operation or the uterine incision made. Based on the timing of the operation, the procedure can be elective (planned) or emergency. Based on uterine cut, it can be transverse lower uterine segment caesarian section or classical (vertical upper uterine segment) caesarian section. It is today indicated when a normal vaginal delivery poses the life of the baby, mother or both at risk. Occasionally, it is performed upon the request by the mother, (Wilkinson M. et al., 1998).

There has been an insidious upsurge in the rate of operative abdominal delivery all over the world above the WHO (1985) recommended 15%. This has been attributed partly to an increase

in use of technical medical equipment, increasing maternal age, maternal request, previous cesarean section, and multiple pregnancies (Becher L. & Stokke S., 2013).

It is an obstetrical procedure important in reducing death and disability from causes like hemorrhage, infection, obstructed labour among others. However, the adverse effects of caesarian section delivery in comparison to vaginal delivery are higher cost, delayed recovery and increased risk of infection, (Gwer S. O et al., 2011).

According to World Health Organization (WHO) publication of 1985, there is no justification for a caesarian section rates of more than 15% in any part of the world. The global caesarian section delivery rates currently stands at 15% with the rates still progressively increasing in developed countries and considerably lower in developing countries (Worjoloh A. et al., 2012). In Europe, the average caesarean section rate is estimated at 19% with the high rates found in Italy and Portugal at 36 % and 30.2 % respectively. In this continent the lowest rates of caesarean section are found in Serbia and Montegro at 8% and 6.2% respectively.

Generally, extremely developed regions of Europe, North America, Japan, Australia, and New Zealand, the rates are of the range of 6.2 - 36% averaging at 21.1%, Betran et al, (2007) while less developed regions comprising parts of Africa, Asia excluding Japan, South America and Oceania has marked variation in rates from 29.2% to 3.5% with an average of 14.3%. (Worjoloh et al., 2012)

In the least developed regions, the rates range from 0.4% in Chad to 6% in Cape Verde averaging at 2% (Azami-aghdash S. et al., 2014). Particularly, the average caesarean section rate in Africa is 3.5% with South Africa leading the continent at 15.4% (Gibbons L. et al., 2010). This is attributable to lack of access or unavailability of maternal health services together with the corresponding underuse of caesarean section which predispose to high maternal and perinatal deaths and relatively low rates of caesarean section in Africa (Lauer et al., 2010).

A study by Betren et al (2007) found that, as a country's caesarian section rates increase above the 15%, the maternal mortality rises. This led them to a conclusion that "unnecessary caesarian section kills women''. This sentiment is supported by data from studies done in United States

of America (USA) where maternal mortality rates keeps rising with an increase in caesarian section rates (Azami-aghdash S. et al., 2014).

From the WHO report of 2007, the attention has shifted to strategies of reducing caesarian section rates due to the fact that higher rates of caesarian section do not offer better health gains but has the potential to increase maternal risks in the present or future pregnancies (Azami-aghdash S. et al., 2014). The high rates also have resource implications for health services since they in essence lead to wastage.

Why the Upward Trend?

The reasons for the upward trend are complex in nature. The most common reasons advanced by the physician to perform this procedure are to benefit the fetus. Other possible reasons are fetal compromise, prolonged labour, abnormal presentation, multiple pregnancies, previous section, and caesarian section on request, (Gwer S. O et al., 2011). As observed by Mukherjee N. S, (2006), caesarian section is frequently prescribed for fetal compromise and prolonged labour without recognizing the need for corrects diagnosis and unbiased decision (Mukherjee N. S., 2006). Maternal request is a major indication on this concept of "caesarian section on Demand" (Mukherjee N. S., 2006).

Another reason is "Defensive Obstetrics'' (Mukherjee N. S., 2006). It has been noted that approximately 82% of doctors performed caesarian section to avoid litigation, (Menacker F. and B. E., 2010). This concept (defensive obstetric) has been found to violate the fundamental principle of medical practice though it has not led to a decrease in litigation of doctors in developed countries (Mukherjee N. S., 2006). Caesarian section is also being performed for economic reasons since doctors and hospitals especially in the private sector earn much more money from caesarian section compared to vaginal delivery (Mukherjee N. S., 2006).

Gwer S. O et al., (2011) identified the six commonest indications for EmCS at the Kenyatta National Hospital. These are:

1. Fetal compromise
2. Breech presentation
3. Maternal hypertensive disease in pregnancy such as pre-eclampsia and eclampsia
4. Ante-partum haemorrhage
5. Labour process

6. Cervical dystocia

How safe is Caesarian Section?

The decision to have caesarian section or not is not such an easy task. Even the elective caesarian section carries serious risk for both the mother and the child despite the fact that major complications are usually double in emergency caesarean delivery compared to elective (Menacker F. and B. E., 2010). Caesarian section is four times the major cause of maternal mortality even in good set up where both medical and obstetric complications are controlled (Gichuhi J. W. et al., 2014). The immediate risks associated with caesarian section are the exposure of women to the potential complications of anaesthesia (Gwer S. O et al., 2011). Others are uterocervical lacerations, blood loss (Haemorrahage), fetal risks such as accidental cut by surgeon's knife, respiratory distress, and iatrogenic prematurity (Gibbons L. et al., 2010).

Late consequences for caesarian section are uterine scar rupture, hysterectomy, maternal and fetal deaths in future pregnancies (Mukherjee N. S., 2006). Previous caesarian section increases the risk of multiple placental abnormalities in subsequent pregnancies (Mukherjee N. S., 2006). Women with previous caesarian section have been found to be less likely to have a normal delivery in subsequent pregnancies compared to those with spontaneous vaginal delivery (Gichuhi J. W. et al., 2014). In addition, they also face the risk being the potential candidates for ectopic pregnancy in their future pregnancies (Gibbons L. et al., 2010).

1.1.1 Health Service Delivery System in Kenya

The health care system has for a long time been structured in a pyramidal pattern with the dispensaries and health centers forming the base while the two referral hospitals forming the apex (Ministry of Health, 2013a). With the ordinance of the new constitution in the year 2010, the structure and the organization changed into a two tire system composed of the central government and the 47 county governments (Ministry of Health, 2013a).

Functionally, ministry of health as a whole is concerned with the coordination, management, and organization of the health services at their implementation levels (Ministry of Health, 2013a). According to the Kenya Health Policy 2012-2030, coordination of health functions are found at the national, county, sub-county and at the community health committee (Ministry

of Health, 2013a). The management functions are the mandate of Ministry of health headquarters and parastatals at the national level, the hospital management teams at the county, and the health facility management teams at the sub-county, (Ministry of Health, 2013a).

In terms of the organization, the national referral services is composed of all secondary and tertiary referral facilities which provide highly skilled services such as general specialization, discipline specialization and geographical or regional specialization (Ministry of Health, 2013a). The county health services is organized to comprise of all level 4 or primary hospitals and the non-state actors such faith based organizations and the private sectors (Ministry of Health, 2013a). They are constitutionally defined to offer all – inclusive in-patient diagnostic, medical, surgical, and rehabilitative health care services. They also offer special out-patient services, facilitate, and manage the referral system from lower levels and others.

The primary care services are found within the sub county levels of health service system. It is comprised of level two facilities, mostly dispensary and level three such as health centers and those managed by the non-state establishments (Ministry of Health, 2013a). Their primary role is to offer both disease prevention and health promotion activities. They also offer basic outpatient diagnostic, medical, surgical, and rehabilitative services. They are also constitutionally mandated to offer inpatient treatment for emergency cases as they await transfer to other health facilities, offer close monitoring and normal vaginal delivery services to expectant mothers, (Ministry of Health, 2013a). Facilitation for referral in and out of their facilities is also expected of them.

Last in the tier are the community health services which are composed of the community units in the county. Organizationally, their major functions are to facilitate individuals, households, and community to carry out appropriate health behaviors. The members are expected to have the know-how to diagnose conditions that require referrals and to promote community diagnosis, treatment, and referral.

1.2 Problem Statement

Generally, health care demand is affected by income, preferences, price, health status, time and coinsurance or insurance (demand shifters). The introduction of free maternity program in Kenya has reduced the financial barrier to access in an effort made by the government to reduce

maternal mortality and morbidity. As indicated by Bourbonnais Nicole (2013), free maternal program has led to an increase in facility deliveries which has the potential to result in an increase in emergency CS in the health facilities where these services are provided. However, high rates of emergency CS is associated with increased maternal death and disability due to bad out-comes arising directly or indirectly from the procedure.

This research analyzed the effect of free maternal program on the rates of emergency CS at Kenyatta National Hospital with the aim of highlighting its determinants and policy decisions that are needed to address them.

1.3 Research Questions

1. What is the prevalence of emergency caesarean delivery at the Kenyatta National Hospital?
2. What are the determinants of emergency caesarean delivery at the Kenyatta National Hospital?
3. What policy interventions could be implemented to minimize the rate of emergency caesarean delivery at the Kenyatta National Hospital?

1.4 Objective of the Study

To determine the demand for emergency caesarean delivery at Kenyatta National Hospital

1.5 Specific Objectives

1. To Identify the current indications for emergency caesarean delivery at KNH
2. To determine the prevalence of emergency caesarean delivery at KNH
3. To examine the determinants of emergency caesarean delivery at KNH
4. To identify the institutional and national policy changes that can be implemented to minimize the rate of emergency caesarean delivery at Kenyatta National Hospital.

