CORRELATES OF PREGNANCY RELATED COMPLICATIONS IN MANDERA EAST, MANDERA COUNTY, KENYA

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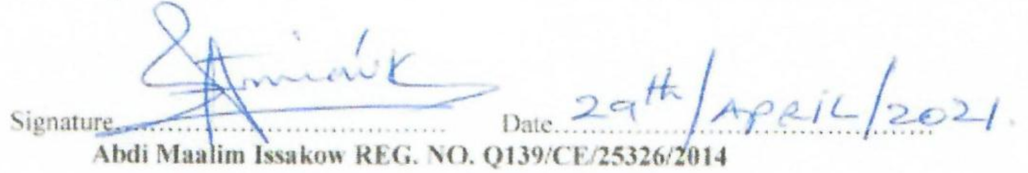
APRIL, 2021

DECLARATION

This thesis is my original work and has not been presented for a degree in any other University.



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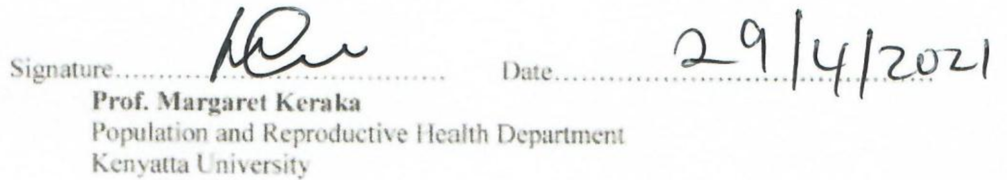

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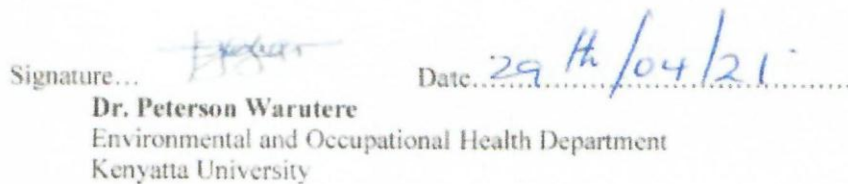

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DEDICATION

This work is dedicated to my extended family, in memory of my late father, Mr. Maalim Issakow, to my Lovely Mother, Mrs. Medina Hassan, and my lovely spouses. Their supports were instrumental in the achievement of my academic goals, inclusive of this dissertation and lastly to my beautiful daughters and sons.

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I am also grateful and indebted to all the respondents/participants who consented to participate in this study.

TABLE OF CONTENTS

DECLARATION ii

DEDICATION iii

ACKNOWLEDGEMENT iv

TABLE OF CONTENTS v

LIST OF TABLES viii

LIST OF FIGURES ix

ACRONYMS AND ABBREVIATIONS x

DEFINITION OF TERMS xi

ABSTRACT xii

CHAPTER ONE: INTRODUCTION 1

1.1 Background Information 1

1.2 Problem Statement 2

1.3 Justification of the Study 4

1.4 Research Questions 4

1.5: Objectives 5

1.5.1: Broad Objective 5

1.5.2: Specific Objectives 5

1.6: Null Hypothesis 5

1.7 Significance and Anticipated Output 5

1.8: Delimitation of the study 6

1.9: Limitation of the study 6

1.10 Conceptual Framework 7

CHAPTER TWO: LITERATURE REVIEW 8

2.1 Maternal Morbidity 8

2.2 Health Systems Determinants of Pregnancy Complications 11

2.3 Facility Determinants of Pregnancy Complications 13

2.4 Maternal Characteristics and Pregnancy Complications 14

2.5: Socio-Cultural Factors 15

2.6: Summary of Literature Review 17

CHAPTER THREE: MATERIALS AND METHODS 19

3.1 Research Design 19

3.2: Variables 19

3.2.1: Dependent Variable 19

3.3 Location of the Study 20
3.4 Study Population 20
3.4.1: Inclusion Criteria 20
3.4.2: Exclusion Criteria 21
3.5 Sample Size Determination 21
3.6 Sampling Techniques 21
3.7 Research Instruments 22
3.8 Pre-Testing 22
3.8.1 Validity 22
3.8.2 Reliability 23
3.10 Data Analysis 23
3.11 Logistical and Ethical Considerations 23
CHAPTER FOUR: RESULTS 24
4.1: Introduction 24
4.2: Socio-Demographic and Economic Characteristics of Respondents 24
4.3: Obstetric Complications in Pregnancy. 27
4.3.1 Complications during the current pregnancy 27
4.3.2: Complications mentioned during delivery in previous pregnancies. 27
4.3.3: Mode of Delivery 28
4.3.4: Complications mentioned after Delivery in previous pregnancies. 28
4.4: Health Facility-Related Factors 29
4.4.1: Time estimate travelling to Health Facility 29
4.4.2 Perceived Satisfaction towards Health Care Providers 29
4.4.3: Utilization of Maternal Health Services 30
4.4.4: Preferred Mode of Transport to Health Facility 30
4.4.5: Perceived Comfort with Male midwives 31
4.5: Socio-Cultural Factors 33
4.5.1: Proportion of respondents who undergone FGM 33
4.5.2: Reservations against certain types of foods 33
4.5.3: Cultural Support for Early Child Marriages 34
4.6: Test of Associations 34
4.6.1: Complication during the current pregnancy 34
4.6.2: Complication during Delivery in the previous pregnancy. 37

4.6.3: Complications after delivery during a previous pregnancy. 40

CHAPTER FIVE: DISCUSSION, RECOMMENDATION, AND CONCLUSIONS 43

5.1: Introduction 43

5.2: Complications in Pregnancy 43

5.2.1: Complications experienced during the current pregnancy 43

5.2.2: Complications during Delivery 45

5.2.3: Complications after delivery 46

5.3: Health System Related Factors 47

5.3.1: Utilization of maternal health services 48

5.4: Socio-Cultural factors 48

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS 50

6.1: Conclusion 50

6.2: Recommendations 51

REFERENCES 53

APPENDIXES 64

Appendix I: Map of Study Area. 64

Appendix II: Informed Consent 65

Appendix III: English Questionnaire 67

Appendix IV: Somali Questionnaire 72

Appendix V: Research Approval- Kenyatta University 77

Appendix VI: Ethical Research Authorization- Kenyatta University 78

Appendix VII: Research Permit NACOSTI 80

LIST OF TABLES

Table 2.1: Obstetric Complications 8
Table 3.1: Summary of Independent Variables 19
Table 3.2: Sampling Matrix 22
Table 4.1: Summary of Socio-Demographic and Economic Characteristics 26
Table 4.2: Nature of Complications mentioned during Current Pregnancy 27
Table 4.3: Summary of Complications mentioned during delivery in previous pregnancies. 27
Table 4.4: Mode of Delivery 28
Table 4.5: Cumulative Summary of Complications mentioned after Delivery in previous pregnancies. 28
Table 4.6: Time estimate travelling to a health facility 29
Table 4.7: Utilization of Maternal Health Services 30
Table 4.8: Proportion of respondents who have undergone female genital mutilation. 33
Table 4.9: Cultural influence on types of foods in pregnancy 33
Table 4.10: Community Support for early child marriages 34
Table 4.11: Maternal Characteristic and Complications during Pregnancy 35
Table 4.12: Test of Association between Health Facility-related Characteristics and Complication during pregnancy 36
Table 4.13: Test of Association between Socio-cultural Characteristics and Complication during pregnancy 37
Table 4.14: Average time taken travelling and Complications during delivery 38
Table 4.15: Socio-Cultural Characteristics and Complications during delivery 39
Table 4.16: Complications after delivery during previous pregnancy and Maternal characteristics 40
Table 4.17: Time taken to health facility and complication after delivery 41
Table 4.18: Circumcision and Complications after delivery 42

LIST OF FIGURES

Figure 1.1 Conceptual Framework 7
Figure 4.1: Perceived Attitude towards Health Care Providers 30
Figure 4.2: Modes of transport used by respondents 31
Figure 4.3: Perceived Comfort with Male Midwives 32

ACRONYMS AND ABBREVIATIONS

APH	Ante-partum Haemorrhage
F.G.M	Female Genital Mutilation
HIV	Human Immunodeficiency Virus
KDHS	Kenya Demographic Health Survey
MMR	Maternal Mortality Ratio
O. R	Odds Ratio
PPH	Post-partum Haemorrhage
FISTULA	Recto-vaginal Fistula
UN	United Nations
UNFPA	United Nation Population Fund
USAID	United States Agency for International Development
WHO	World Health Organization
SPSS	Statistical Package for Social Science
NACOSTI-	National Commission, Science, Technology and Innovation
MDGS	Millennium Development Goals
KUERC	Kenyatta University Ethics and Review Commission
UTI	Urethral Tract Infections
C.S	Caesarean Section
ANC	Antenatal Care
P.N.C	Post-natal Care

DEFINITION OF TERMS

Ante-Partum Haemorrhage- Bleeding from or in the genital tract occurring from 24 weeks of pregnancy and before the baby's birth.

Correlates of pregnancy Complications: Having an association with pregnancy complications

Fistula –is an abnormal connection between two parts inside the body, which may develop between different organs, such as between the bowel and the vagina.

Maternal Morbidity- "any health condition attributed to or aggravated by pregnancy and childbirth that has an undesirable impact on the woman's wellbeing."

Maternal Mortality- Death of either woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration, site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management but not from accidental or incidental

Mother – One who is pregnant or had at least one delivery attending maternal health services.

Obstetric History-This is the history of a mother during pregnancy, childbirth, and after delivery.

Post- Partum Haemorrhage- is a loss of blood above 500ml after vaginal delivery or >1000mls after caesarean section.

ABSTRACT

Complications during pregnancy and childbirth are a leading cause of death and disability among women of reproductive age worldwide**.** About eight hundred women die from pregnancy or childbirth-related complications around the world every day. In most low-income countries, high maternal mortality of women (462 per 100,000) of reproductive age is attributed to pregnancy-related causes. In Kenya, Mandera County contributes the highest burden of maternal mortality ratio 3795 per 100,000 live births; therefore, this study sought to determine factors influencing complications in pregnancy among women in Mandera County, Kenya. Specifically, the study examined health facility attributes, maternal characteristics, and socio-cultural drivers that reinforce complications in pregnancy. This study employed a descriptive cross-sectional study design utilizing quantitative and qualitative data collection methods among 350 respondents seeking maternal health service in health facilities in Mandera County. Stratified, simple random, and proportionate sampling techniques were used to sample health facilities and respondents. An interviewer-administered questionnaire during data collection. Quantitative data were analyzed using SPSS version 20. Frequencies and percentages were used to describe data. Chi-square and fisher's exact test were used to test the association between the dependent and independent variables. Data were considered significant at $p<0.05$. Findings illustrate that Anaemia (28%), vaginal discharge (13 %), miscarriage (9%), lower limb oedema (24%), and haemorrhage (17%) were the prevalent complications during pregnancy. Laceration (39.1%) anaemia (22.8%), and haemorrhage (19%) were the reported forms of complications during delivery. Spontaneous delivery was the preferred mode of delivery among respondents. Sepsis (56.5%), Haemorrhage (25.9%), and stillbirth (10.9%) were the prevalent complications after delivery. Data shows that the median number of Antenatal visits was three and one for a postnatal visit. Slightly more than half of the respondents (54.4%) were satisfied with staff attitude. At least 87.2% of respondents in the study had undergone female genital mutilation, and the majority of participants attested that their communities supported early child marriage. Inferential analysis shows that complications during pregnancy were associated with age (*p=0.026*), household income (*p=0.05*) time-taken to the health facility *(p=0.02*). Complications during delivery were associated with average waiting time (*p=0.02*) and perceived staff attitudes (*p=0.021*). Complications after delivery were associated with time taken to health facilities. In conclusion, anemia, vaginal discharge, and haemorrhage were the prevalent complication during pregnancy, delivery, and the postpartum period. Antenatal and post-natal care visits were optimally low. This study recommends concerted efforts to emphasize the need to sensitize women of reproductive age to identify common obstetric danger signs and symptoms and other stakeholders on the importance of maternal and child health. There is a need to document incidence and prevalence of maternal morbidity at the health facility level to inform decision-making regarding the quality of maternal health services. The County health department needs to increase the number of health facilities within the county to enable access to Maternal health services to reduce the time - taken to access health facilities.

CHAPTER ONE: INTRODUCTION

1.1 Background Information

Maternal health concerns the well-being of a woman during pregnancy, delivery, and the postpartum period. Healthcare in maternal health includes family planning, pre-conception, and prenatal period but is not limited to post-natal care. It is paramount that a mother receives an essential care package necessary for the mothers' and child's survival (WHO, 2018). When complications arise and are not appropriately managed during pregnancy, it could lead to the mother and her child's death.