1.6 Significance of the Study

The study has both the policy and health quality advantages to policy, decision makers and reproductive health care workers. By identifying the rates of caesarian section at the Kenyatta National Hospital, the information generated shall be of help in efficient and effective allocation of the limited resources in health care provision. To the reproductive health service providers, the information emanating from this study shall among others: help in creating awareness of implications of this procedure; highlight the risks and benefits and also help in the adoption and practice of other safer emergency obstetric services available such proper monitoring of labour during delivery and consultation vertically and horizontally among colleagues.

LITERATURE REVIEW

2.1 Theoretical Literature Review

This study is based on economic theory of demand for health, Wagstaff Adam, (1986a) which analyzes the interaction of socioeconomic determinants of health through understanding of the link between resources, behavior, and health as a consumer good (health behavior). Three basic economic concepts: the indifference map; the health production function and; the budget constraint forms the backbone of this theory (Wagstaff Adam, 1986b).

This economic approach lays emphasis on the role of economic factors in shaping health related behavior what Wagstaff Adam, (1986b) termed, "demand for health" approach since it looks as the individual to always "demanding" for a good health (Grossman M., 1972a).

Literature on indifference map or curves has the assumption that people value both health and other related things in life but they do not place an overriding value on their own health (Wagstaff, 1986). However, good health is desirable for: it is pleasant compared to ill health which is unpleasant; and good health allows one to engage in normal activities which are social and productive in their output (Wagstaff Adam, 1986b).

For example, collectively society, people in the hospitals usually go without life-saving interventions or opportunities because of the inadequate resources in the health sector as resources are diverted to other uses that the society or the country values more comparatively.

The second assumption is that of the health production function which states that individuals exert a comparatively high sense of control over their health by virtue of the fact that they can influence their health-affecting consumption patterns, health care utilization and environment (Wagstaff Adam, 1986b). The individual is conceived to be a producer of own health by combing various health inputs such as medical care (bundles of health inputs) (Wagstaff Adam, 1986b). The health production function displays the relationship between health input and health output for a given state of technological knowledge (Wagstaff Adam, 1986b). He further asserts that, people produce their health by utilizing health resources which results in a commensurate level of improved health up to a certain point beyond which additional quantity of health utilized results in proportionately smaller improvement in health.

The last assumption of this theory is the budget constraint which states that neither health inputs nor consumption activities are costless and that individuals have only limited resources at any

given time to satisfy them, (Wagstaff Adam, 1986b). This can alternatively be stated as individuals have a given income with which to finance their health production and consumption activities and neither their health production nor their consumption activities are costless. Wagstaff Adams (1986) used a combination of all the three assumptions in analyzing individual's behavior using the concept of consumer equilibrium.

Using this concept, he observed that an individual will try to do the best he or she can by organizing his or her expenditures on health resources and consumption in order to achieve the highest possible level of wellbeing (Grossman M., 1972b). The above assumptions can be represented diagrammatically by showing the relationship between the indifference curves, the budget constraint, and the production functions which acts as constraints to individual's behavior (i.e. both financial and technological constraints), (Wagstaff Adam, 1986b). In summary therefore, an individual's objective of his/he behavior will be to attain the highest possible welfare contour subject to the financial and technological constraints facing him/her (Wagstaff Adam, 1986b).

Figure 2.1 Composite Diagram

Source: Wagstaff (1986a)

As shown in the diagram, health is measured in a south - north direction while the health inputs are measured in east - west direction in quadrant II depicting health production function.

Quadrant III depicts budget constraint where the health inputs are measured from east to west and consumption from north to south. Quadrant I, health is measured from south to north and consumption from east to west and quadrant IV, consumption is measured on both axes.

The contribution of Grossman originated from his concern of how people allocate their resources to produce health. As a result, he came up with the model which not only looked at

the traditional demand analysis but also looks at individuals as producers of health. The model also introduced the idea of individuals investing in their own health through health and education to improve the outcomes in both market and non-market sectors of the society.

Building from the traditional demand theory, Grossman Michael in 1972 developed the human capital model which viewed health as a durable stock that yields an output of healthy time and that individuals inherit an initial amount of health stock that depreciates with age but can be increased with investment. In traditional demand theory, consumers of health care, are assumed to have a utility or preference function which allows them to rank alternative combination of goods and services available in the market and select the that combination or bundle that maximizes their utility function subject to individual's income.

Subsequently, Grossman drawing heavily from Human Capital theory of Becker G. S. (1965), came with the human capital model in which he postulates a person's stock of knowledge to affects his commercial and noncommercial productivity, while his stock of health determines the total amount of time he can spend producing money earnings and commodities''. He adopted household production function model of consumer behavior in his approach to account for the gap between health input and output.

In his model, health is defined in general terms to include prolonged life and sickness free days in a given year which are both demanded and produced by the consumer (Becker G. S., 1965). He pointed out that health is demand by the consumers: as consumption commodity with sickness days being looked at as source of disutility and; as an investment commodity where it determines the amount of time available for commercial and noncommercial activities (Becker G. S., 1965). Health as a capital is inherited as an original stock that depreciates as one ages with death occurring when the original stock falls below a certain level. He noted that it is the responsibility of the individual to choose the length of their life and can increase it through investment.

2.2 Cost Theory

Cost theory and application relies heavily on the production function, production function isoquants, and elasticities of substation. Firms minimizes the costs of production through the adoption of isocost curve which shows a combination of all capital and labour that together

cost a specific amount displayed in a cost-function relation. Closely related to this is the concept of economies of scope which in practice is possible only for multi-product firms which produce two or more goods or services jointly and more cheaply than they can be produced separately (Folland S. et al., 1997).

In practice, consumers would want firms to maximize average costs as long as the costs are passed to the public. The theory of perfect competition forces firms in the long run to operate so as to minimize average costs. Unfortunately, most health care firms do not operate in a perfectly competitive commercial environment. As such, the competitive pressure will not necessarily force them to operate at the most efficient scale or optimum (Ringel S. J et al., 2002). In practice, hospitals face difficulty of measuring their numerous outputs with regards to hospital cost studies. Among the cost difficulties are the case-mix problems and how to treat quality since there are variations in quality between hospitals (Acton J. P., 1975).

Demand for Health

The demand for health is more sophisticated compared to that of a typical product making its estimation elasticity to be less straightforward. Consumers with demand for health cannot purchase directly have to purchase health care services that are used to produce it first. The amount of health care demanded is measured by the quantity of services used such as the total cost of the services measured in different units of quantity (Ringel S. J et al., 2002).

2.3 Empirical Literature Review

For this study, the review of empirical literature generally focuses on three dimensions: first, the review highlights the literature on the background characteristics (socioeconomic and demographic) variables on demand for emergency caesarean delivery of mothers. Secondly, on the intermediate (indications) variables of these mothers prior to surgery and towards the end, the researcher will highlight the demand component of health care. Specifically, a critical review looks at the impact of emergency caesarian section.

Mother's education has positively been associated with child survival in a number of studies conducted in developing countries. For example, a study by Elo T. I (1992) in his study on the role of women's education in utilization of maternal health-care services in Peru using the data

from the Peruvian Demographic and Health survey of 1986 with the help of a model of maternal health-service use, arrived at a consistent findings of a positive effect of maternal level of education to use of perinatal health care services (Elo T. I., 1992).

Demographic factors such as age and type of family have been found to be important determinants to the use of health care services. From the study by Majunder Amlan (2006) on the utilization of health care in North Bengal, a numerous observations were made: for example, the probability of visiting a health care facility higher in small families than the large ones; the households whose heads make frequent trips to the health facilities were found to have a high tendency to utilize care; the demand for public health services were high compared to the private and that the probability of utilization was very high in rural area compared to where the preference for the system was homeopathy; the availability of public health facilities was found to have negative impact towards the utilization of care with the assumption that in the urban areas the facilities were readily available (Majunder Amlan, 2006).

Using data from the Uganda National Health Survey on demographic, socioeconomic and community characteristics of 2002-03, the level of formal education was found to have a positive and significant probability of seeking formal care compared to no care (Nabyonga-Orem et al., 2008). Quality of health services were found to influence the probability of seeking care such that improving basic services of health care provision such availability of drugs or child immunization could lead to increase in utilization of formal care especially children services offered in public hospitals (Nabyonga O. J. et al.,2008). This study also found that cost of care was regressive and could substantially reduce health care utilization especially for the poor and that increasing the income of the poor had the potential to increase their utilization of the health facilities holding other factors constant, (Nabyonga O. J.et al., 2008).

Patients' trust in health care provider and the information available to them has been found to be of great value in determining demand for health care in Kibera Slum in Kenya. The trusting relationship if well developed through availability of health information or communication especially between the household and the health care provider is associated strongly with higher visits in the event of illness or injury. This is according to a study done in Kibera slums on the demand for health care in Nairobi with more attention on the role of quality and information, (Muriithi M. K., 2013b).

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Identification of major determinants of health care demand is important in the formulation of government policy, assessment of the impact of policy changes at household level and in estimating of health care services demand, (Lawson D., 2004). Ahmed and Khan (2011) using a cross-sectional data to analyze the determinants of demand for health care services in Bangladesh by employing a binary logistic regression model found that the estimated coefficient of price variable was negatively related to the demand for health care, (Ahmed S. and M., 2011). Further, the level of education and income had positive effect on demand for health care Ahmed S. and M., (2011) with waiting time having a positive relationship effect to the study. They concluded that, the price for health care should be reduced in such a way that the patient gets the maximum health services (Ahmed S. and M., 2011).