Statistically, complications during pregnancy, delivery, and after delivery account for at least ninety-nine percent of maternal deaths globally. Of these, a large proportion of maternal mortality occurs majorly low and middle-income; close to 500,000 women according to World Health Organization's estimate (USAID, 2015). Geographically, in Sub-Saharan Africa, the odds of mortality among pregnant women is estimated to be at least one in 39 chances (UNICEF, 2019). Comparatively, women in developed countries are less likely to die due to pregnancy complications, with estimates showing 1 to 3800 risks involved. It is observed that obstetric complications leading to maternal mortality frequently occur around delivery and can be prevented by subjecting an expectant woman through a full continuum of maternal health services such as family planning, complete utilization of recommended antenatal care, skilled birth attendance as well as post-natal care. While there is a desirable need for quality maternal healthcare, access and use of these vital services continue to be a challenge, especially in low and middle-income countries (UNFPA, 2018). Fillipi & Veronique (2016) add that the risk of pregnancy-related illness and consequences after birth is higher when Millennium Development

Goal number five aspired to reduce maternal mortality by at least 75% in light of the above. Agonizingly, a drop of 43% was realized between 1990 and 2015 as targeted (WHO, 2015). Following MDGs, sustainable development goal three endeavors to reduce the maternal mortality ratio to 70 per 100,000 live births (United Nations, 2015). Kenya's maternal mortality ratio was 584 in 2011, 562 in 2012, 540 in 2013, 525 in 2014, and 510 per 100 000 live births in 2015 (World Bank, 2015). The recent Kenya Demographic and Health Survey (2014) estimates the maternal mortality ratio at 388 per 100,000 live births.

As of 2013, Kenya ranked among the top ten countries, with at least two-thirds (60%) of global maternal mortality occurrence in 2013 (UNFPA, 2014). In 2014, 21% of reported deaths among women of reproductive age (15-49) were caused by pregnancy-related complications. With the advent of devolution in Kenya, 15 of 47 counties accounted for ninety-eight percent of total reported mortality. Of the fifteen counties, Mandera County recorded the highest, with at least 2136 reported maternal deaths representing a maternal mortality ratio of 3795 per 100,000 populations (UNFPA, 2014). Given the high maternal mortality ratio in Mandera County, it is essential to understand the correlations of pregnancy-related complications that lead to the high maternal mortality ratio in this County. The correlates could be from health systems, maternal or socio-cultural issues.

1.2 Problem Statement

Across low and middle-income countries, maternal morbidity accounts for the leading cause of death and disability among millions of women of reproductive age (15-49 years). For instance, one of two reported deaths in rural Africa and Asia die due to pregnancy complications (Mungai, 2015). Through its integrated management of

pregnancy and childbirth strategy, the world health organization posits that while all pregnancies are at risk, the majority of pregnancies are uneventful and that at least 15% of pregnant women are likely to develop life-threatening complications that necessitate skilled care. Nicole (2013) and (Firoz *et al*., 2013) claim that thirty other women suffer debilitating injury or disability for every reported maternal death in Kenya due to maternal morbidity. Complications related to pregnancy exert emotional and psychological stress on both the mother and her family.

Additionally, uninsured households experience financial shock, the majority of whom reside in low-income countries. (UNFPA, 2015). Despite improvements in other health-related indicators over the decades in Kenya, high maternal morbidity rates are still being documented; 388 per 100 000 live births (KDHS, 2015), higher than the global maternal mortality ratio of 210 per 100 000 live births in 2013. Contrary, this is mainly due to the high maternal morbidity. Mandera County is among the topmost contributors to Kenya's maternal mortality ratio of 3,795 per 100 000 live births in 2015 (UNFPA, 2015). The Lack of information on the quality of the entire continuum of maternal health persists and is neglected (Kiragu, 2014). While maternal mortality ratio has been estimated widely in Mandera County to be nine-fold higher than the national estimate, there is a dearth of information on the extent and correlates of complications during pregnancy, during delivery, and after contributing to the reported high-maternal mortality ratio in the county.

1.3 Justification of the Study

Sustainable Development goal number three targets to reduce the global maternal mortality ratio to less than 70 per 100 000 live births. This objective can only be attained if each country achieved a significant decline in pregnancy complications that result in a high maternal mortality ratio. The maternal mortality ratio is unacceptably high in Kenya at 388 per 100 000 live births (KDHS, 2015), higher than the global maternal mortality ratio, which was 210 per 100 000 live births in 2013. Contrary, This is mainly due to the high maternal morbidity. Mandera County is among the topmost contributors to Kenya's maternal mortality ratio of 3,795 per 100 000 live births in 2015 (UNFPA, 2014). Understanding the correlates of pregnancy-related complications leading to a high maternal mortality ratio could inform strategies to address the problem.

1.4 Research Questions

This study aimed to address the following research questions:

1. What are pregnancy-related complications among pregnant women in Mandera County, Kenya?
2. What are the health system determinants influencing complications of pregnancy in Mandera County, Kenya?
3. What are the maternal characteristics influencing complications of pregnancy in Mandera County, Kenya?
4. What are the socio-cultural factors influencing complications of pregnancy in Mandera County?

1.5: Objectives

1.5.1: Broad Objective

To establish the correlates of pregnancy-related complications among women of reproductive age in Mandera County, Kenya.

1.5.2: Specific Objectives

1. To establish pregnancy-related complications among pregnant women in Mandera County, Kenya?
2. To establish the health system characteristics associated with complications in pregnancy among pregnant women in Mandera County, Kenya.
3. To assess maternal characteristics associated with complications in pregnancy among pregnant women in Mandera County, Kenya
4. To determine socio-cultural characteristics associated with complications in pregnancy among pregnant women in Mandera County.

1.6: Null Hypothesis

This study hypothesizes that health-system, maternal and socio-cultural characteristics are not associated with complications in pregnancy among pregnant women in Mandera County, Kenya

1.7 Significance and Anticipated Output

This study adds to the existing knowledge on public health, especially on complications in pregnancy in Kenya. It also contributes to the current literature in addressing future research problems in obstetrics. With the implementation of free maternal health care in all government facilities, this study may assist policymakers in the government to

develop a comprehensive policy framework to guide the implementation of maternal health programs that promote safe motherhood in the county.

1.8: Delimitation of the study

The study was only limited to the Mandera East sub-county and only assessed direct complications in pregnancy

1.9: Limitation of the study

Recall of the preceding complication experienced by mothers was a limitation to the study. The mother's inability to describe the condition at the time made it a challenge to collect data

1.10 Conceptual Framework

The conceptual framework shows the relationship between the independent and dependent variables. It highlights how various factors contribute to pregnancy complications, such as maternal characteristics, socio-cultural issues, and health facility determinants. Government policies in maternal health services and interested stakeholders in maternal and child health influence the outcomes of complications in pregnancy.

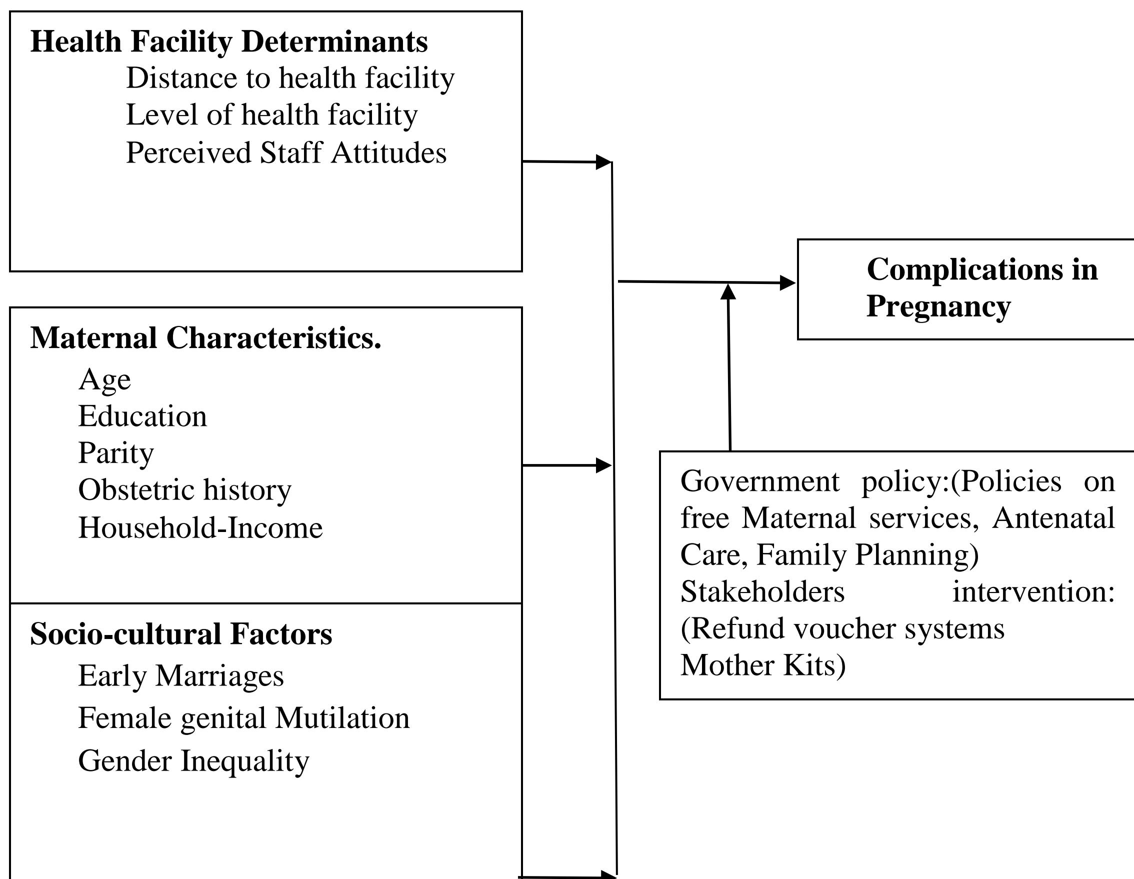

Figure 1.1 Conceptual Framework

Adapted for literature (2016)

CHAPTER TWO: LITERATURE REVIEW

2.1 Maternal Morbidity

Maternal morbidity refers to a condition that is directly caused by pregnancy, irrespective of whether it attest to or after the termination of pregnancy. It could also be defined as a pre-existing condition before pregnancy but is aggravated by the pregnancy or a condition whose causal relationship to pregnancy is inconclusive (Adams *et al.*, 2010). The definition, according to Ashford (2002), sums up morbidities either related directly (principal cause) or indirectly to pregnancy and childbirth (Say *et al.,* 2014). Primary root causes include obstructed or prolonged labour, haemorrhage, infections, eclampsia, and unsafe abortions. Indirect maternal complications include diabetes, anaemia, malaria, and Human Immunodeficiency Virus (HIV).

Table 2.1: Obstetric Complications

Direct Obstetric Complications	
During delivery	Ectopic Pregnancy Obstructed Labour Retained product of Conception Gestational trophoblastic disease Unsafe induced Septic abortion
Hypertensive Disorders of Pregnancies	Pre-eclampsia Eclampsia Gestational hypertension HELLP syndrome
Obstetric Hemorrhage	Post-partum Hemorrhage Ant Partum Hemorrhage
Pregnancy-Related Infections	Mastitis/Breast abscess Peuperal sepsis

Source: adapted from literature

Multiple authors, Amaral *et al.,* (2011); Furuta *et al.*, (2012); Kaye *et al.,* (2011); Kayem *et al.,* (2011); Sousa *et al.* (2008), have referred as pregnancy-related complications as severe maternal morbidity. In other studies, severe maternal morbidity has interchangeably defined with near-miss (Ali *et al.,* 2011; Nelissen *et al.,* 2013; Oladapo *et al.*, 2005). The World Health Organization defines maternal near-miss as a situation in which a woman survives a near-fatal life-threatening complication of pregnancy, childbirth, or the first 42 days following delivery (Say *et al.,* 2009). (Alvarez et al., 2009) assert that haemorrhage, hypertension-related disorders, and obstructed labour are the primary direct complications that account for the most significant contributor to maternal mortality. The Indirect causes of maternal mortality account for twenty percent. Such cases are aggravated during pregnancy and after delivery.

Quantifying the magnitude of pregnancy complications in a limited resource setting remains a herculean task due to the lack of or non-existence of vital or surveillance or birth registration systems to capture data. Additionally, this is exacerbated by home deliveries, and, therefore, complications experienced never recorded for women who pull through or those who die. Observed and self-reported morbidity approaches measure maternal morbidity in developing countries (Kiragu, 2014). Over time, the world health organization has been able to quantify the incidence of near-miss by using a global network near-miss maternal mortality system (Gebrehiwo & Tewolde, 2014). However, the tool developed fails to provide a definition and criteria for less severe cases along the continuum of maternal ill-health (Chou *et al*., 2016). Some studies in sub-Saharan Africa have quantified the ratio of maternal near-miss to maternal mortality. For instance, in Ethiopia, the ratio is 12:1 according to (Gebrehiwo & Tewolde, 2014), 7:1 in Tanzania

according to (Nelissen *et al*., 2013), 5:1 in Uganda according to (Nakimuli *et al*., 2016), 2:1 in Nigeria according to Oladapado *et al.* (2016), and 8:1 according to (David *et al*., 2014).