In another related study by Lawson David, (2004) on determinants of health seeking behavior in Uganda using the Uganda national household survey data by employing the discrete choice model found a strong association between income and increased health usage across all ages and especially so among women, and that user fees were of less significance at first impression (Lawson David, 2004). In addition, he found that there existed a significant difference in health seeking behavior related to age, and gender and that increased level of education was consistently associated with transfer away from government provided health care probably perceived to be of low quality (Lawson David, 2004).

A study in Kano, Nigeria by Omole-Ohonsi, Ashimi, and Adeleke (2009) to determine the incidence, age, parity, indications, types and feto-maternal outcomes found that caesarian section rates was at 13.7% with emergency caesarean delivery accounting for 87.9% of deliveries. The leading indications for the emergency caesarean delivery were cephalopelvic disproportion, eclampsia, and pre-eclampsia. Maternal mortality and morbidity was relatively high among the unbooked women presenting late in the hospital (Omole-Ohonsi et al., 2009). In South Africa, a study on rising rates of caesarian section in private practice was in conformity with the trend in developed countries (Naidoo and Moodley, 2009).

Abasiattai et al. (2006) in their study to establish the role of caesarian section in reducing perinatal mortality in singleton breech delivery at a university teaching hospital in Nigeria found that; compound presentation was the leading reason for caesarian section delivery. With the adoption of caesarean section in this facility, a significant decrease in perinatal mortality among the primigravida was revealed (Abasiattai et al., 2006). They concluded that caesarian

section had an important role to play in the management of breech presentation and advocated for elective caesarian section for all primigravida with breech and those fetuses whose weights are estimated at above 3.5 kg.

Brouwere D. V. et al. (2010) in their study to estimate the actual cost of caesarean section from patients' point of view noted that financial barriers were important obstacles for the use of Emergency Obstetric Care and a contributing factor to a reduction in the level of maternal deaths (Brouwere D. V. et al., 2010). They found that fees exemption policy for caesarean section primarily minimized the cost for household who had no access but did not lead to true caesarian section deliveries due to other costs involved Brouwere D. V. et al., 2010).

Ngangue Ngwen, (2014) using the data collected from Cameroon's Third Household Investigation to identify determinants of health care resort in Cameroon in order to propose many improvement axes for their health system and allow better fulfillment of the poor's needs came up with the following conclusions: that the consultation fees by the doctors was negatively correlated with the demand for health services regardless of the place of residence; that wealthier quintile tempted to desert hawkers, native doctors and health centers to use clinics and specialized hospitals which potentially tend to have more skilled personnel; that education increases the probability to seek health care services from the clinics or private health facilities and decreases the probability to be attended to by local doctors or to hawkers (Ngangue Ngwen, 2014).

WHO in the year 2010, sponsored a study on determinants for caesarian rates in developed regions of the world targeting the supply, demand and opportunities for control using the national level data between 1980-2004 (Lauer et al., 2010). He found that the capacity of health system to offer surgical obstetric care services including the financial structure and human resource profile have stronger effects to caesarian section rates than the income (Lauer et al., 2010).

Azemi-Aghdash et al (2014) used content analysis of the databases in a systemic review to determine the prevalence and causes of caesarian section in Iran (Azami-aghdash S. et al., 2014). In this study, he divided the factors influencing caesarian section into three categories: social and demographic factors such as maternal education and grand multiparty; obstetric-

medical causes such as previous caesarian section and; non-obstetric medical cause such as the fear of normal-vaginal delivery and doctor's suggestion (Azami-aghdash S. et al., 2014). They concluded that it is essential to design and implement programs and interventions effectiveness such as providing painless child deliveries, educational and psychological interventions (Azami-aghdash S. et al., 2014).

Similarly, Mishra and Ramanathan (2002) used the national facility health survey of 1992-93 of eighteen selected states in India to examine the levels and correlate delivery related complication of caesarian section in terms of specific maternal and institutional factors (Mishra & Ramanathan, 2002). They noted a rising trend in caesarian section rate which they attributed to an increase in hospital deliveries; the risk of undergoing caesarian section was higher in the private than the public institutions and that caesarian section was being misused for profit purposes especially in the private sector (Mishra & Ramanathan, 2002).

Giguere R. (2007), reviewed the manuscripts from a collection of peer-reviewed journal articles, books, and internet websites to study social determinants of caesarian section deliveries in Latin America the case of Brazil (Giguere R., 2007). He came up with the following findings: that there was a regional trend in caesarian section rates of the range 12-40% with a median of 33%; that there was a positive relationship between gross national product and the frequency of caesarian section; that the rates were higher in urban areas mediated by educational level and socioeconomic status (Giguere R., 2007). He concluded that the high caesarian section rates were attributed to high rates of medically unjustified caesarian section deliveries. He arrived at numerous recommendations which can be borrowed in the formulation of the local policies (Giguere R., 2007).

Impacting demand from women by increasing continuous support for women during labour, improving communication between the women and the health care provider regarding women's' birth preferences, increased counseling and provision of information for women who prefer elective caesarian section or manifest a fear of childbirth (Briand V. et al., 2012). He also recommended altering of physician preferences through audit and feedback systems to inform them of their practices, increased teamwork among Obstetrician staff and increased support for midwifery and Obstetric nurses in hospitals (Giguere R., 2007). For the system change, he recommended decrease use of continuous electronic fetal monitoring, increased

trial of vaginal birth after previous caesarian section and performing external cephalic version of breech presentation (Briand V. et al., 2012).

In Kenya, Wanyonyi S. et al. (2006) in their retrospective study on caesarian section rate and perinatal outcome at the Aga Khan University Hospital for the year 2001 - 2004 found that the overall caesarian delivery rate was 20.4% in 1996, 25.9% in 2001, and 38.1% in 2004. The rate was also noted to be higher among privately managed patients than the general hospital patients at 27.1% in 1996, 30.8% in 2001, and 41.7% in 2004 compared to 14.7%, 21.5%, and 34.5% respectively, (Wangui M. L., 2014). For emergency caesarian section, the main indication was fetal distress while previous uterine scar topped the list among the elective cases. Concerning the outcome of caesarian section, there was a remarkable improvement in the overall perinatal mortality from 25.2 in 2001 to 14.0 per 1000 births in 2004, (Wanyonyi S. et al., 2006). They came to a conclusion that there was a remarkable increase in the rate of caesarian delivery over the years probably due to the nature of the hospital being a referral hospital with the potential to receive many high risk patients referred from other places (Wanyonyi S. et al., 2006). In addition, they attributed the high rate to prompt diagnosis of fetal compromise and improved diagnostic facilities leading to timely intervention.

In a study to evaluate the relationship between caesarian section rates and pregnancy outcomes in hospitals in African continent using data obtained from all births over a period of two to three months in 131 facilities, Gebremedhin S. (2014) found that the median caesarian section delivery rate was at 8.8% among 83439 births in 95 facilities where it was offered. The hospital specific delivery rates were majorly determined by previous caesarian section, hypertensive disease in pregnancy, induced labour, referral status and higher hospital classification scores. Hypertensive disease in pregnancy was found to increase the probability of maternal deaths, fresh still births and severe maternal morbidity while emergency caesarean delivery was found to have an association with more fresh still births, neonatal deaths and severe neonatal morbidity related probably to pronged labour, asphyxia and sepsis (Gebremedhin S., 2014). They concluded that the use of caesarian section delivery was limited in African hospitals surveyed and that the emergency caesarean delivery performed were often done when it's already too late to reduce perinatal deaths.

Gwer S. O et al. (2011) in their attempt to analyze the percentage of sub optimal diagnoses for the common indications of emergency caesarean delivery using a cross sectional study at

Kenyatta National hospital by analyzing the data of patients undergoing emergency caesarean delivery for a period of six months (Gwer S. O et al., 2011). During this period, they reviewed how the six commonest indications such as dystocia, fetal compromise, previous caesarian section, abnormal presentation, hypertensive disease in pregnancy and third trimester bleeding were arrived at (Gwer S. O et al., 2011). Out of the 1080 women, 409 of them were delivered by caesarian section (37.9%) as a result of prior uterine scar and presumed fetal compromise. They concluded that strategies to be devised to improve optimality of diagnosis by paying attention to the six commonest indications.

2.3.1 Free Maternal Care and Effects of Coinsurance

Health insurance is a demand shifter that modify the effective price hence more insurance means a lower coinsurance rate. Insurance has the effect of increasing the demand for health care services and in effect, makes demand for health less elastic (Gwer S. O et al., 2011). This has effect on the demand curve by making it more vertical or perfectly inelastic as it does not respond to money price in the market. What happens in the case of free maternal care? Free maternal care increases the quantity of health care demanded.

Tudjegbe, Imarengiaye, and Sadoh (2012)in a prospective study looking at the socio-demographic characteristics of the mothers, indications for caesarian section, type of surgery and anaesthesia in the University of Benin Teaching Hospital found that emergency status, foetal distress and general anaesthesia were prerequisite for poor foetal outcome necessitating the need for resuscitation and the need for paediatrician at the time of birth by CS.

Separately, Triunfo and Rossi (2009) using data about births from perinatal information system of Uruguay by estimating the probability of having emergency caesarean delivery controlled by risk factors and endogeneity of the hospital choice where there were fixed charges in public hospitals and a separate payment for the procedure in private hospitals. They found 11% a probability of having a CS in public hospitals lower than that of 25% in private hospitals. This led to a conclusion that the remuneration system as a fundamental reason for the difference between the two groups of institutions.