Yego *et al*. (2013) argue that diagnosing acute obstetric complications involves examining clients for apparent signs and symptoms. Confirmatory laboratory findings also suffice. Corroboratively, Chersich *et al*. (2009) and Ukachukwu *et al*. (2009) agree that patient's antenatal care and socio-demographic data records would provide a cue to existing morbidity. Nyablade *et al*. (2010) approve that the observed maternal morbidity method offers accurate information on various obstetric complications since data is gathered from multiple points. As such, incidence, prevalence, and determinants can be ascertained (Forney & Smith, 1999). According to Haddad et al. (2011) and Filippi *et al.* (2000), observed morbidity avails drawbacks. Both claim that hospital-based studies are not representative of the general population due to selection and diagnosis bias. Nyablade *et al*. (2010) further assert that lack of standardized criteria to define obstetric complications could result in diagnosis bias, culminating in misclassification of underlying causes of these complications. (Chou *et al*., 2016) posit that the lack of standardized criteria to define obstetric complications is further compounded by the lack of standardized assessment tools at the primary level. Additionally, unskilled birth attendance at home brings out selection bias and, consequently, limits quantifying incidence and prevalence.

Population-based or community-based surveys often rely on self-reports of women’s perception of obstetric complications, either major or minor. It is imperative to obtain women’s perspective and understanding of maternal complications (Amaral *et al*., 2011).

While this information from such surveys at the national level is crucial in informing policy, it is not immune to bias (Souza *et al*., 2010).

The world health organization utilizes integrated management of pregnancy and childbirth strategy. The strategy uses a symptom-based technique in the identification of specific complications of pregnancy. Different variations to identify maternal near-miss has made it challenging to estimate near-miss prevalence, more so from a global perspective (Chhabra, 2014).

2.2 Health Systems Determinants of Pregnancy Complications

Meeting sustainable development goals on maternal health necessitates a responsive health system. Health systems have been defined as all processes or that primarily promote, restore and maintain health. The fundamental objectives of health systems are limited to improving the population they serve, responding to people's expectations, and reducing the financial burden due to ill-health (WHO). The health system compares with other social systems such as education on two affronts; one is the illness itself and the impact the disease can have on people's dignity. The other peculiar way health systems defer from the others concerns the destructive nature of the disease in terms of cost. These arise due to the different needs for medical care among individuals; it necessitates the need to have a robust and effective financial protection mechanism. Maternal health interventions operate within the purview of the health system. As such, an enabling environment, governance, and service delivery are essential. (Ergo *et al.,* 2011)

Ergo *et al.,* (2011) describes an ideal health system environment in which maternal health intervention should be implemented, however, the present situation is that health systems

are not responsive to people's expectation. Those in low and middle-income countries have poor health systems characterized by inadequate funding for health, insufficient or no health infrastructure, scarce human resources for health, poor service delivery, but not limited to poor leadership and inappropriate mechanisms of governance; all these compound efforts to document population-based indicators such as maternal mortality. There is a direct correlation between health systems and maternal morbidity as measuring maternal morbidity serves as an indicator for the quality of obstetric care provided in health facilities (Chou *et al*., 2016).

Achieving desirable outcomes from severe pregnancy-related complications depends on prompt identification and appropriate management that exacerbates severe maternal morbidity and mortality. Studies by Geller *et al.* (2004), Oladapo *et al. (*2005) Storeng *et al.* (2012) have established that poor adherence to antenatal care and suboptimal clinical care on delivery and post-partum period contribute significantly towards severe morbidity and maternal mortality.

Nair *et al*. (2015), in a study in the UK, attributed six factors with maternal death. They include under-utilization of antenatal care, substance misuse, medical co-morbidities, pre-existing pregnancy-related problems, and hypertensive disorders of pregnancy to maternal mortality. According to Thaddeus & Maine (1994), maternal morbidity could be due to the perceived quality of care. Both argue that perceptions held on the quality of care override medical quality hence a strong determinant of health-care seeking behaviour. They further assert that while particular elements such as waiting time, staff attitudes, availability of supplies greatly influence a client's satisfaction since it is subjective. A qualitative study in Ghana (Suman kuuro *et al.,* 2019) established that

healthcare workers' negative attitude at community health centers was a barrier to seeking emergency delivery services. Their findings illustrate that health care workers were non-responsive to emergency calls and would only provide a referral note, and to some extent, they couldn't even provide painkillers.

Frequent contact with health care providers on antenatal care increases an expectant mother's ability to identify and recognize critical warning signs for complications. For instance, in Zambia, Stekelenburg *et al.* (2004) established a high probability of women who were knowledgeable on danger signs delivering in health facilities than the latter.

2.3 Facility Determinants of Pregnancy Complications

Region and place of residence have shown a direct association with the utilization of maternal health. The rural-urban difference results in a skewed maternal health services pattern (Bell, Curtis, and Alayón 2003). For instance, Mekonnen & Mekonnen, 2003 study in Ethiopia established that women living in urban areas were forty-times more likely to be attended by a skilled birth attendant than those living in rural areas during delivery. A recent un-matched case-control study by (Mekango *et al*., 2017) revealed that those who lived in rural areas were 1.4 times more likely to experience pregnancy complications. Say & Raine (2007) systematic review corroborates Mekonnen's study on rural-urban difference effect on maternal health services utilization. In contrast, Navaneetham & Dharmalingam's (2002) study in Kerala Kathmandu observed a minimal difference (OR 1.7) in the utilization of skilled birth attendance.

Distance to health services influences an expectant woman's decision to seek medical care whenever there is a complication (Thaddeus & Maine, 1994). When the lack of

transport compounds distance to health facilities, poor road network undesirable outcomes are more likely to be precipitated. A subsidized cost of transportation would facilitate the utilization of health facilities. Anson (2004) asserts that the quality of care offered determines the level of utilization. A focus group discussion in a study by (Geleto *et al*., 2018) in Mozambique elicited that the fear of being mistreated by health care workers was a barrier to delivering in health facilities. From the discussions, expectant women who did not attend any or limited antenatal care were disproportionately mistreated.

2.4 Maternal Characteristics and Pregnancy Complications

Socio-demographic variables often have a direct association with pregnancy-related complications. For instance, older women are more likely to experience difficulties and are more likely to seek skilled birth attendance in a health facility. In contrast, older women harbor traditional midwifery tenets and are likely to seek maternal health at a traditional birth attendant Duong *et al.,* 2004). Overall, there is a strong correlation between age and other variables such as education level, marital status, and occupation (Magadi, Agwanda & Obare, 2007). For instance, a recent study in Ethiopia (Lakew, Tachbele, & Gelibo, 2015) established a statistical association between household income and skilled assistance to pregnancy complications. A different study in India (Jungari & Paswan, 2019) posits that husbands' level of knowledge on various difficulties is a plausible determinant of the utilization of skilled attendance at any stage of pregnancy and after. The study further asserts that the husband’s knowledge of maternal-related complications before pregnancy improved birth preparedness. Also, findings show a

dearth of knowledge and awareness among husbands on pregnancy, delivery, and delivery complications.

A British study by Kayem *et al.* (2011) established that obesity, childhood pregnancies, low education levels, and female genital mutilation as major predisposing factors to maternal morbidity and mortality. Kiragu (2014) posits that elevating girl's literacy levels has a multiplier effect on their socio-economic status and access to maternal health services, thereby ultimately averting undesirable pregnancy complications.

A perinatal improvement program down in South Africa established that 45.8% of maternal deaths reported were associated with patient-related factors. The program's findings are that a delay in seeking health care results in a neonatal morbidity rate of 4.5% Pattison R (2013). (Khupakonke, Beke, & Amoko, 2017) study results show that women with higher gravidity were 1.4 times more likely to experience a pregnancy-related complication. Those residing in informal environments were 7.6 times to experience difficulties during pregnancy, delivery, and after delivery. Results further show that having a short duration of labour was a precursor to maternal morbidity.

2.5: Socio-Cultural Factors

Female Genital Mutilation (FGM), as a cultural practice, is prevalent in some regions in Kenya. The proportion of genitally mutilated women was relatively high at the national level (39%). The 1998 survey observed statistically significant differences between provinces, with Rift valley having the highest proportion of genitally mutilated women (63.2%), with the most negligible proportion being in the Western region (3%). Genital mutilation is considered an underlying cause of maternal mortality since it predisposes

women to complications such as haemorrhage and uterine rupture (Oduro *et al*., 2006). Gayle (2016) avers that Women with FGM are more likely to have obstetric complications, such as recurrent urinary tract infections (UTIs), obstructed labour, perineal tears, caesarean section, etc., post-partum haemorrhage. A WHO prospective study in six sub-Saharan Africa countries, including Kenya, observed that women who were genitally mutilated had a higher risk of postpartum haemorrhage than those who were not (WHO *et al*., 2006).

Socio-cultural influence on complications in pregnancy can be attributed to indigenous knowledge of people. Those in rural areas are more inclined to such and, as a result, it influences the perceptions held on illnesses, possible causes of disease, and health-seeking behaviour. Understanding indigenous knowledge of communities provides an insightful way of providing practicable interventions to delays in seeking maternal health care. Hounton *et al.* (2008) posit that socio-cultural ties, lack of information, and poverty disfavour measuring the magnitude of maternal morbidity quantitatively.

Helman's aetiology model of lay illness considers personal, social, natural, and supernatural causes to lay illnesses. From a maternal health perspective, according to the model, adverse pregnancy outcomes can be as a result of an individual woman's form of carelessness wherein the adverse consequences are or can be due to diet, dressing, sedentary behaviour, substance abuse but not limited to relationships. Social attributable factors, according to the model would be, apportioning blame to other members of the community for causing the observed adverse pregnancy outcome. Common forms would include witchcraft, a community member having 'evil eyes,' and sorcery. Other

supernatural causes of adverse pregnancy outcomes can be ascribed as a God's reminder for evil done in the past.

Findings from a qualitative study in Kenya by (Riang' a Nangulu & Broerse, 2018) showed that respondents in the study were advised against eating certain types of foods such as eggs, avocado as this would result in having prolonged labour and tears during delivery. Conversely, expectant mothers were encouraged to eat certain foods to increase their blood volume and energy. Additionally, findings illustrate that pregnancy complications are perceived to be contagious; as such, expectant women would avoid a woman who had recently aborted or miscarried,

(Sumankuuro *et al.,* 2019) established that pregnancy stigma-related due to unplanned pregnancies were a contributor to low uptake of antenatal care. Women with unplanned pregnancies felt embarrassed in seeking antenatal care. Additionally, focus group discussions among health care workers identified that late disclosure of labour was perceived as a way to a safe birth. When labour is announced earlier, the perception held is that there is a likelihood that it would prolong. Such perceptions facilitate unskilled birth deliveries and more likely to subject the woman to severe obstetric complications.

2.6: Summary of Literature Review

This study has reviewed the literature on pregnancy complications and health-system perspectives on how it contributes to the difficulties mentioned above. Facility determinants, maternal characteristics, and socio-cultural factors were also addressed. In summary, maternal morbidity is a condition directly caused by pregnancy, irrespective of whether it attests to or after pregnancy termination. Literature has shown that Eclampsia, haemorrhage, hypertension, obstructed labour are the major complications in pregnancy.

The presence of underlying conditions such as diabetes exacerbates the difficulties and becomes life-threatening to the mother. The literature reviewed illustrates that quantifying pregnancy complications is a herculean task, more so in a limited resource setting. However, in developing countries, the observed and self-reported morbidity approach is used to quantify maternal morbidity. These approaches are subject to bias and may not present the magnitude as they should. These can be attributed to health system-related factors such as the availability of qualified staff, appropriate surveillance structure for maternal morbidity, and other factors. At the health facility level, complications can arise due to various proximal factors such as distance, poor road network undesirable staff attitudes towards clients. Socio-cultural practices such as female genital mutilation and early marriages are a significant contributor to complications in pregnancies. In conclusion, much of the literature on maternal health is biased to maternal mortality as a population-based indicator; however, there is a need to document incidences and prevalence of pregnancy complications at all levels of care.

CHAPTER THREE: MATERIALS AND METHODS

3.1 Research Design

This study used a facility-based descriptive cross-sectional research design. This study design allows the researcher to use quantitative and qualitative data collection methods at a specific time.

3.2: Variables

3.2.1: Dependent Variable

The dependent variable in this study was complications experienced by women of reproductive age during pregnancy.

3.2.2 Independent Variables

The independent variables in this study included health facility determinants, maternal characteristics, and Socio-cultural factors influencing complications in pregnancy

Table 3.1: Summary of Independent Variables

Independent Variable	Sub-Variables	Level of Measurement
Maternal Characteristics	Parity	Interval
	Socio-economic status	Nominal
Health facility determinants	Distance from the health	Ordinal
	facility	Ordinal
	Level of Health facility	Ordinal
	Perceived staff attitudes	
Socio-Cultural factors	Early Marriages	Nominal
	Female genital Mutilation	

3.3 Location of the Study

This study was conducted in Mandera County (see Appendix 1 for Map). The County has an estimated population of 1,365,750 across seven sub-counties, namely Mandera East, Mandera West, Mandera South, Mandera North, Laffey, Banisa, and Kutulo. They are located on the following geographical Coordinates 3.41667°N 40.6667°E. The county has one county referral hospital and six sub-county referral hospitals with an estimated 800 health care workers. Mandera County has the highest burden of maternal and neonatal mortality in Kenya and is ranked among the top ten common health conditions associated with linkage to essential medical services. Other common ailments observed at the county's various health facilities include urinary tract infections, upper-respiratory-tract infections, and diarrhoeal diseases.