In Mali, Fournier et al. (2012) in their study highlighting the effects of free caesarian section policy on maternal and child survival using a three zone model for the entire country found that

the survival of the mother and child increased from 68% to 78% and a joint mother and newborn death rate decreased from 4.6 to 2.4%. They concluded that free emergency CS improved mother and child survival depending on the residence and that the free CS should be extended to include other costs such as transport and hotel expenses.

Similarly, Bennis and De Brouwere (2012) in a study to estimate the real cost of caesarian section from the patients' perspective in three public hospitals in Morocco using a semi-structured interview of 100 women who delivered by emergency CS. In this set-up fee exemption policy reduced the total cost for the households who did not have access to a poverty card and that it did not lead to truly free caesarian section deliveries.

Trowell, (1983) did a pilot study to explore mother-child relationship among mothers delivered by emergency CS compared to normal vaginal deliveries. He noted that the mothers who went through CS had a period of amnesia after birth with the delayed contact with their babies compared to control group. In addition, the mothers had more doubts about their capacity to care for their babies, were more depressed. Equally, the children had no difference in their general behaviour and development. The only difference noted between them is that children delivered by CS were comparatively heavier by birth weight. He also found that the mothers who went through CS had difficulty adjusting to birth of their first born making parenthood more difficult compared to the control group.

2.4 Critique of the Literature

The literatures reviewed are majorly from the developed world where health systems are deemed to be performing relatively well compared to our set-up. As noted by Folland S. et al. (1997) that education makes people efficient producers of their own health, much of the literature does not explain what happens with consumption of the produced health when the health care becomes a public good in totality. The literature on demand and rates of emergency caesarean delivery does not show whether the increased rates were as a result of insurance, coinsurance, or out-of-pocket expenditures by the beneficiaries.

In most countries of the developed world, delays in accessing the health facilities in order to consume health care has been associated with increased complications leading to more utilization of caesarian section, morbidity and mortality. This is not the case with the developed

world; as a result, there is need for a country specific study to determine the regional demand, rates, and prevalence of caesarian section.

2.5 Overview of the Literature

The study is based on the Economic theory of demand for health by Wagstaff Adam (1986b) which analyses the interaction of socioeconomic determinants of health by linking factors of production of health such as resources, behavior of individuals and health. In addition, the theoretical framework is borrowed from the demand for health approach upon which the individual is looked at as always demanding for a good health with three assumptions: the indifference curves (map) which assumes that people value both health and other related things in life but they do not place an overriding value on their own health. The budget constraint approach assumes that individuals have a given income with which to finance their health production and consumption activities none of which is costless. In sum, theoretical review of literature is built on the assumption that individuals' objective is attain the highest possible welfare contour subject to the financial and technological constraints facing him or her.

Empirically, human capital model of Grossman M. (1972a) which views health as a durable capital stock that yields an output of health time and that individuals inherit an initial amount of health stock that depresses with age but can be increased by investment. It assumes that a person's stock of knowledge affects both his or her market and non-market productivity while his or her stock of health determines the total amount of time he/ she can spend producing earnings and commodities. On this basis, determinants of emergency caesarean delivery demands are grouped into broad categories comprising of socioeconomic and demographic independent variables and the intermediate variables.

In the first group, maternal education is positively associated with child's survival perinatally. Mothers' level of education has also been associated in a number of literatures with increased utilization of maternal health care such as pre-natal care services. Mothers' trust of the facility and health workers through proper communication has also been linked to more facility utilization including childbirth.

A number studies have identified cost to be an impediment to demand for maternity health care. In Kenya, Maternity services are free in all government facilities but there are other costs

that still impeding the utilization of these services such the transport cost, waiting time due to the huge number of patients turning-up for care. There are also cultural or religious barriers together with the family size that affects the demand for emergency caesarean delivery of obstetric care.

CHAPTER THREE
METHODOLOGY

3.1 Analytical Framework

3.1.1 Grossman's Model for Health Production

Grossman's Model, (1972) is a modification of the ancient demand theory which assumes that goods and services purchased in the market enter consumers' utility functions. In this approach, Grossman assumes that consumers produce commodities with inputs of market goods and their own time. The commodity (good health), is treated as a durable item because health capital is assumed to be one component of human capital. The human capital is treated as a stock of investment in human beings. Individuals are thus assumed to inherit original stock of health which depreciates overtime in an increasing rate up to some stage in life cycle and that it can be increased by investment.

He also assumes that a direct input into the production function also depends on environmental factors such as the level of education that alters the efficiency of the production process. The level of health of an individual depends on the resources available for its production and that health is demanded by consumers for two reasons: As a consumption commodity where it directly enters their preference functions where sick days are treated as a source of disutility; As an investment commodity where it determines the total amount of time available for market and non-market activities.

Grossman's model also illustrates the downward slope of the demand curve which conventionally, is a fundamental law in economic studies. In health economics, the quantity of health demanded is negatively correlated with its shadow price which depend on many variables other than price of medical care.

For this study, we made the assumption that expectant mothers derive utility from their own and that of the unborn baby. To achieve this, they engage in such activities that help in their health production using behavioral, market and non-market inputs (Mwabu Germano et al., 2008). Borrowing from Rosenzweig and Schultz (1982), Mwabu's utility maximization function of the form shown below is adopted:

U=f (X, Y, H) …………………………………………………………….…… (1)

where **U,** is mother's utility function, **X** represents consumption of goods purchased by her but do not directly affect her health, **Y** represents health inputs and behavior which directly affects her health such as access to health care services and her behaviors that has the potential to influence her health such as smoking, **H** represents mother's own health status. Mother's health during pregnancy is influenced by her level of education, **E** her socioeconomic background such cultural beliefs, occupation and source of income **B**, demographic factors **Y,** health input and behavior **X**, and the unobservable characteristics some of which are unknown to the researcher but known to the mother **μ** (Muttai C. P., 2014).

The mother's health production function is thus written as:

$$H = H (E, X, B, Y, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

Based on the conceptual framework of the research, the mother maximizes (1) and (2) above subject to the budget constraint as follows:

$$I = PC + PE + POX \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

The result of this maximization leads to the following equations of determining consumption price (C), price of mother's education (PE) and price of health inputs **(PX).**

$$C = C (PC, PX, PE, B, Y, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (4)$$

$$X = X (PX, PC, PE, B, Y, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5)$$

$$E = E (PE, PC, PX, B, Y, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (6)$$

The reduced form of the model for maternal health production is created by combining equations (2) and (5) so that E is linked to maternal health status (Mwabu Germano et al., 2008). Thus, the new model of maternal health production is of the form:

$$H = H (PX, PC, E, B, Y, I, \mu) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (7)$$

where **H,** is a measure of maternal health status which is a function of PC, PX, E, and B, I while E and μ are potentially endogenous and unobservable respectively.

3.2 Specification of the Model

The model specified is structurally a multiple regression model where emergency caesarean delivery function is hypothesized to depend on a combination of maternal background variables such as maternal education, age, employment, etc and intermediate variables such as fetal status, maternal hypertension, ante-partum hemorrhage, and twin pregnancy.

This is depicted by a population regression function (PRF) as:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots + \beta_k X_k + \varepsilon \quad\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (8)$$

where **Y**, is the outcome or dependent variable, **X**'s are the independent variables, **β's** the partial slope coefficients of the parameters, and **ε** is the stochastic error term.

From equation (1) above, a sample regression function (SRF) is expressed as:

$$y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots\ldots\ldots\ldots\ldots \beta_k X_k + \varepsilon \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (9)$$

where, **y** is a binary variable that can take the values of zero and one. This leads to a binary logistic regression model of the form:

$$CS = \beta_1 + \beta_2 EmCs + \mu_i \ldots\ldots\ldots \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (10)$$

In this study y denotes a delivery by caesarean section which takes the value of one if emergency and zero otherwise. This lead to the formulation of this regression model:

$$CS = \beta_1 + \beta_2 mag + \beta_3 res + \beta_4 rel + \beta_5 ms + \beta_6 anc + \beta_7 CSi + \beta_8 par + \beta_9 EmCS + \mu i \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (11)$$

Assuming the error term (μ) follows a normal distribution, its probability is given:

$$P\,(EmCS = 1|\ mag, res, rel, ms\ em, mod, ci, par, anc,) = \Phi(\beta_0 + \beta_1 mag + \beta_2 res + \beta_3 rel + \beta_4 ms + \beta_5 EMP + \beta_6 CSi + \beta_7 par + \beta_8 anc \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \quad (12)$$

where, **mag** represents mother's age at gestation, **res**, represents residence of mother, **rel,** represents religion of the mother or family, **ms**, represents marital status of the mother, **ci,** represents indication for CS, **par** represents parity of the mother or birth order of current pregnancy, **anc** represents ante-natal care status and, Φ is the cumulative density function (cdf) of the error distribution.