3.4 Study Population

The study population was women of reproductive age. The target population comprises cases of mothers seeking maternal health services reporting any form of obstetric complications in public and private health facilities in Mandera County within three months of the study. The estimated population for pregnant women reporting obstetric complications is 2784 (Source: Mandera County Health Records, 2015)

3.4.1: Inclusion Criteria

The study included all mothers seeking maternal health services in public health and private facilities in the county reporting any obstetric complications during pregnancy, delivery, and after delivery.

3.4.2: Exclusion Criteria

The study excluded mothers who were critically sick and respondents who were not of sound mind, those without obstetric complications, those who declined to consent, and those without obstetric complications.

3.5 Sample Size Determination

Sample size determination was determined using Yamane (1967) formula

(P = 0.5 is assumed)

$$n = \frac{\mathrm{N}}{1 + N(e)2}$$

n= desired sample size

N= Study Population (Estimated proportion of pregnant women within the three-month study period)
e=level of Precision

$$\frac{2784}{1+2784(0.05^2)}$$

n=350 plus (10% non-response rate) = 385

3.6 Sampling Techniques

This study utilized stratified and proportionate sampling techniques. Health facilities were stratified as per the ministry of health classification of health facilities formed. A proportional sampling technique was used from each stratum to establish the number of respondents to participate in the study. A systematic sampling technique was used at the health facility level to select individual cases for the study (2784/385), where every 7th client was included. Key informants were purposively selected. Table 3.1 summarises the sampling of respondents in the respective health facilities.

Table 3.2: Sampling Matrix

Facility	Number of facilities	Total Number of Women in Each Tier	Sample
Tier 4 facilities	1	139	20
Tier 3 facilities	4	557	77
Tier 2 facilities	8	1114	154
Private Hospitals	7	974	134
Total	20	2784	385

3.7 Research Instruments

An interviewer-administered questionnaire also translated in Somali (appendix 4) was used to collect data. The questionnaire was designed to have sub-sections as per the objectives with both open and closed sections. The interview guide was utilized for face-to-face interviews with health facility managers from each level who were the key informants of this study. Data collected was triangulated to enhance validity. Research assistants with a nursing background were hired and trained on the data collection tools and ethical research issues.

3.8 Pre-Testing

The questionnaire was pre-tested in one of the level IV health facilities (Name of Health facility) among 35 respondents in neighbouring Wajir County; this was conducted to ascertain the validity and reliability of data collection instruments. Qualitative and quantitative were triangulated.

3.8.1 Validity

Validity is the ability of a research instrument to capture the information it was intended to capture. In this study, validity was ensured by presenting research instruments to a panel of experts in reproductive health to ascertain whether they will yield the

information sought in this study. Data was triangulated during report writing to enhance validity.

3.8.2 Reliability

In this study, internal consistency was established in the pilot study using the test-retest method.

3.10 Data Analysis

Data entry form developed using epi info version 7 was used to enter quantitative data. Data were then exported to Statistical Package for Social Scientist version 20, wherein descriptive and inferential statistics were used to analyze quantitative data. Descriptive statistics include mean scores, percentages, and frequencies. Chi-square test and fisher's exact test were used to establish the relationship between the dependent and independent variables. Analyzed quantitative data analysis was presented using tables and bar charts. Thematic content analysis will be used to analyze qualitative data.

3.11 Logistical and Ethical Considerations

Authorization to conduct this study was obtained from Kenyatta University Graduate school. Ethical approval to conduct this study was obtained from Kenyatta University Ethical Review Committee (KUERC) (Appendix 3). Authority to survey in Mandera County was sought and obtained from the National Commission for Science, Technology, and Innovation (NACOSTI) (Appendix 4) and from the respective heads of facilities sampled. Respondents in the study provided signed informed consent.

CHAPTER FOUR: RESULTS

4.1: Introduction

This chapter presents the analyzed field survey data. Information is presented in tables and is consistent with the objectives of the study. Out of 385 mothers recruited in the study, 350 (91%) responded, but 9% opted not to participate. Since the right of self-determination is engraved in the ethical principle of respect for human dignity, the researcher granted their choice and worked with the complying ones.

4.2: Socio-Demographic and Economic Characteristics of Respondents

Table 4.1 presents the socio-demographic and economic characteristics of the respondents. From the table, the median age of respondents was 27. The minimum age was 18 years, and the maximum was 49 years. The median number of children to each respondent is 4. More than half of the respondents (52.9%) of respondents aged between 18-28 years, 38.9% were aged between 29-39 years old, and less than 10% were aged 40-50. As shown in Table 4.1, the marital status of respondents in the survey. Of most respondents in the survey, 88.9% (N=240) were married, an equal proportion (4%) of respondents were single and widowed. Islam was the dominant religion, 91.4%, while Christian and others represented 6.6%.

From table 4.1, 46.9% of respondents in the study had no formal school, 15.7% did not complete primary school level education, 12.6% of respondents surveyed completed secondary school, and only 10.3% had college-level education. With regards to partner's level of education, a large proportion of respondent's partners, 38%, had no formal education, 24.6% of partner's respondents had a college level of education, and 15.7% completed high school level while only 4.9% did not complete high school level of

education. On income level, 24.9% of respondents earned a monthly income level of K.sh 10001-15000, 18.9% earned between K.sh 2501-5000, while at least 16% earned K.sh. 5001-10000

Table 4.1: Summary of Socio-Demographic and Economic Characteristics

Age (Years)	**Frequency**	**Percent**
18-28	185	52.9
29-39	136	38.9
40-50	29	8.2
Total	350	100
Median Age of Respondent	27	
Median Number of Children	4	
Maximum Age of respondent	49	
Minimum Age of respondent	18	
Marital Status	**Frequency**	**Percent**
Divorced	11	3.1
Single	14	4
Widowed	14	4
Married	311	88.9
Total	350	100
Religion	**Frequency**	**Per cent**
Other	7	2
Christian	23	6.6
Muslim	320	91.4
Total	350	100
Level of Education	**Frequency**	**Per cent**
Secondary Incomplete	17	4.9
Primary Complete	34	9.7
College/University	36	10.3
Secondary Complete	44	12.6
Primary Incomplete	55	15.7
Informal	164	46.9
Total	350	100
Level of Education of Husband/Partner	**Frequency**	**Percent**
Secondary Incomplete	17	4.9
Primary Complete	22	6.3
Primary Incomplete	37	10.6
Secondary Complete	55	15.7
College/University	86	24.6
Informal	133	38
Total	350	100
Monthly Household Income	**Frequency**	**Percent**
5001-10000	56	16
0-2500	66	18.9
>15001	67	19.1
2501-5000	74	21.1
10001-15000	87	24.9
Total	350	100

4.3: Obstetric Complications in Pregnancy.

4.3.1 Complications during the current pregnancy

Multiple response analysis in table 4.2 illustrates that respondents experienced anaemia (28%), vaginal discharge (13%), miscarriage (9%), lower limb oedema 24%, and haemorrhage 17% during pregnancy.

Table 4.2: Nature of Complications mentioned during Current Pregnancy

Nature of Complication	N	%
Anaemia	119	28%
Lower limbs oedema	100	24%
Haemorrhage	70	17%
Vaginal discharge	56	13%
Miscarriage	38	9%
Pre-eclampsia	37	9%
Total	420	100%

4.3.2: Complications mentioned during delivery in previous pregnancies.

Multiple response analysis, as displayed by table 4.3, shows that lacerations 39.9% anaemia (22.8) and haemorrhage (19%) were the prevalent conditions experienced by respondents during delivery.

Table 4.3: Summary of Complications mentioned during delivery in previous pregnancies.

Nature of Complication	N	%
Laceration/Tear	154	39.1%
Anaemia	90	22.8%
Haemorrhage	75	19.0%
Foetal Distress	50	12.7%
Foetal Obstruction	25	6.4%
Total	**394**	**100.0%**

4.3.3: Mode of Delivery

As presented in table 4.4, spontaneous vaginal delivery was the mode of delivery among 80% of respondents, while assisted delivery was the mode of delivery among 20% of respondents who had previously delivered.

Table 4.4: Mode of Delivery

Mode of delivery	Frequency	%
Spontaneous Vaginal Delivery	280	80
Assisted Delivery(C.S)	70	20
Total	**350**	**100.0**

4.3.4: Complications mentioned after Delivery in previous pregnancies.

Multiple response analysis shows that Haemorrhage (41%) accounted for respondents' highest complications, while fistula and peuperal psychosis accounted for 5% and 4% of all conditions, respectively.

Table 4.5: Cumulative Summary of Complications mentioned after Delivery in previous pregnancies.

	Responses	
Nature of Complication	**N**	**Percent**
Sepsis	24	31%
Fistula	4	5%
Puerperal Psychosis	3	4%
Still Birth	15	19%
Haemorrhage	32	41%
Total	78	100.%

"Majority of post-natal cases, when we receive in this facility are usually transferred to the referral hospital, most of whom suffer from postpartum haemorrhage. Fistula cases are often few, but we referred cases when it arises. However, we manage some uncomplicated cases of reported sepsis, stillbirths and provide counseling to mothers who exhibit post-partum depression" Tier 3, Nurse 37 years old.

4.4: Health Facility-Related Factors

4.4.1: Time estimate travelling to Health Facility

A large proportion of respondents (45.1%) in the survey took at least 30-60 minutes to get to a health facility. Thirty-eight percent took less than 30 minutes while only 16.3% took more than one hour, as illustrated in table 4.6

Table 4.6: Time estimate travelling to a health facility

Time Taken	Frequency	Percent
0-30 minutes	135	38.6
30min -1hr	158	45.1
>1hr	57	16.3
Total	350	100.0

"The nearest facility did not have doctors at the time of delivery, and I was in great pain; I was referred to the referral hospital, but by the time I reached there, the baby had died in the stomach. They did an operation to remove it. I am still angry because I would have got help" Un-named respondent at the post-natal ward.

4.4.2 Perceived Satisfaction towards Health Care Providers

Figure 4.1 displays the respondent's perceived attitude towards health care providers at the health facilities. More than half (54.3%) of the respondents were satisfied with the health facilities staff. Thirty-six percent of respondents were very satisfied with staff attitudes at the facility, and only 8.9% were not happy with health care workers.

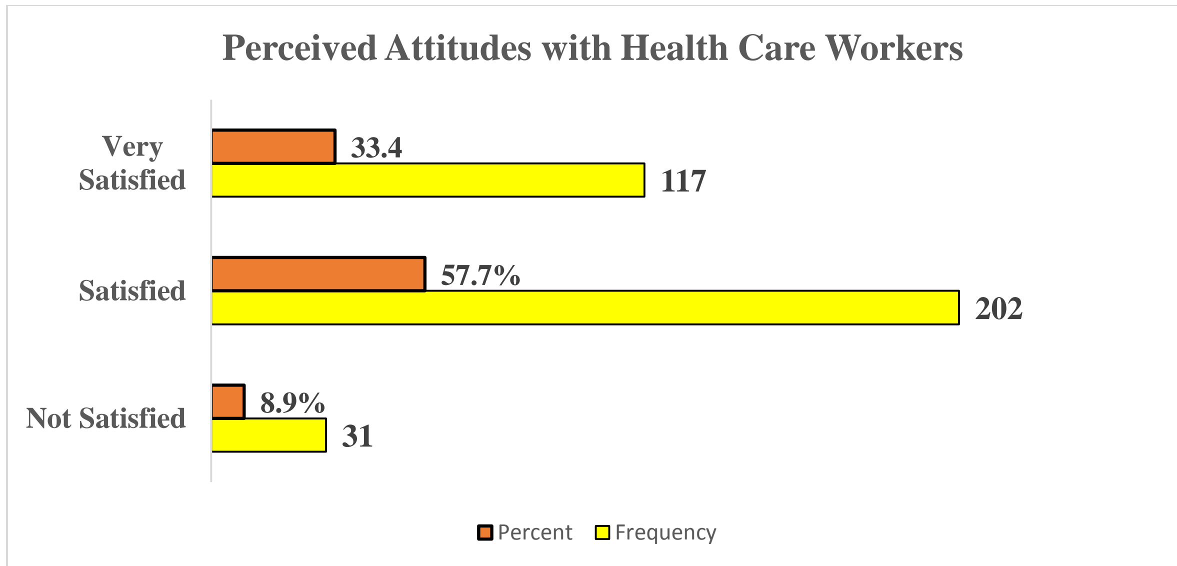

Figure 4.1: Perceived Attitude towards Health Care Providers

4.4.3: Utilization of Maternal Health Services

Table 4.7 displays that respondents made at least three antenatal visits during pregnancy and one post-natal visit.