Consequently, ordered regression model for mother's education, and the indications for Emergency CS is constructed as follow

$$CS(Outc) = \boldsymbol{\beta_1} + \boldsymbol{\beta_2} agegrp1519 + \boldsymbol{\beta_3} agegrp2034 + \boldsymbol{\beta_4} agegrp35plus + \boldsymbol{\beta_5} medu\_prim$$
$$+ \boldsymbol{\beta_2} parity2 + \boldsymbol{\beta_7} medu\_sec + \boldsymbol{\beta_8} medu\_high + \boldsymbol{\beta_9} slum\ \boldsymbol{\beta_{10}} chris + \boldsymbol{\beta_{11}} mar\_married$$
$$+ \boldsymbol{\beta_{12}} gestat\_pre + + \boldsymbol{\beta_{13}} durac + \boldsymbol{\beta_{14atno\_1}} + \boldsymbol{\beta_{15atno\_2}} + \boldsymbol{\beta_{16}} atno\_3 + \boldsymbol{\beta_{17}} consent\_self$$

where, outc represent outcome (dependent variable), Agegrp represents age group, medu represents maternal education, slum represents residence, chris represents religion/sect, mar represents marital status, empstat represents employment status, gestat represents gestation, atno represents attending nurse designation

Table 3.1 Variable in the Model and their Definitions

Variable	Measurement	Definition	Value	Expected Sign
Age	Binary variable	Grouped as Group 1 is < 20 years Group II, 20-34 years Group III, above 35 years (Kenya National Bureau of Statistics and ICF Macro 2010)	Group I = 1 if age < 20 years, 0 otherwise Group II = 1 if age is 20-34 years, 0 otherwise Group III = 1 if age is above 35 years, 0 otherwise.	Positive for women in age group below 20 years and those above 49 years.
Mother's level of education	Binary Variable	No education (ED) Primary level education (ED1) Secondary education (ED2) Higher education (ED3)	ED = 1 if no education, 0 otherwise ED1 = 1 if primary education, 0 otherwise ED2 = 1 if secondary education, 0 otherwise ED3 = 1 if higher education, 0 otherwise	Positive (Muttai C. P., 2014)
Residence	Binary Variable	Slum or Non-slum	1 if slum, 0 otherwise	Mixed results (Mukherjee N. S., 2006)

Variable	Measurement	Definition	Value	Expected Sign
Religion	Binary Variable	Christians and Non-Christians	1 if Protestant, 0 otherwise	Mixed results
Marital Status	Binary Variable	Single or Married	1 if Single, 0 otherwise	
Employment	Binary Variable	Employed (formal or informal) or unemployed	1 if unemployed, 0 otherwise	Positive sign expected since employment, wealth and level of education is positively associated with urban dwelling with better maternal care services (Kenya National Bureau of Statistics and ICF Macro, 2010)
Indication for Caesarean section (Gwer S O, Mutungi, and Guyo J 2011)	Categorical Variable	Indication		
		Fetal compromise (FC), Breech presentation (BP), Hypertensive disease (HD),	FC = 1 if fetal compromise, 0 otherwise	Mixed results

Variable	Measurement	Definition	Value	Expected Sign
		Ante-partum haemorrhage (AH), Labour dystocia (LD).	BP = 1 if breech presentation, 0 otherwise HD = 1 if hypertensive disease, 0 otherwise AH = 1 if antepartum heamorrhage, 0 otherwise LD = 1 if labour dystocia, 0 otherwise	
Parity	Binary variable	Birth order of the current pregnancy 1-3 (P1) 4-6 (P2) Above 7 (P3)	P1 = 1 if parity is 1-3, 0 otherwise P2 = 1 if parity is 4-6, 0 otherwise P3 = 1 if parity is above 7, 0 otherwise	Previous scar has been linked to emergency caesarean delivery due to fear of uterine rupture by the obstetricians (Lauer et al. 2010)
Ante-natal Care	Categorical variable	Mother attended who attended > 4 times (ANC1) 1-3 times (ANC2)	ANC1 = 1 if attended >4, 0 otherwise	The risk of adverse pregnancy outcome

Variable	Measurement	Definition	Value	Expected Sign
(Kenya National Bureau of Statistics and ICF Macro, 2010)		Did not attend at all (ANC2)	ANC2 = 1 if attended 1-3 times, 0 otherwise ANC3 = 1 did not attend at all, 0 otherwise	reduces with the number of ANC visits
Caesarian section (Y)	Binary variable	Classified as either emergency or elective	Caesarian section = 1 if emergency, 0 otherwise	Result yet to be determined by the study.
Attending doctor	Categorical Variable	Can be Clinical Officer intern (COI), Medical Officer intern (MOI), Senior House Officer (SHO) or Consultant.	COI = 1 if attended by CO, 0 otherwise MOI= 1 if attended by MOI, 0 otherwise SHO= 1 if attended by SHO, 0 otherwise CON= 1 if attended by consultant, 0 otherwise	Not Known
		Frequency of reviews: hourly (R1), every 2 hours (R2) or over 3 hours (R3).	Review R1 = 1 if hourly, 0 otherwise Review R2 = 1 if 2 hourly, 0 otherwise	Not known

Variable	Measurement	Definition	Value	Expected Sign
			Review R3 = 1 if over 3 hours, 0 otherwise	
Primary Nurse	Categorical variable	By designation: Senior Nursing Officer (SNO), Nursing Officer I (NO1), Nursing Officer II (NOII), Nursing Officer III (NOIII)	SNO = 1 if attended by SNO, 0 otherwise NOI = 1 if attended by NOI, 0 otherwise NOII = 1 if attended by NOII, 0 otherwise NOIII=1 if attended by NOIII, 0 otherwise	Not known
		Frequency of observations during labour process: Hourly, every 2 hours, over 3 hours	Hour 1 = 1 if hourly, 0 otherwise Hour 2 = 1 if 2 hourly, 0 otherwise Hour 3 = 1 if over 3 hours, 0 otherwise	
Consent endorsement	Categorical	Can be endorsed by the patient (P) if above 18 years and of sound mental	Consent P = 1 if patient, 0 otherwise	Should be endorsed by the patient with the exception of the minor or mental

Variable	Measurement	Definition	Value	Expected Sign
		status, or husband (H), relative (R) or a senior doctor (SD).	Consent H = 1 if husband, 0 otherwise Consent R= 1 if relative, 0 otherwise Consent SD = 1 if senior doctor, 0 otherwise	incapacitation situations when the doctor is authorized as an agent to the patient (Gwer S. O et al., 2011)
Informant	Categorical Variable	Can be patient (PI), husband (HI), relative (RI) or neighbours (NI)	Informant PI= 1 if patient, 0 otherwise Informant HI= 1 if husband, 0 otherwise Informant RI=1 if relative, 0 otherwise Informant NI= 1 if neighbours, 0 otherwise	
Health status of the mother during pregnancy	Binary Variable	Congenital (Dwarfism, sickle cell anaemia) or Acquired (pre-existing maternal disease e.g. hypertension or diabetes)	Health status HSC= 1 if congenital, 0 otherwise Health status HAS= 1 if acquired, 0 otherwise	Maternal health status determines mode of delivery (Wangui M. L., 2014).

3.3 Study Design

This was a cross-sectional retrospective study at Kenyatta National Hospital from 1st January, 2014 to 31st December, 2014. The justification for the choice of this period and Kenyatta National Hospital as the study site is supported by the following facts: It is considered to be fairly stable in view of the turbulence that characterized period of the devolution of health care to counties in terms of financing and human resources among other challenges; the limited duration of time available for the study; and the financial resources at the disposal of the researcher for the study to be undertaken to its logical conclusion.

The Kenyatta National Hospital is designated as a level 6 teaching and referral hospital with a wide scope in capacity of volume and technology to deal with all the health care related demand as depicted by the heterogeneous nature of our society. Secondly, the researcher is a permanent employee of the hospital which is important in the following aspect: it is a hospital and departmental objective for the staff to be involved in research as a means to improving customer satisfaction. Thirdly, involving more facilities other than KNH would mean more money and time towards this project despite the heterogeneous nature of the patients and human resources for health available at the facility which would otherwise be the aim for the wide scope. Within this period, a detailed review of patient level data covering both socioeconomic and demographic profile together with the commonest indications of emergency caesarean delivery were done. The data so obtained was entered in stata software or stored in a windows spreadsheet.

3.4 Study Population

As detailed in the KNH (2014) Code of Conduct and Ethics as a guide to the practice of Medicine and Surgery in the provision of health care, all patients who are potential beneficiary of surgical procedures must formally sign an informed consent for the procedure. As such, the files reviewed in this study are assumed to have a formal consent for the procedure. However, a cross-check was carried out to exclude those whose consent forms are either missing, misplaced or inappropriately signed as is case of teenage pregnancies where controversies still exist. In addition, for the file sampled, it was a requirement that the woman must have delivered through a caesarian section during the period under study.

3.5 Inclusion and Exclusion Criteria

Women with vaginal delivery or those cesarean sections not falling within the study period were excluded from the research while all emergency caesarean delivery within the twelve-months period were included in the study. However, for sampling purposes, the data from both elective and emergency cases were used. This was to allow for the review of the perinatal outcome as documented in their files.