Table 4.7: Utilization of Maternal Health Services

	The median number of ANC Visits attended	The median number of Post Natal Visits
Median	3.0	1.0

4.4.4: Preferred Mode of Transport to Health Facility

Figure 4.2 shows that 42.6% and 46.6% of respondents walked or use public transport to the health facilities, respectively. Less than 10% of them use private cars for health facilities.

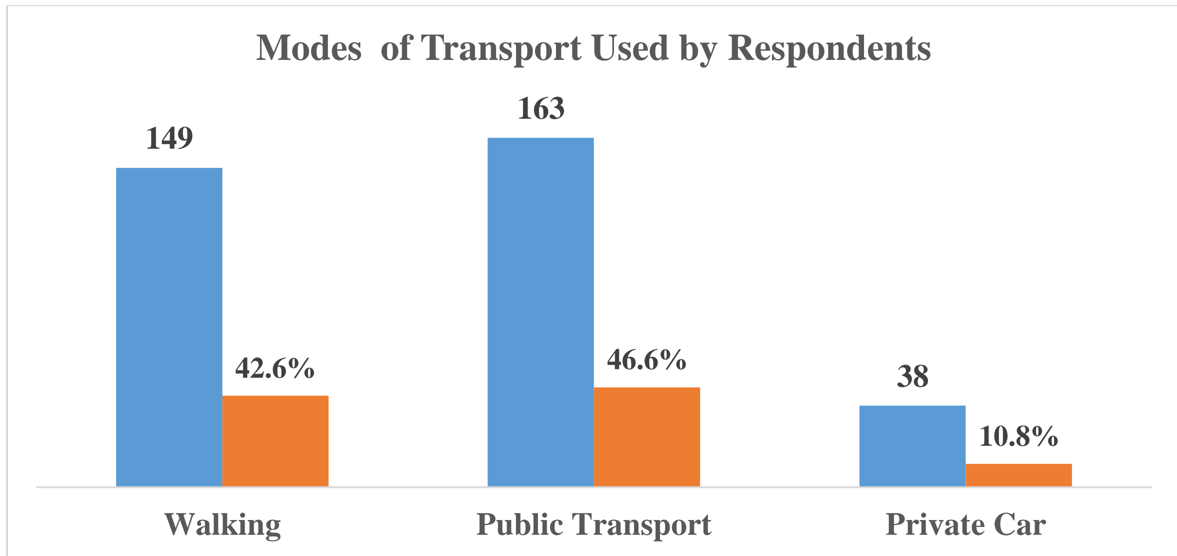

Figure 4.2: Modes of transport used by respondents

"The health facility is far away from my home; I always struggle to reach because I am a mother of three children. My husband is ever away, and sometimes I lack transport money"-Halima (not her real name) 35 years old mother of three*

4.4.5: Perceived Comfort with Male midwives

Figure 4.3 shows the respondent's perceived comfort with male midwives at the health facility. Seventy-one percent (N=188) were comfortable having male midwives. A third of them were not comfortable

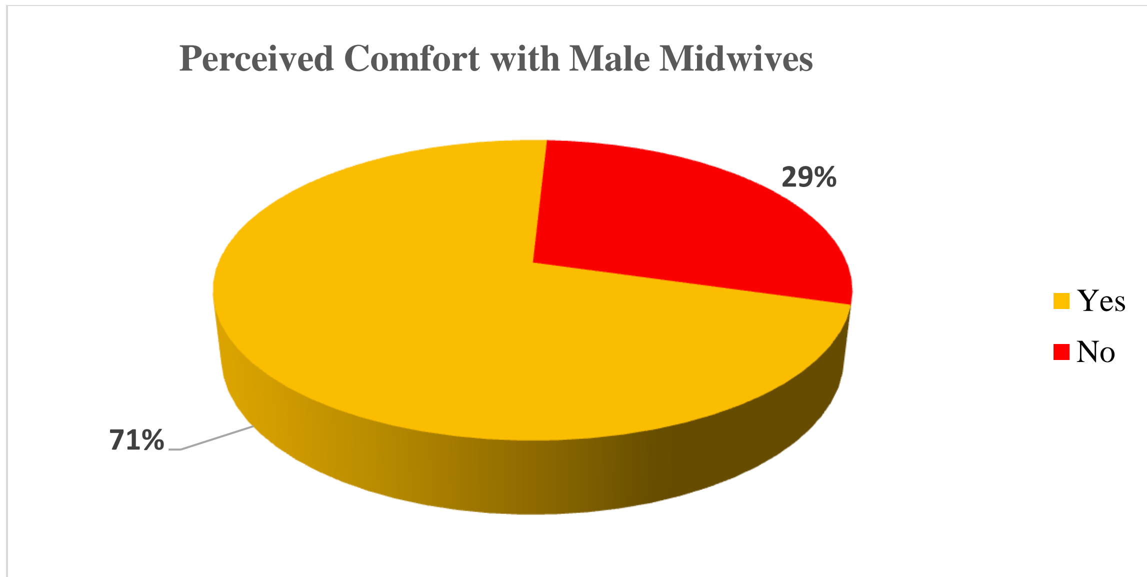

Figure 4.3: Perceived Comfort with Male Midwives

"Initially, women would shy away from health facilities, especially when a male nurse is on duty. One would come to the facility to observe whether there is a male nurse, and when it happens to be male, she returns home. So this has influences antenatal and postnatal clinic attendance, but lately, we are seeing a majority of women seeking to honour clinic appointments and delivery at the facility; however, there a number who are still reserved". Nurse in Charge

My husband did not want me to deliver at the facility because there are male workers at the maternity, so I was forced to deliver at home, and then when there was too much pain, I was brought to the hospital- Unnamed respondent recovering at the post-natal ward in

4.5: Socio-Cultural Factors

4.5.1: Proportion of respondents who undergone FGM

Table 4.8 presents the proportion of respondents who have undergone female genital mutilation. 87.2% of respondents had undergone FGM circumcised, and only 12.8% had not

Table 4.8: Proportion of respondents who have undergone female genital mutilation.

Undergone FGM	Frequency	Percent
Yes	307	87.2
No	43	12.8
Total	350	100.0

"Many women in this County have been circumcised. Those living further from the town have undergone circumcision, and this often brings about complications, especially during delivery."- Nurse at MCH clinic Mandera Referral Hospital

4.5.2: Reservations against certain types of foods

Table 4.9 shows that 62.9% of respondents in the survey attested that there was no cultural reservation against eating certain foods, while 37.1% claimed a cultural influence on certain types of food.

Table 4.9: Cultural influence on types of foods in pregnancy

Cultural influence on types of food in pregnancy	Frequency	Percent
Yes	130	37.1
No	220	62.9
Total	350	100.0

"I have three daughters in my house whose age difference is a year or a year and a half; my husband is always unhappy because he wants a son, and the last three years I have been pregnant all the time. The sister has told me that I have little blood in me, and they have told me to eat certain types of food and given me a few tablets to swallow" a 30-year-old mother of three at the antenatal clinic."

4.5.3: Cultural Support for Early Child Marriages

From table 4.10, 68% attested that there the community was in support of early child marriage

Table 4.10: Community Support for early child marriages

Community support early child Marriage	Frequency	Percent
Yes	228	65.1
No	106	30.3
No response	16	4.6
Total	350	100.0

"I was married when I was 20 years old; I had dropped out of secondary school. My parents married me off to one of their friends. "

I have an extended family, and housework is sometimes like carrying water from the source, which is very far, so most of the time I am exhausted; when pregnant, it is difficult even to see the doctor at the health center I am tired. (43-year-old mother of 4 at post-natal ward)

Sometimes I am ashamed to speak to my husband, especially when you are pregnant and you are in pain, because he sometimes becomes arrogant and says that it is a woman's issue (27-year-old mother of two, at post-natal ward)

There are times that when I want to go to the health center, I ask for my fare, he sometimes says he does not have the money (24-year-old mother at the antenatal clinic)

4.6: Test of Associations

4.6.1: Complication during the current pregnancy

Complications in Current pregnancy and Maternal Characteristics factors

Table 4.11 summarizes chi-square analysis between socio-demographic and obstetric complications. Findings show an association between respondents' age and complication during pregnancy λ^2 (12.0879, *df=12, p=0.026).* The analysis shows an association between monthly income and (λ^2= 36.38, *df=24, p=0.05).* Further, there was an

association between the respondent’s education level and complications during pregnancy ƛ^2 (35.19, *df=30, p=0.004).*

Table 4.11: Maternal Characteristic and Complications during Pregnancy

`	age grouped			
Complication Type	18-30 years	29-39 years Old	40-50 years Old	ƛ2(*df) sig*
Miscarriage	15(51.7)	23(57.5%)	4(10%)	
Anaemia	28(56)	32(42.1%)	11(14.5%)	
Preeclampsia	5(62.5)	8(57.1%)	0(0%)	**12.0879(*12*), *p=0.026***
Haemorrhage	17(70.8)	16(43.2%)	2(5.4%)	
Swelling	19(79.2)	15(38.5%)	2(5.1%)	
Discharge	31(72.1)	20(35.7%)	2(3.6%)	

Household Income	**0-2500**	**2501-5000**	**5001-10000**	**10001-15000**	**>15001**	ƛ^2*(df)* sig
Miscarriage	4(30.8%)	8(36.4%)	7(30.4%)	7(31.8%)	3(25%)	
Anaemia	8(61.5%)	16(72.7%)	10(43.5%)	9(40.9%)	7(58.3%)	
Preeclampsia	1(7.7%)	2(9.1%)	4(17.4%)	1(7.7%)	1(8.3%)	**36.38(24) *p=0.05***
Haemorrhage	9(69.2%)	6(27.3%)	4(17.4%)	3(13.6%)	2(16.7%)	
Swelling	3(23.1%)	5(22.7%)	6(26.1%)	5(22.7%)	5(41.7%)	
Discharge	8(61.5%)	7(31.8%)	11(47.8%)	14(63.6%)	3(25%)	

			Respondent's Level of Education				
Complications during Pregnancy	Primary Incomplete	Primary Complete	Secondary Incomplete	Secondary Complete	College	Informal	ƛ^2(df) sig.
Miscarriage	6(24%)	0(0%)	1(50%)	2(40%)	1(20%)	19(39.6%)	
Anaemia	12(48%)	3(42.9%)	1(50%)	2(40%)	3(60%)	29(60.4%)	
Preeclampsia	2(8%)	1(10%)	1(50%)	1(20%)	1(8%)	4(8.3%)	35.19 (30) *p=0.004*
Haemorrhage	8(32%)	1(10%)	1(50%)	1(20%)	2(40%)	12(25%)	
Swelling	6(24%)	2(28.6%)	1(50%)	4(80%)	3(60%)	8(16.7%)	
Discharge	12(48%)	5(71.4%)	1(50%)	2(40%)	1(20%)	22(45.8%)	

Complications during pregnancy and Health Facility-related Factors

Table 4.12 shows that chi-square analysis shows an association between the time taken to health facilities and complications during pregnancy (ƛ^2=35.867, *df=12, p=0.0001).* There was an association between perceived staff attitudes and complications during pregnancy and ƛ^2 (24.234, *df=12, p=0.02).*

Table 4.12: Test of Association between Health Facility-related Characteristics and Complication during pregnancy

	Travel time to Health facility			χ^2*(df)* sig.
	0-30 mins	31-1hr	>1hr	
Miscarriage	10(26.3%)	11(26.2%)	8(66.7%)	
Anaemia	14(36.8%)	27(64.3%)	9(75%)	
Preeclampsia	4(10.5%)	0(0.0%)	4(33.3%)	35.867(*12*)
Hemorrhage	9(23.7%)	10	5(41.7%)	***p=0.0001***
Swelling	9(23.7%)	9(21.4%)	6(50%)	
Discharge	19(50%)	19(45.2%)	5(41.7%)	
	Perceived staff Attitudes			χ^2*(df)* sig
	Satisfied (%)	**Not Satisfied (%)**	**Very Satisfied (%)**	
Miscarriage	17(27)	5(62.5)	7(33.3)	
Anaemia	36(57.1)	5(62.5)	9(42.9%)	
Preeclampsia	5(7.9%)	1(12.5%)	2(9.5%)	24.234(12)
Hemorrhage	19(30.2%)	4(50%)	1(4.8%)	***p=0.02***
Swelling	19(30.2%)	1(12.5%)	4(19%)	
Discharge	34(54%)	5(62.5%)	4(19%)	

Complications in Current Pregnancy and Socio-Cultural Factors

As illustrated in table 4.13, there was no direct relationship between community support for early marriages, undergoing female genital mutilation, and complications in the current pregnancy.

Table 4.13: Test of Association between Socio-cultural Characteristics and Complication during pregnancy

	community support early child Marriage		
	Yes	No	
Miscarriage	19(67.9%)	9(32.1%)	
Anaemia	37(78.7%)	10(21.3%)	
Preeclampsia	6(85.7%)	1(14.3%)	8.75(6), *p=0.189*
Haemorrhage	20(83.3%)	4(16.7%)	
Swelling	17(81%)	4(19%)	
Discharge	29(67.4%)	14(32.6%)	
	Undergone Female Genital Mutilation		
	Yes	No	
Miscarriage	27(96.4%)	1(3.6%)	
Anaemia	43(89.6%)	5(10.4%)	
Preeclampsia	7(99.7%)	1(0.03%)	4.25(6), *p=0.643*
Haemorrhage	20(87%)	3(13%)	
Swelling	19(86.4%)	3(13.6%)	
Discharge	39(92.9%)	3(7.1%)	

4.6.2: Complication during Delivery in the previous pregnancy.

Complications in Previous pregnancies and Health Facility Factors

Table 4.14 illustrates a significant association between the average waiting time and complications during delivery λ^2 (24.234, *df=12, p=0.02).* There was an association between perceived attitudes towards health care workers and pregnancy complications during delivery λ^2 (21.014, *df=10, p=0.021).*

Table 4.14: Average time taken travelling and Complications during delivery

Complication during Delivery	The average time taken to Health Facility				
	<30mins	31min-1hr	1-2hrs	>2hrs	
Laceration/Tear	39(72.2%)	41(69.5%)	19(82.6%)	15(93.8%)	24.58(15), ***p=0.005***
Anaemia	23(42.6%)	17(28.8%)	10(43.5%)	1(6.3%)	
Haemorrhage	12(22.2%)	14(23.7%)	8(34.8%)	4(25%)	
Foetal Distress	9(16.7%)	4(6.8%)	4(17.4%)	1(1%)	
Foetal Obstruction	6(11.1%)	3(5.1%)	3(13%)	1(0%)	

Perceived Attitude to Health Care Worker

Complications during delivery	Satisfied	Not Satisfied	Very Satisfied	χ^2(*df*) sig.
Laceration/Tear	65(74.7%)	14(87.5%)	35(71.4%)	21.014(10), ***p=0.021***
Anaemia	37(42.5%)	2(12.5%)	12(24.5%)	
Haemorrhage	27(31%)	5(31.3%)	6(12.2%)	
Foetal Distress	12(13.8%)	0(0%)	5(10.2%))	
Foetal Obstruction	9(10.3%))	0(0%)	3(6.1%)	

Complication during Delivery and Socio-Cultural Factors

Table 4.15 shows that female circumcision was associated with pregnancy complications during delivery χ^2 (12.32, *df=5, p=0.0031).* There was no association between perceived comfort with male midwives and complications during delivery χ^2 (8.349, *df=5, p=0.138)*

Table 4.15: Socio-Cultural Characteristics and Complications during delivery

Complication during Delivery	**Circumcised**		$\chi^2(df)$ sig
	Yes	No	
Laceration	91(71.7%)	15(88.2%)	
Anaemia	48(37.8%)	2(11.8%)	
Haemorrhage	36(28.3%)	1(5.9%)	12.32(5), ***p=0.0031***
Foetal Distress	15(11.8%)	2(11.8%)	
Foetal Obstruction	12(9.4%)	0(0%)	
Complication during Delivery	**Perceived Comfort with Male Midwives**		$\chi^2(df)$ sig
	Yes	No	
Laceration	77(72.6%)	37(80.4%)	
Anaemia	42(39.6%)	9(19.6%)	8.349(5)
Haemorrhage	25(23.6%)	13(28.3%)	*p=0.138*
Foetal Distress	12(11.3%)	5(10.9%)	
Foetal Obstruction	10(9.4%)	2(4.3%)	

4.6.3: Complications after delivery during a previous pregnancy.

Complications after delivery in previous pregnancy and respondent's Maternal characteristics.

Table 4.16 shows that the study participants' age was statistically associated with complications after delivery in previous pregnancies λ^2 (27.88 *df=5, p=0.019).*

Table 4.16: Complications after delivery during a previous pregnancy and Maternal characteristics

	Age		
Complication Type	18-30 years	31-49 Years	
Sepsis	30(55.6%)	24(44.4%)	***13.536(5), p=0.019***
Fistula	2(50%)	2(50%)	
Peurperal Psychosis	2(100%)	0(0%)	
Still Birth	8(72.7%)	9(27.3%)	
Haemorrhage	6(27.3%)	21(72.7%)	

	Household Income					
Nature of Complication	0-2500	2501-5000	5001-10000	10001-15000	>15001	
Sepsis	6(11.1%)	12(22.2%)	16(29.6%)	12(22.2%)	8(14.8%)	*24.961(20), p=0.203*
Fistula	0(0%)	1(25%)	2(50%)	0(0%)	1(25%)	
Peurperal Psychosis	0(0%)	0(0%)	2(100%)	0(0%)	0(0%)	
Still Birth	4(36.4%)	2(18.2%)	3(27.3%)	1(9.1%)	1(9.1%)	
Haemorraghe	5(22.7%)	8(36.4%)	5(22.7%)	3(13.6%)	1(4.5%)	

	Level of Education						
	Primary Incomplete	Primary Complete	Secondary Incomplete	Secondary Complete	College	Informal	
Sepsis	16(29.6%	6(11.1%)	2(3.7%)	4(7.4%)	5(9.3%)	21(38.9%)	*32.118(25), p=0.115*
Fistula	0(0%)	0(0%)	0(0%)	2(50%)	0(0%)	2(50%)	
Peurperal Psychosis	0(0%)	0(0%)	0(0%)	1(50%)	0(0%)	1(50%)	
Still Birth	3(27.3%)	1(9.1%)	0(0%)	2(18.2%)	0(0%)	5(45.5%)	
Haemorrhage	5(22.7%)	0(0%)	1(4.5%)	4(18.2%)	0(0%)	12(54.5%)	

Complication after delivery in previous pregnancy and Health facility factors

Table 4.17 below illustrates a significant association between the time taken to health facilities and complications associated with pregnancy after delivery χ^2 (27.88 *df=5, p=0.002).* There is a significant association between respondents' perceived attitudes and complications associated with pregnancy after delivery χ^2 (21.596, *df=10, p=0.017).*

Table 4.17: Time taken to health facility and complication after delivery

Nature of Complication	**Time taken To Health Facilities**			χ^2*(df)* sig
	0-30 mins	31-1hr	>1hr	
Sepsis	16(66.7%)	26(86.7%)	12(100%)	27.88(10), ***p=0.002***
Fistula	2(8.3%)	0(0%)	2(16.7%)	
Psychosis	2(8.3%)	0(0%)	0(0%)	
Still Birth	7(29.2%)	3(10%)	1(8.3%)	
Haemorrhage	8(33.3%)	6(20%)	8(66.7%)	
Complications after Delivery	**Perceived Attitude towards Staff**			χ^2*(df)* sig
	Satisfied	Not Satisfied	Very Satisfied	
Sepsis	41(93.2%)	4(80%)	9(52.9%)	21.596(10), ***p=0.017***
Fistula	3(6.8%)	0(0%)	1(5.9%)	
Psychosis	1(2.3%)	0(0%)	1(5.9%)	
Still Birth	5(11.4%)	0(0%)	6(35.3%)	
Haemorrhage	16(36.4%)	2(40%)	4(23.5%)	

Complication after Delivery and Socio-Cultural Factors

From table 4.18, it evident that there is no significant association between complications after delivery and having been circumcised.

Table 4.18: Circumcision and Complications after delivery

Complications after delivery	**Ever been Circumcised**		χ^2*(df)* sig
	Yes	No	
Sepsis	44(78.6%)	9(100%)	
Fistula	3(5.4%)	1(11.1%)	
Puerperal Psychosis	1(1.8%)	1(11.1%)	7.468(5), $p=0.188$
Still Birth	10(17.9%)	1(11.1%)	
Haemorrhage	20(35.7%)	1(11.1%)	

CHAPTER FIVE: DISCUSSION, RECOMMENDATION, AND CONCLUSIONS

5.1: Introduction

This study's primary objective was to determine the correlations of pregnancy-related complications of pregnant women in Mandera County. This study was conducted at health facilities among three hundred and fifty women reporting any form of obstetric complication across various private and government health facilities in the Mandera East sub-county. Sociodemographic data illustrates that the respondent's median age was 27 years, and ninety percent of respondents were married and practiced Islam by religion. Half of the respondent's survey had no formal school level of education regarding the status of education; fifteen percent did not complete primary school level of education, and only 9.3 percent had a college level of education. Further, data shows that forty-one percent of respondent's partners had no formal education; twenty percent has at least a college level of education. Monthly income ranged between 10,000 and 15000 Kenya shillings.

5.2: Complications in Pregnancy

5.2.1: Complications experienced during the current pregnancy

Anaemia (28%), lower limbs oedema (24%), Haemorrhage (17%), and vaginal discharge (13%) were the prevalent conditions experienced by respondents during pregnancy. Miscarriage (9%) and pre-eclampsia 9% were the least reported of all obstetric complications experienced. Anaemia is considered a common pregnancy disorder. A facility-based cross-sectional study in South Africa by Tunky & Moodley (2016) established a 42.7% prevalence of anaemia among two thousand pregnant women. In

Kenya, a facility-based cross-sectional study by Okube *et al*. (2016) among pregnant women showed an anaemic prevalence of 57% in their second and third-trimester stages.

Further, a recent study by (Ndegwa 2019) at a local hospital in Nairobi County among pregnant women attending antenatal clinics established that 40.7% of respondents were diagnosed with anaemia, attributed mainly to helminthic infections. Compared with other studies, this study illustrates a high prevalence of anaemia among expectant mothers seeking health facilities. This finding underscores the threat that anaemia is a prevalent pregnancy condition and a potential risk factor to undesired obstetric outcomes. In contrast, other underlying factors contribute to the high prevalence of anaemia, the need for adequate antenatal care, iron/folate supplementation, and proper nutrition diet management strategies. The proportion of expectant mothers who reported vaginal discharge (13%) in this study is incongruent (Ibrahim, Bukar, Mohammad, Audu, & Ibrahim, 2013) thirty-one percent of respondents in the study exhibited abnormal vaginal discharge. A similar study (Omole-Ohonsi & Nwokedi, 2011) established that one in twenty women seeking antenatal care was confirmed to have vaginal discharge. Further, this study has found a statistical difference between age and obstetric complications during pregnancy, which is consistent with other studies (Krauss-Silva et al., 2014) that have shown a direct relationship between gestational age and vaginal discharge.

The present study has established that pre-eclampsia accounted for 9% of all complications in the current pregnancy. Evidence from a recent case-control study in Ethiopia by (Hinkosa *et al*., 2020) showed that pre-eclampsia accounted for 76.5 % of all hypertensive disorders assessed during pregnancy among respondents; close to eight folds higher than findings of the present study.

5.2.2: Complications during Delivery

Laceration, anaemia, and haemorrhage were the prevailing conditions experienced by those who had delivered. Spontaneous vaginal delivery was the prevalent mode of delivery among 70.1% of respondents. A third (29.9%) attested to have undergone an assisted delivery. Robledo *et al.,* (2017) study examining the prevalence rates of pre-existing pregnancy conditions on maternal medical reports indicated that 53% of deliveries were spontaneous while Caesarean section accounted for 39% in medical records examined. The indecisions of pregnant women could influence the mode of delivery. For instance, (Biraboneye S *et al.,* 2017) at Kenyatta national hospital established that the lack of information and doctor's preference influenced a woman's decision making on the preferred mode of delivery. Foetal obstruction (12.7%) and distress (6.4%) were the least reported complications after delivery in this study. Findings from this study corroborate Yang *et al.'s* (2017) study on the association between gestational weight gain and delivery outcomes among one thousand and two pregnant mothers at a public hospital in China established that 10.6% of pregnant women assessed experienced foetal distress during delivery.

Additionally, the study established an association between delivery outcomes and weight gain in the third trimester. A recent facility-based survey in Tanzania (Nandonde, Matovelo, Massinde, & Rumanyika, 2016) accounted for 21.1% of all maternal and fetal outcomes assessed among respondents. The study further established that 93.7% and 27.4% of respondents experienced anaemia and post-partum haemorrhage, respectively.