3.6 Data Source

The major source of the data for this study was KNH central registry and the health records and information unit in the maternity department. The files and registers of the patients that meet the inclusion criteria for the study were reviewed and relevant information extracted. The total number of sample files reviewed was obtained using Yamane Taro (1967) as shown:

$$n = \frac{N}{1+Ne^2}$$

where,

n = Sample size

N = the population Size (Number of women who gave birth at KNH through caesarean section from 1st January, 2014 to 31st December, 2014):

Table 3.2 Trends of Caesarian Deliveries at KNH from January to December, 2014

Month (2014)	EmCS	Elective CS	Total
January	357	52	409
February	324	55	379
March	375	42	417
April	348	18	366
May	397	27	424
June	385	39	424
July	341	67	408
August	396	50	446
September	371	25	396
October	388	59	447
November	452	30	482
December	435	46	481
Total	4569	510	5079

Source: KNH Maternity Delivery Register

Level of confidence used is 95%:

$$n = \frac{5079}{1 + 5079(0.05)^2}$$

n =371 Files of mothers delivered by EmCS at KNH in the period under study as indicated above.

3.7 Sampling Procedure

Systematic random sampling technique was adopted in this cross sectional study of 371 files at Kenyatta National Hospital registry for the purpose of analyzing the perinatal outcomes. This sampling technique was adopted because it is easier and less costly compared to other complex random sampling designs. In addition, it is intuitively more precise than simple random sampling. Having determined the sample size as outlined above, the next step was to determine the sampling

interval by dividing the total population by the sample size i.e. 5079/371 = 13.69 rounded off to 14. From the table of random numbers, a starting point was selected blindly. In this case my starting random number was 4 from the table 48767. Then every 14th number was selected from the starting point and this process was continued until the required sample size was achieved.

3.8 Data Processing and Analysis

Patients' data was entered into a stata software from where binary logistic regression analysis was conducted to draw a conclusion about the demand for emergency caesarean delivery to the entire population of expectant mothers and its implications to policy makers in the health care system.

3.9 Ethical Consideration

The study sought for the approval from the Research Committee of the University of Nairobi and Kenyatta National Hospital for this research work to be carried out. All the ethical protocols with regard to patient safety, the researcher, and the public were adhered to as stipulated in the guidelines. The privacy and confidentiality of study participants was ensured. Data was anonymized to preserve identifying information. No personal identifiers were contained in the study files and databases. Physical security of the hard copy documents and the mass storage devices such as USB were used to ensure the confidentiality and security of the data.

CHAPTER FOUR

RESULTS AND PRESENTATION

4.1 Introduction

This chapter presents the study results based on the retrospective data collected at the hospital records and information department of Kenyatta National Hospital. Some of the variables and their observations in table 4.1 below are omitted in this report due to lack of or inadequacy from the primary data sources. The data presentation tools used here are tables and figures.

4.2 Results

The results for five variables were excluded from further analysis (dropped) because of the significant baseline shift (table 4.1). However, what was evident from the raw data collected is that only two mothers were attended to by the consultant doctors as a result of the severity of their condition leading to emergency caesarean delivery while the rest were attended to by the senior house officers (SHOs). Similarly, majority of the reviews by the doctors took place within the stipulated hours with the exception of two patients whose reviews were conducted on an hourly basis. These compared favorably with the reviews by the nurses with the exception of two patients; one was reviewed in over three hours and the other on an hourly basis. It is worrying that majority of the clients who visited the facility for this life saving procedure had no ante-natal records in their files as only 54 were available for scrutiny. Out of these, 59.26% had incomplete visits while 7.41% having never attended. The possible reason for this could probably due to the nature of the hospital serving as a referral facility with many of the cases referred here from other hospitals where their records are kept.

Table 4.1 Service at the Facility

Variable Name	Observation	Frequency	Percentage
Frequency of review by the doctor before surgery		328	
	Every 2 hours	326	99.39%

Variable Name	Observation	Frequency	Percentage
	Hourly	2	0.61%
Frequency of observation as indicated in the partograph		326	
	Every 2 hours	324	99.39%
	Over 3 hours	1	0.31%
	Every 1 hours	1	0.31%
Attending doctor's category		329	
	Consultant	2	0.61%
	SHO	327	99.39%
Ante-natal Care		54	
	Full attendance	18	33.33%
	Incomplete attendance	32	59.26%
	Never attended	4	7.41%
Duration of Active labour		329	
	Normal	320	97.26%
	Prolonged labour	9	2.74%

Out of the 44 variables, only six were found to be statistically significant at the 95% confidence level. These are residence, parity of the mother, previous exposure to caesarian section, maternal age group, marital status and the designation of the attending primary nurse at the time of labour leading to the caesarian section intervention. The table below presents the results of the logistic regression depicting both the strength of association and the direction for an emergency caesarean delivery compared to an elective caesarian section with the independent variables.

Table 4.2. Logistic model estimation for likelihood of undergoing emergency caesarean delivery (EmCS = 1, 0 otherwise)

Variable Name	Odds Ratio	Standard Error	Z-Score	P-Value	95% Conf. Interval
Dependent Variable					

Variable Name	Odds Ratio	Standard Error	Z-Score	P-Value	95% Conf. Interval	
outc (1 = Emergency CS; 0 = Otherwise)						
Independent Variables						
Resident (1 = Non-slum)						
slum	2.026	0.821	1.74	0.081	0.916	4.483
Religion (1 = Non-Christian)						
chris	1.307	0.574	0.61	0.542	0.553	3.092
Gestation (1 = term)						
gestat_pre	1.178	0.666	0.29	0.772	0.389	3.566
Parity (1 = < 3 children)						
parity	0.692	0.112	-2.27	0.023	0.504	0.952
Previous CS (1 = No C/S)						
prev_cs	0.323	0.109	-3.36	0.001	0.168	0.625
Consent Endorsement (1 = Doctor/Husband)						
consent_self	0.322	0.276	-1.32	0.186	0.061	1.725
Age group (1 = < 20 years)						
agegrp2034	1.901	0.689	1.77	0.077	0.934	3.871
agegrp35plu	0.367	0.233	-1.58	0.115	0.106	1.277
Maternal Education (1 = Primary or none)						
medu_sec	0.727	0.328	-0.71	0.481	0.301	1.759
medu_high	0.694	0.293	-0.87	0.387	0.304	1.587
Marital Status (1 = Married)						
mar_single	2.597	1.117	2.22	0.026	1.118	6.032
mar_separated	0.663	0.361	-0.75	0.451	0.228	1.929
Attending Nurse Designation (1 = SNO)						
atno_1	2.907	1.094	2.84	0.005	1.391	6.076
atno_2	0.768	0.266	-0.76	0.447	0.389	1.516
atno_3	2.295	1.524	1.25	0.211	0.625	8.434
_cons	12.808	13.694	2.39	0.017	1.576	104.131

Mothers with greater than 3 children had less odds of undergoing an emergency caesarean delivery is significantly associated with mothers whose parity at the time of the current intervention had less than three children (OR = 0.69; p-value 0.023) compared to those with less than three children or deliveries. A mother with a history of having undergone a caesarian section in the previous

pregnancies had lower odds of undergoing and emergency caesarean delivery compared to those without a previous history of a caesarian section (OR = 0.32, p-value 0.001).

Mothers in the age group of 34 years and below had nearly twice as much odds of undergoing an emergency caesarean delivery compared to those of 35 years and above (OR = 1.90, p-value 0.07). Single first time mothers had nearly three times the odds of benefitting from an emergency caesarean delivery compared to the married or separated (OR = 2.59, p-value 0.026). The study also revealed that mothers attended to by junior nurses at job group of NOI had close three times the odds of undergoing emergency caesarean delivery compared to those in other job groups (OR = 2.90, p-value 0.005).

Slum dwelling, being a Christian, having a preterm delivery, maternal level of education and consent endorsement by the mother other than the husband were not significantly associated with the symptoms leading to the emergency caesarean delivery intervention at the time of delivery.

Table 4.3 Demographic and Obstetric Variables

Variable Name	N = 329 Frequency (%)
Dependent Variable	
EmCS (1 = Undergone EmCS; 0 = Otherwise	
Independent Variable	
Residence	
Non-slum	208 (63.22%)
Slum	121 (36.78%)
Level of Education	
Higher education	143 (43.47%)
No-education	7 (2.13%)
Primary	55 (16.72%)
Secondary	122 (37.08%)
higher education	1 (0.30%)
Secondary	1 (0.30%)
Marital Status	
Married	214 (65.05%)
Separated/divorced	26 (7.90%)
Single	89 (27.05%)
Religion	
No-Religion	1 (0.30%)
Christian	243 (73.86%)
Non-Christian	85 (25.84%)

Variable Name	N = 329 Frequency (%)
Employment Status	
No-Employment	4 (1.22%)
Formal Employment	189 (57.45%)
Informal employment	136 (41.34%)
Attending Nurse Job designation	
NO I	121 (42.31%)
NO II	96 (33.57%)
NO III	20 (6.99%)
SNO	49 (17.13%)
Employment Status	
No- Employment	4 (1.22%)
Formal Employment	189 (57.45%)
Informal Employment	136 (41.34%)
Parity	
0 – 3 Children	327 (99.40%)
More than 3 children	2 (0.60%)
Number of Previous CS	
0 Previous CS	243 (74.09%)
1 Previous CS	70 (21.34%)
2 Previous CS	15 (4.57%)
Gestation for the current pregnancy	
Post - Date (PD)	1 (0.31%)
Pre – Term (PT)	24 (7.34%)
Term (T)	302 (92.35%)
Duration of active labour	
Normal (N)	320 (97.26%)
Prolonged labour	9 (2.74%)
Indication for Emergency Caesarian (EmCS)	
Ante partum heamorrhage	16 (4.86%)
Breech presentation	23 (6.99%)
Fetal Compromise	91 (27.66%)
Hypertensive disease	46 (13.98%)
Labour dystocia	32 (9.73%)
Labour process	50 (15.20%)
PMTCT	1 (0.30%)
PPH2) Cx Tear	1 (0.30%)
Previous scar	69 (20.97%)
Ante-natal care	
Full attendance	18 (33.33%)
Incomplete attendance	32 (59.26%)
Never attended	4 (7.41%)
Maternal outcome	
Stable	325 (98.78%)

Variable Name	N = 329 Frequency (%)
Unstable	4 (1.22%)
Attending Doctors Category	
Consultant	2 (0.61%)
SHO	327 (99.39%)
Frequency of review by the doctor before CS	
Every 2 hours	326 (99.39%)
Hourly	2 (0.61%)
Frequency of observation	
Every 2 hours	324 (99.39%)
Over 3 hours	1 (0.31%)
every 2 hours	1 (0.31%)
Consent form endorsement	
Doctor	4 (1.22%)
Husband	9 (2.74%)
Patient	316 (96.05%)
Maternal Age Group	
Agegrp1519	293 (89.06%)
Agegrp2034	75 (22.80%)
Agegrp35plus	21 (6.38%)

It is important to note that the model depicted in the equation above was adequate for the study as depicted by the LR ch2 of 65 percent stability. Most of the data collected for this study were utilized in the analysis as can be seen from the logistic regression below (84%).
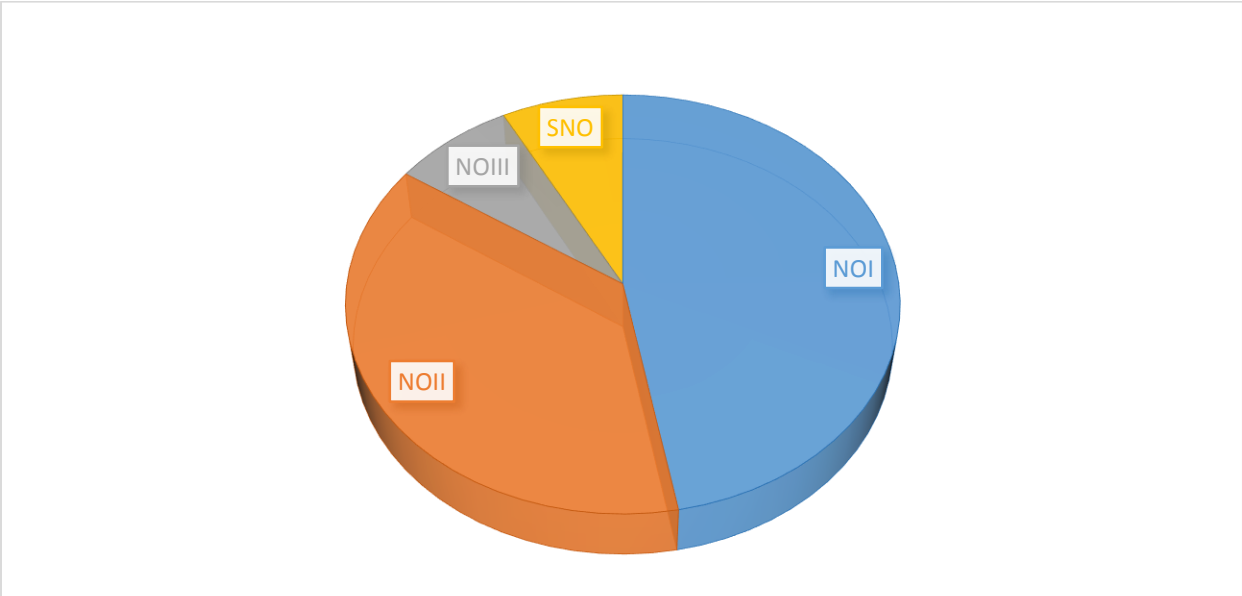
Figure 4.1 Attending Nurse Job Designation

Finally, and in general terms, the risk of having the prescription by the doctor for a mother to undergo emergency CS is higher for a woman with the following attributes; slum dwelling, being a Christian, preterm gestation, lower parity, age group of $20-34$ years, above secondary education, being single or separated in marital status and being attended to by a senior nurse or a junior nurse in the delivery process. Conversely, it is safer or a woman is less likely to undergo EmCS in preference for elective when she has the following attributes; history of previous CS, ability to sign own consent, age above 35 years and being attended to by middle grade nurse.
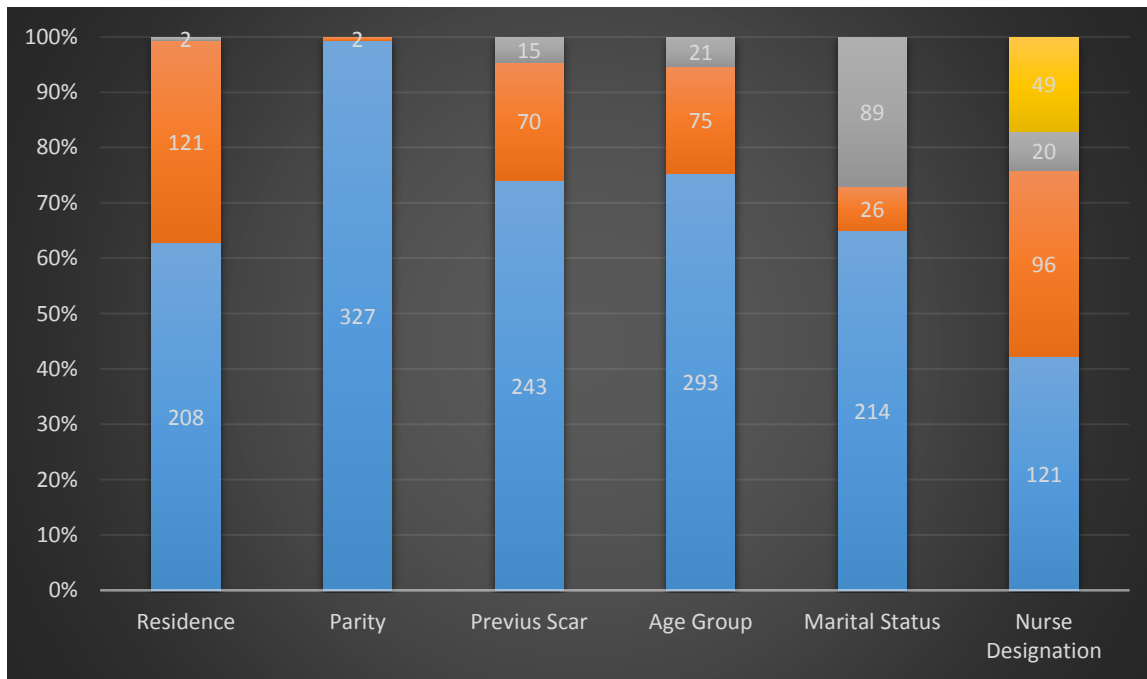

Figure 4.2 Demographic Results

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATION

5.1 Discussion

The definition for caesarian section adopted for this study hence the analysis of the retrospective data is based on the timing of the procedure rather than the incision made on the uterus. Evidently, the procedure was performed in this study when normal delivery posed danger either to the mother, baby or both.

Globally, the caesarian section rate stands at 15% while the locally the rate is at 6% based on the previous report. Based on this study the caesarian section rate at Kenyatta National Hospital for the period under review is 3.8% while that for emergency caesarean delivery is 3.1%. Out of the 326 data analyzed, 71.73% of the mothers were delivered by emergency caesarean delivery while 28.27% went through elective method of caesarian section.

This study was designed to determine the demand for emergency caesarean delivery at Kenyatta National Hospital comparing both the emergency and elective caesarian section on one hand the dependent variable and a number of demographic and obstetric variables as independent variables. Our base for the dependent variable was elective caesarian section which took the value of zero (Elective CS = 0, Emergency CS = 1). The analysis revealed both negative and positive findings.

To begin with, similar studies in the past have demonstrated a positive association between mother's level of education and use of prenatal care and delivery. In this study women with secondary and higher education (80.55%) were more likely to undergo emergency CS compared to those with primary education and below (18.85%). A study by Kenya National Bureau of Statistics(KNBS) and ICF Macro (2010) pointed out a similar finding in which the demand for inpatient services were found to correspond with higher levels of education within the general Kenyan population.

Residence of the mother which in this study compared those living in slum and non – slum areas positively associated slum or rural set up which incase ended in the facility as a referral from remote rural facilities with higher rates of emergency caesarian section. This could have been due to the impact of geographical inaccessibility, transport or slow response level to the early signs of

complications by the referring institutions. This reiterate the finding by Kenya National Bureau of Statistics(KNBS) and ICF Macro, (2010) which associated better urban utilization of health services to easier access due to the short distance to facilities and greater financial resources for indirect costs of health care such as transport. This further highlights the threats of free maternal care of insufficient number of facilities, long and remote distance and inadequate infrastructure (Brouwere D.V., Richard F., and Witter S. 2010).

Higher order births, urban or non -slum dwelling and higher level of education are associated with higher odds of caesarian section in general terms. In this study, previous caesarian section together higher parity was also associated with elective caesarian than emergency section. This could have been due to early recognition of symptoms leading to emergency section hence mother would take to seek for the elective caesarian section (Ministry of Health 2013a). They are also likely to been seen by doctors or obstetricians in the ante-natal period than those of the contrary group.