5.2.3: Complications after delivery

By proportion of all obstetric complications after delivery, Sepsis (56.5%) was attested most by respondents; Hemorrhage and stillbirths accounted for 38.8% and 16.3%, respectively, of all causes of complications in summary. Puerperal psychosis and fistula accounted for 2% and 4.8% of all complications reported in the study. Findings from (Andersen *et al.,* 2012) prospective study among 7007 respondents in seeking care for abortion services in various government, private and non-governmental health facilities in Nepal showed that suspected sepsis and offensive discharge and haemorrhage accounted for 0.24%, 0.51%, and 0.26% respectively of all cases of complications. A recent study by (Chepchirchir, Nyamari, & Keraka, 2017) in Nandi County established sepsis prevalence of 38.1% among respondents delivered in hospitals against 33.5% of those delivered home. The study adds that the prevalence shown could (Ndosi & Mtawali, 2002) be attributed to late referral to health facilities, induced abortion, prolonged labour but not limited to other obstetric-related illnesses such as anaemia. Chepchirchir *et al. (*2017) aver that inadequate or lack of knowledge is a significant contributory factor to sepsis incidence. A recent study in Uganda has shown that thirty percent of maternal deaths were attributed to puerperal sepsis (Ngonzi *et al.,* 2016). This survey has established that 38% of respondents experienced post-partum haemorrhage. This finding corroborates a study in Nigerian by (Mutihir & Utoo, 2010) wherein thirty-five percent and twenty-four percent of respondents in the survey had haemorrhage, respectively. Evidence in this study illustrates that 3.8% of respondents developed puerperal psychosis. A study at a referral hospital in Tanzania (Ndosi & Mtawali, 2002) established a puerperal psychosis prevalence of 3.2 per 1000 live births. Elsewhere in

Nigeria, (Mutihir & Utoo, 2010) study found out that of all respondents who participated in the survey, 4.9% developed puerperal psychosis within seven days of birth. (Ragendra, Resham, Shiva, Vishnu, & Vidya, 2015) Avers that expectant mothers develop depressive symptoms that result from stressful situations such as pain during delivery

5.3: Health System Related Factors

Close to half (45.7%) of the respondents surveyed took at least 30 to 60 minutes to access health care services from their households. Forty percent took less than half an hour and only 14.5%. Walking and the use of public transport were the most preferred modes of transportation. Only less than 10% of the respondents utilized private vehicles to access maternal health services. Time taken to health facilities and mode of transport used by respondents in this study indicates that access to health care facilities remains a hurdle despite numerous efforts through policy and infrastructural development by both the National and County governments to enable fast and easy access to health facilities. A cross-sectional study by Wanyua (2016) in Machakos County indicated that most respondents took at least one hour to access maternal health care service and that public transport was the preferred mode of transport. Evidence from (Owiti, Oyugi, & Essink, 2018) in an urban slum setting established that the long distances to health facilities were a barrier to the utilization of public health facilities. In this study, slightly more than half of the respondents (54.4%) were satisfied with staff attitude at the respective health facilities, and 36.7% were delighted with the attitude shown by health care workers. Descriptive analysis posits favourable attitudes towards healthcare providers in the facilities in which respondents seek maternal health care. This finding would perhaps,

underscore the efforts put in place by facility administrators in addressing systemic issues affecting staff at the facilities. A study by (Liambila & Shiphrah, 2014) recommends that providing complementary services to mothers whom health care workers have delivered facilitates an improved perception towards health workers, and in the long-term, it enables the utilization of skilled birth attendance.

5.3.1: Utilization of maternal health services

Descriptive data illustrates that the study respondents attended at least three antenatal visits and only one post-natal visit. The world health organization recommends at least four antenatal visits as a precautionary measure to perinatal mortality. In Kenya, the Ministry of Health recommends at least four antenatal visits. Evidence from the 2014 Kenya Demographic and Health Survey shows that only 58% of made at least four visits and 25.2% of respondents in Northeastern province did not receive any antenatal care; the median number of ANC visits was zero. Post-natal non-attendance rates in northeastern Kenya, according to KDHS 2014, showed that the proportion of postnatal mothers decreased from 7% within the first 4hours to 0.8% between 3-6 days after delivery. Furthermore, the report affirms that 80% of respondents in the survey did not receive post-natal checks.

5.4: Socio-Cultural factors

Qualitative data from respondents illustrate that husbands to the respondents interviewed had a divided opinion on male health care workers at health facilities. This finding could be a plausible reason for the inadequate utilization of maternal health services in the general population. This finding highlights the autonomy of women in decision making, and wherein there is a need to seek consent to seek maternal health services from their

partner. This, in part, becomes a contributor to complications experienced during pregnancy and after. Quantitative data shows that a third of respondents in the survey were uncomfortable with male midwives. This finding perhaps highlights a significant change in perception among women and thus facilitates positive maternal health-seeking behaviour and, in some instances, promotes access to services. A favourable perception towards male midwives implores the county government to recruit and deploy more male nurses to resolve the reported low patient-provider ratio. A qualitative study in Ethiopia revealed that patients assigned to male midwives reported high acceptability and reduced or no negative labour and delivery experience than those with female mid-wives (Barrowes, Holcombe, Jara, Carter, & Smith 2017).

Close to ninety percent of respondents in this study were circumcised. This finding corroborates evidence in the KDHS (2014), wherein 94% of inhabitants, ethnic Somalis in Mandera County, practice female genital mutilation. A study conducted by the WHO on the effects of female genital mutilation on childbirth shows that infant resuscitation rates and pre-natal deaths were significantly higher among infants born to women who had undergone female genital mutilation. The study further reveals that women who had undergone type III mutilation were 70% higher at risk of post-partum haemorrhage than women who were not mutilated. While this vice has been criminalized, several pockets of these practices are still being perpetrated by respondents, albeit discreetly. Gender roles, in a way, contribute to delaying in seeking health care services. One of the respondents upon interviewed attested that they overwork for long periods on house chores; this partly affects attendance to scheduled clinic appointments and use of skilled birth attendants during delivery.

CHAPTER SIX: CONCLUSION AND RECOMMENDATIONS

6.1: Conclusion

This study has established that anaemia, haemorrhage, lower limb oedema, vaginal discharge, and miscarriage were the most prevalent obstetric complications among respondents during pregnancy. Laceration, Anaemia, and haemorrhage were experienced by a majority of respondents surveyed during delivery. Spontaneous delivery was typical among the respondents interviewed. After delivery, sepsis was the common complication attested by the majority of respondents.

This study concludes that based on inferential analysis, maternal characteristics such as age, income, and respondents' education level have a bi-directional relationship with complications during pregnancy, delivery, and after delivery.

Regarding health system factors, this study concludes that antenatal and post-natal visits are optimally below the recommend standards given that respondents made a median of three antenatal visits and only one post-natal visit. The time taken to health facilities is not desirable. Generally, travel time to health facilities ranged between 30 to 60 minutes as most of the respondents in the survey walked to the health facilities. Further, the study has established that the respondent's perceived attitude to health care workers is desirable and that the majority were comfortable being attended to by male midwives, except that few respondents were uncomfortable being attended by male midwives. In this study, a large proportion of respondents were circumcised, and that early child marriage as a way of life was practiced despite the vice being illegal.

6.2: Recommendations

1. This study recommends concerted efforts by the county officials and those in the national government to emphasize the need to sensitize women of reproductive age on obstetric danger signs. This in part facilitates desirable health-seeking behaviour and eventually a reduction of the prevalence of maternal morbidity.
2. There is a need for the county health services department to document the incidence and prevalence of maternal morbidity at the facility level to inform decision-making regarding the quality of maternal health services by the county health management team.
3. There is a need to improve mothers' socio-economic status by applying income-generating activities, empowering mothers with requisite maternal health knowledge to utilize maternal health services. Educating young girls to higher levels of education facilitates easy understanding of pregnancy-related danger signs.
4. Antenatal visits were below the optimally recommended visits of at least four. There is a need to utilize community health workers to provide antenatal care to increase antenatal and postnatal coverage through outreach programs by the Mandera county department of health.
5. There is a need to collect and record vital statistics on the prevalence and incidences of complications during pregnancy, childbirth, and the postpartum period at the facility level.

6. Some respondents in the study have expressed reservations about being attended by male midwives at health facilities. This calls for facility managers to increase the proportion of female health care workers.
7. Community sensitization on the dangers of harmful cultural practices by Mandera county department of health, local administration, and Gender-based non-governmental organization.
8. The County health department needs to increase the number of health facilities within the county to enable access to Maternal health services to reduce the time taken to access health facilities.

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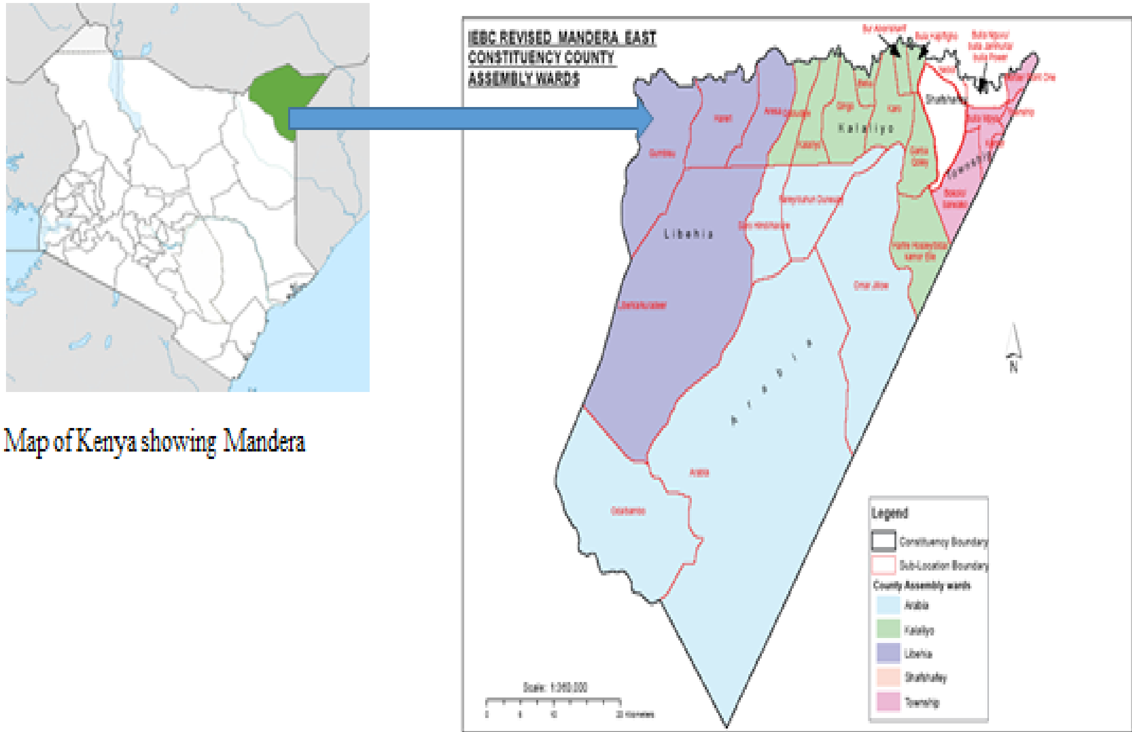
APPENDIXES

Appendix I: Map of Study Area.

Map of The Study Area



Map of Kenya showing Mandera

Mandera East Sub county

Appendix II: Informed Consent

STUDY TITLE: CORRELATES OF PREGNANCY RELATED COMPLICATIONS IN MANDERA COUNTY

Good morning/Good afternoon. My name is **ABDI MAALIM ISSAKOW.** I am a Post-graduate student at Kenyatta University pursuing a Master of Science degree in Reproductive Health. I am surveying correlates of pregnancy-related complications among women of reproductive age in Mandera County. Finding from this study could also assist in identifying ways in which maternal morbidity within the community can be managed at the community level.

Risks and Discomforts: At this stage, you have been assessed and found eligible by the clinic staff to participate in this study. You will be asked various questions regarding your condition. Some of the questions asked are sensitive and personal. Kindly inform the study staff if you are uncomfortable with the questions. However, I do not foresee any risks or discomfort from your participation in the research.

Voluntary Participation: Your participation in the study is voluntary, and you may refuse to answer any question or choose to stop participating for any reason at any time.

Reward: You will not be rewarded for participating in this survey. Additionally, you will not be asked to pay any amount to participate in the survey.

Confidentiality: All information you provide during the research will be held in confidence that your name will not be recorded on the questionnaire and during the focus group discussion conversations. Questionnaires and Interview recordings will be kept in a secure location for safe-keeping. Data provided will be disseminated as an aggregate

finding and not as an individual.

Contact Information: If you have any questions regarding this survey, you may contact the following persons. **1**. Dr. Peterson Warutere on 0721993833 **2.** Prof.Margaret Keraka on 07218175215.**3.** Kenyatta University Ethical Review Committee Secretariat on Chairman.kuerc@ku.ac.ke, Secretary.kuerc@ku.ac.ke.

Participant Statement

I have understood the nature of this study. I have been provided with the opportunity to ask questions, and I am satisfied by the answers provided and wish to participate. My signature or thumbprint below indicates my consent

……………………………………. ……………………….
Signature or thumbprint Date

Investigator Statement

I have explained to the volunteer the nature of this project, the Risks, and benefits involved in a language that s/he understands

Name of Interviewer: ……………………………………….……………………
Signature Date

Appendix III: English Questionnaire

PART ONE: SOCIODEMOGRAPHIC AND ECONOMIC CHARACTERISTICS

1. What is your age………………..?

2. What is your Marital Status?

☐Single ☐Married ☐ Widowed ☐ Divorced

3. At What age did you get Married………………………..

4. What is your Religion…………………….

☐ Christian ☐ Muslim ☐ Other

5. How many children do you have………………………..

6. Have you ever attended school?

☐ Yes ☐ No

7. What is your highest level of education achieved?

☐Primary Incomplete ☐ Primary Complete ☐ Secondary Incomplete

☐ Secondary Complete ☐ College/University

8. Has your partner ever attended school?

☐ Yes ☐ No

9. What is the level of education of Husband/Partner?

☐ Primary Incomplete☐ Primary Complete☐ Secondary Incomplete

☐ Secondary Complete ☐ College/University

10. What is your Monthly Household's income level?.......................................

PART TWO: COMPLICATIONS OF PREGNANCY

11. What was the mode of delivery in previous pregnancies (applicable only to those who have delivered- Skip if it is a first-time mother)

Conditions	Yes	No
Spontaneous Vaginal Delivery		
Assisted Delivery (Caesarean Section/ Vacuum)		

Complications during Current Pregnancy

12 What difficulties are you experiencing in the current Pregnancy (Probe further on particular information provided and record it on notebook provided)

Conditions	Yes	No
Miscarriage		
Anaemia		
Pre-eclampsia		
Hemorrhage/Bleeding (APH)		
Lower limbs oedema		
Vaginal discharge/Infection		

Were there any complications during previous pregnancies?