In terms of the demographic factors contribution to emergency caesarian section, marital status (single first time mothers) of the mother at the time of delivery is an important and a new finding worth following for it is a predisposing factor to emergency caesarian section.

Obstetrical reasons apart from the previous scar were also analyzed. The commonest reason for performing emergency caesarean delivery was fetal compromise (91%) and labour process (50%) as shown in the diagram below. This is compares favorably with the study by Wanyonyi S., Sequeira E., and Obura T. (2006) who attributed results for their findings to early detection of fetal compromise and diagnostic facilities at the institution where the study was carried out. Gwer et al also attributed 37.8% caesarian section in their study to previous scar a pattern that seems to have changed with the adoption of free maternal health care policy.
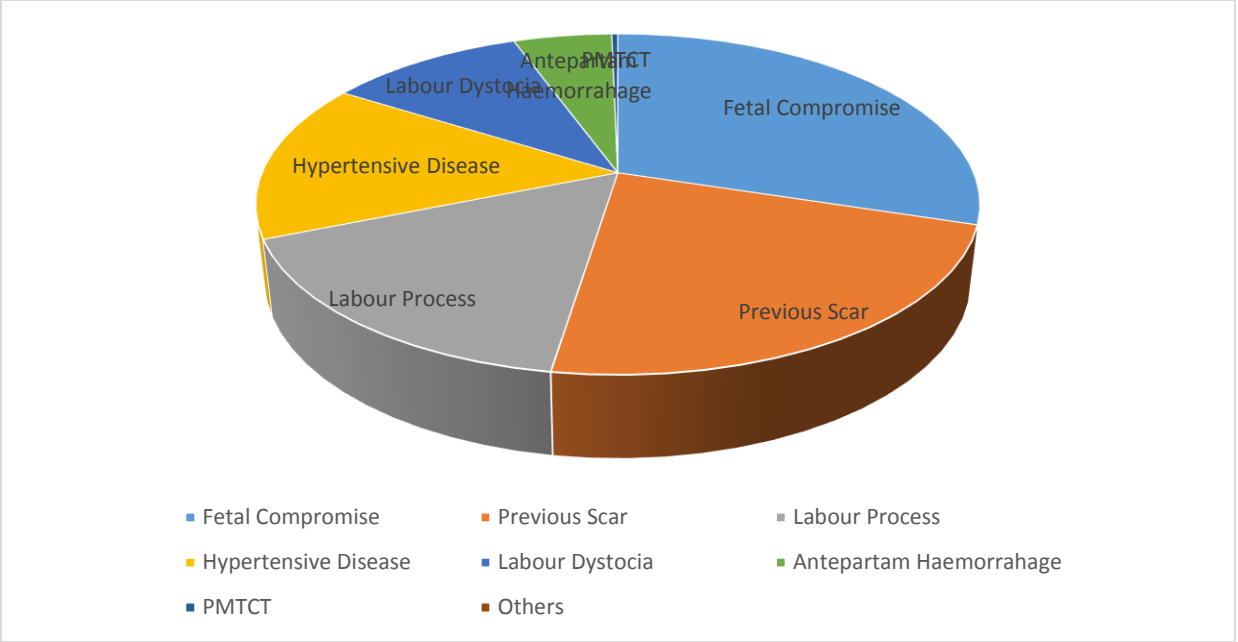
Figure 5.1 Obstetric Results

This study authoritatively state with a 95% confidence level that the prevalence for emergency caesarean delivery is high at Kenyatta National Hospital (71.73%) compared to elective caesarian section. In addition, this high demand is determined by both demographic (residence, parity, maternal age, marital status and years of experience of the attending midwife) and obstetric factors (fetal compromise, previous exposure to caesarian section, labour process, hypertensive disease in pregnancy, labour dystocia and antepartum haemorrhage) which can be managed by instituting policy changes.

From the data analyzed, the current indications for emergency is more obstetric (fetal compromise, previous exposure to caesarian section, labour process, hypertensive disease in pregnancy, labour dystocia and antepartum haemorrhage) than demographic in nature. There is as a result, a need for incorporating the demographic factors by the doctors in managing the patients at risk of emergency caesarian section.

5.2 Conclusion

Generally, even though the policy of free maternal health has improved access and utilization of maternal health services hence reduced maternal mortality and morbidity, it is important note that

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this has only addressed the last of the three common delays associated with maternal mortality and morbidity: the delay in receiving an appropriate care at the facility for lack of income, facility, equipment and human resources for health.

The other forms of delay need to be addressed at the same policy level in order to fully enjoy services for which this policy is designed. There is need for a robust public education in recognizing the danger signs and symptoms and the need to seek care with specific target to family members in antenatal clinics, addressing the spiritual and cultural beliefs. The county government have evidently improved the transportation through the purchase of ambulances to speed up the transfer period but much need to be done for the difficult to reach areas such as slums and remote rural settings.

Specifically, from this study, it is evident that there is a high rate of caesarian section but it has not surpassed the WHO recommended threshold. This calls for new intervention strategies to either maintain or reduce the rates further as more and more mother get to benefit from this services which should also be in tandem with growing population by:

- Incorporating demographic factors as predisposing factors to emergency caesarean delivery in managing target group
- By highlighting the new indications as outlined above to the medical practitioners
- By having the junior doctors in advanced training (SHO) to work with their seniors in peri partum period in order to reduce complications leading to emergency caesarian section. From our data, only 0.61% of the patients were attended to by consultant.
- Caesarian section at Kenyatta National Hospital is safe since there was only one mortality
- As a result of uterine rupture which is expected in even more advanced health care systems of the developed world.

5.3 Recommendations

There is need for a more comprehensive national study of similar nature to get the true impact of free maternal health care program and to get the aggregate national caesarian section rate.

Public education on the new predisposing factors to emergency caesarean delivery rate (demographic and obstetric causes)

A post- natal study to determine the morbidity arising from this emergency caesarian sections since the period in which they are admitted for the intervention is not enough to determine the immediate and late complications.

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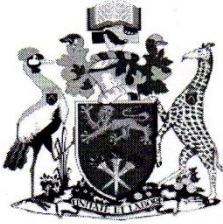
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APPENDIX I: ETHICS APPROVAL LETTER

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17th February, 2016

Juma Erick Ochieng Akech
Reg. No. X53/76362/2012
School of Economics
College of Humanities and Social Sciences
University of Nairobi

Dear Erick,

Revised research proposal: Demand for Emergency Caesarian Section at Kenyatta National Hospital: Free Maternal Health Care Program (P607/09/2015)

This is to inform you that the KNH- UoN Ethics & Research Committee (KNH-UoN ERC) has reviewed and **approved** your above proposal. The approval period is from 17th February 2016 – 16th February 2017.

This approval is subject to compliance with the following requirements:

a) Only approved documents (informed consents, study instruments, advertising materials etc) will be used.
b) All changes (amendments, deviations, violations etc) are submitted for review and approval by KNH-UoN ERC before implementation.
c) Death and life threatening problems and serious 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 72 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 ERC 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 **http://www.erc.uonbi.ac.ke**

APPENDIX II: DATA COLLECTION SHEET FOR EMERGENCY CAESARIAN DELIVERY

1(a) Study Number………………… (b) In-patient number…………………

Socio-economic and Demographic Characteristics

2. Age of the mother ……………………………………………………….

3. Marital Status

a) Single ☐   b) Married ☐   c) Separated/Divorced ☐ d) Widowed ☐

4. Level of education

a) No-education ☐   b) Primary ☐   c) Secondary ☐   d) Higher ☐

5. Residence

a) Slum ☐   b) Non-slum ☐

6. Religion

a). Christian ☐   b) Non-Christian ☐

7. Employment Status

a) Formal Employment ☐   b) Informal-employment ☐

Obstetric history

8. Parity ☐   Abortion ☐

9. Number of Previous CS……………………………………………………

10. Gestation for the current Pregnancy…………………………………………

11. Duration of Active labour……………………………………………………

12. Indication for EmCS……………………………………………………….

a) Fetal Compromise, [ ] reech Presentation [ ]

c) Hypertensive Disease [ ] d) Ante partum heamorrhage [ ]

e) Labour Process [ ] f) Labour dystocia [ ]

13. Ante-natal Care

a) Never attended [ ] b) incomplete attendance [ ] c) full attendance [ ]

14. Maternal outcome

a) Stable [ ] b) Unstable [ ] c) Death [ ]

15. Attending doctor's category

a) CO Intern [ ] b) MO intern [ ] c) SHO [ ] d) Consultant [ ]

16. Frequency of review by the doctor before surgery

a) Hourly [ ] b) Every 2 hours [ ] c) Over 3 hours [ ]

17. Attending primary nurse parameters

i) Job designation

a) NO I [ ] b) NO II [ ] c) NO III [ ]) SNO [ ]

ii) Frequency of observation as indicated in the partograph

a) Hourly [ ] b) Every 2 hours [ ] c) Over 3 hours [ ]

18. Consent form endorsement

a) Patient [ ] b) Husband [ ] c) Relative [ ] d) Doctor [ ]

19. Price in Kshs. As indicated in the files

a) Surgery ☐   b) Anaesthesia ☐   c) Theatre time ☐ d) Nursing ☐

d) Doctors consultation ☐   e) Laboratory ☐   f) Radiology ☐

g) Hotel charges ☐   h) Pharmacy ☐

20. Time

a) Before surgery ☐

b) After surgery and up to discharge ☐

c) Duration of labour in minutes ☐