Yes No (if No, thank the respondent for her participation)

If yes, which ones (probe further?)

Conditions	Yes	No
Miscarriage		
Anaemia		
Pre-eclampsia		
Haemorrhage/Bleeding (APH)		
Lower limbs oedema		
Discharge/Infection		

Have you experienced complications during previous deliveries (skip if no previous deliveries?)

The complication in previous pregnancies during Delivery

Conditions	Yes	No
Lacerations/Tears		
Anaemia		
Haemorrhage		
Foetal Distress		
foetal Obstruction		

The complication in previous pregnancies after Delivery (Skip if No last deliveries)

Condition	Yes	No
Sepsis		
Fistula (RVF/VVF)		
Puerperal Psychosis		
Still birth(FSB/ MSB)		
Haemorrhage (PPH)		

PART 3: MATERNAL HEALTH SERVICE UTILIZATION CHARACTERISTICS

12. How many antenatal Care visits have you attended during this pregnancy?...............................

13. How many antenatal Care visits did you attend in your previous pregnancy (if applicable)...
14. In your previous pregnancy, How many Post-natal visits after delivery (Applicable to those who have delivered before)…………………………..

PART 4: HEALTH SYSTEM FACTORS

15. Where did you normally attend ANC/PNC clinic during your previous pregnancy(If applicable)

☐ Private ☐ Government ☐ None

16. Currently, where do you attend ANC clinic?

☐ Private ☐ Government ☐ None

17. How long does it take you to travel to the government/Private health clinic?

☐ <30 min ☐ 30 min. to 1 hour ☐ More than 1hr

18. Which mode of transport do you use to go to the health clinic?

Walking ☐ Bicycle ☐ Public transport ☐ Private Car ☐

19. What was the average amount of time you waited to see medical staff when you visited the clinic?

☐ <30 min. ☐ 30 min. to 1 hr. ☐ 1-2hrs ☐ More than 2 hrs.

20. Generally, to what extent are you satisfied with Staff Attitudes?

☐ Satisfied, ☐ Not Satisfied ☐ very satisfied

21. Generally, whom will you prefer to conduct your delivery?

☐ Skilled Midwives ☐ TBAs

22. Generally, are you comfortable being attended by Male midwives?

☐ Yes ☐ No

23. If No…what could be the possible reasons……………………………………
……………………………………………………………………………………

PART 4: SOCIO-CULTURAL FACTORS

24. Does your culture prohibit the consumption of a particular type of food during pregnancy?

☐ Yes ☐ No

25. If yes, in Q27 above, could you mention some of them?......................................

26. Does your culture hold reservations on Caesarean Section?

☐ Yes ☐ No

27. Does your community support early child Marriage? ☐ Yes ☐ No

28. Does your community practice Female Genital Mutilation? ☐ Yes ☐ No

29. Have you been circumcised? Yes ☐ No ☐

30. If yes, in question 30, What is the community perception regarding FGM...

Appendix IV: Somali Questionnaire

QEEBTA 1: ARIMAHA QEEBAHA BULSHADA IYO DHAQAALAHA:

1. Meeqa jirtaa……………..?
2. Xaalada guurkaaga kawaran?
   ☐ Maguursan ☐ Guursaday ☐ Agoonley ☐ Garoob
3. Meeqaa jirtay markad guursatay………………………
4. Diintada waatee………………………

   ☐ Kiristan ☐ Muslim ☐ diimaha kale

5. Meeqa caruur ayaad leedahay………………………….

6. Waliga Iskol magashay?

   ☐ Haa ☐ Maya

7. Wax barashada halkee kugu sareysay?

   ☐ Dugsihose mabogin ☐ Dugsihose bogay ☐ Dugsisare mabogin

   ☐ Dugsisare bogay ☐ Jamacad/Kolage bogay

8. Lamanahaaga iskol magalay?

   ☐ Haa ☐ Maya

9. Wax barashada halkee kugaaray lamanahaaga?

   ☐ Dugsihose aan bogin ☐ Dugsihose bogay ☐ Dugsisare aan bogin

   ☐ Dugsisare bogay ☐ Jamacad/kolage bogay

10. Bishi dhaqaalaha guriga soogala waa meeqa?

    ☐ Ksh0-2500 ☐ Ksh 2501- 5000

    ☐ Ksh5001-10000 ☐ Ksh 10001-15000 ☐ kabadan Ksh. 15001

QEEBTA 2: DHIBAATOOYINKA LA XIRIIRA UURKA:

11. Habkeed kudashay dhalmooyinkii ad hore u soo martay (waxaa kabaxsan kuwa horaan aan dhalma soo marin)

Xaaladaha	Haa	Maya
Dhalma si caadi udhashay		
Dhalma qaliin kudhashay		

Dhibaatooyinka Jira uurkan

A).Uurkan dhibaatooyinka kuheysta maxaa kamid ah (sii tixraac jawabaha lagu siiyo kuna qor buuga aawadatid)

Xaaladaha	Haa	Maya
Dhicis/dill		
Dhiig la'aan/dhiig yari		
Dhiigbur waqtiga uurka		
Dhiig furan/Dhiig baxa waqtiga uurka		
Bararka lugaha hoose		
Dheecan ka dareera xubinka dhalmada ama cudur kudaca		

B).Ma jiraan dhibaatooyin ad lakulantay uurki hore? (Hadii maya tahay, ogamahad naq kaqeeb qadashada)

☐ Haa ☐ Maya

Hadii haa tahay (sii weeydii xaaladee waayo)

Xaaladaha	Haa	Maya
Dhicis		
Dhiig la'aan		
Dhiigbur waqtiga uurka		
Dhiig furan waqtiga uurka		
Bararka lugaha hoose		

Dheecan ka dareera xubinka dhalmada ama cudur kudaca		

C).Ma lakulantay dhibaatooyin dhalmooyinki hore? (Kasoc hadii eysan horan udhalin)

Dhibaatooyinka la xirira dhalmooyinki hore

Xaaladaha	Haa	Maya
Dillaacid waqtiga dhalmada		
Dhiig la'aan		
Dhiig furan		
Uurjifka oo naqaska kuxirma		
Foosha oo kudhibta ama dherata		

Dhibaatooyinka uurki hore dhalmada kadib (Iskadhaf hadii eysan horan udhalin)

Xaaladhaha	Haa	Maya
Qaranqarada umusha		
Iskufurka xibinaha waqtiga dhalmada		
Dhimirka umusha oo lagudarsama		
Canuga oo meed ku dhasha		
Dhiig furan dhalmada kadib		

QEEBTA 3: ISTICMAALKA ADEEGA CAAFIMADKA EE HOOYOOYINKA:

12. Intaad urkan isku argtay meeqa jeer ayaad tagtay kilinga hoyooyinka uurkaleh?.........................

13. Uurki hore meeqa jeer ayaad tagtay kilinga hoyooyinka uurkaleh?..........................

14. Uurki hore dhalmada kadib meeqa jeer ayaad kiliniga tagtay (weydii kuwa horaan udhalay)………………………………………..

QEEBTA 4: ARIMAHA NIDAAMKA CAAFIMAKA

15. Uurki hore, badanaa goobahee ayaad kilinig utagijirtay? (weydii hadii ey quseyso)

☐ Shaqsi ☐ Dowlada ☐ Midnah

16. Hada xagee ayaad kiliniga utagtaa?

☐ Goob shaqsi ☐ Dowlada ☐ Midnah

17. Meeqaa saac ama daqiiqo ayad usocotaa kiliniga

☐ <30 daqiiqo ☐ 30 daqiiqo ila1saac ☐ Kabadan1saac

18. Gaadiidkee racdaa marki aad kiliniga tageeysa?

Lug ☐ Baskiil ☐ Gaadiidka bulshada ☐ Gaadiid qaas ☐

19. Isku celcelin waqti intee ayeey kuguqadataa argtida dhaqtarka markaad isbatalka tagto?

☐ <30 daqiiqo ☐ 30 daqiiqo ila 1saac ☐ 1-2saac ☐ Kabadan 2saac.

20. Heer itee la'eg ayaad ku qanacsantahay dhaqanka shaqaalaha caafimadka?

☐ Waan ku qanacsanahay ☐ Kuma qanacsani ☐ aad ayan ogu qanacsanahay

21. Siguud, yaad rabilaheed inuu kaa umuliyaa?

☐ Umulisa dhaqtar ah ☐ Umulisa dhaqameed

22. Maku kalsoontahay inuu kaa umuliyo nin umuliso ah?

☐ Haa ☐ Maya

23. Hadii maya tahay, maxaa waya sababta……………………………………….

QEEBTA 5: ARIMAHA DHAQANKA BULSHADA:

24. Majiraan cunooyin uu dhaqankaaga kaa hor'istaagi markaad uur leedahay?

☐ Haa ☐ Maya

25. Hadii eey haa tahay S24 ee kor kuqoran, sheeg cunooyinka?...............................

26. Dhaqankaa muxuu ka qabaa qaliinka dhalmada

☐ Haa ☐ Maya

27. Dhaqanka ma tageera guurka gabdhaha aan qangarin? Haa ☐ Maya ☐

28. Bulshada maku dhaqan taa gudniinka fircowniga? Haa ☐ Maya ☐

29. Adiga malagu guday? ☐ Haa Maya ☐

30. Hadii eey jawabtu tahay S29, Bulshada maxay kaqabtaa guud niinka fircowniga?.........

Appendix V: Research Approval- Kenyatta University

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

P.O. Box 43844, 00100
NAIROBI, KENYA
Tel. 020-8704150

Internal Memo

FROM: Dean, Graduate School

DATE: 12th May, 2017

TO: Abdi Maalim Issakow
C/o Population and Reproductive Health
Department.

REF: Q139/CE/25326/2014

SUBJECT: APPROVAL OF RESEARCH PROPOSAL

We acknowledge receipt of your revised Research Proposal as per our recommendations raised by the Graduate School Board of 29th **March, 2016** entitled **"Complications of Pregnancy among Women: A Case of Mandera County, Kenya".**

You may now proceed with your Data collection, subject to clearance with the Director, Ethics Office, Kenyatta University and Director General, National Commission for Science, Technology and Innovation.

As you embark on your data collection, please note that you will be required to submit to Graduate School completed Supervision Tracking Forms per semester. The form has been developed to replace the Progress Report Forms. The Supervision Tracking Forms are available at the University's Website under Graduate School webpage downloads.

Thank you,

GIDEON KAIMENYI
FOR: DEAN, GRADUATE SCHOOL

CC. Chairman, Population and Reproductive Health Department

Supervisors:

1. Prof. Margaret Keraka
   C/o Population and Reproductive Health Department
   Kenyatta University

2. Dr. Peterson Warutere
   C/o Environmental and Occupational Health Department
   Kenyatta University

GK/rwm

Appendix VI: Ethical Research Authorization

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Fax: 8711242/8711575
Email: kuerc.chairman@ku.ac.ke
kuerc.secretary@ku.ac.ke
Website: www.ku.ac.ke

P. O. Box 43844,
Nairobi, 00100
Tel: 8710901/12

Our Ref: **KU/ERC/ APPROVAL/VOL.1** (137)

Date: 14th June, 2018

ABDI MAALIM ISSAKOW
P.O Box 43844-00100
NAIROBI

Dear Abdi,

APPLICATION NUMBER: PKU/712/I 873 "COMPLICATIONS OF PREGNANCY AMONG WOMEN:A CASE OF MANDERA COUNTY, KENYA"

1. **IDENTIFICATION OF PROTOCOL**

The application before the committee is with a research to **"Complications Of Pregnancy Among Women:A Case Of Mandera County, Kenya"** received on 16th April, 2018 and discussed on 12th June, 2018.

2. APPLICANT

Abdi Maalim Issakow

3. **SITE**

Mandera county

4. **DECISION**

The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines and **APPROVED that the research may proceed for a period of ONE year from 12th June , 2018.**

5. ADVICE/CONDITIONS

xxi. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.

xxii. Serious and unexpected adverse events related to the conduct of the study are reported to this committee immediately they occur.

xxiii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.

xxiv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.

If you accept the decision reached and advice and conditions given please sign in the space provided below and return to KU-ERC a copy of the letter.

KENYATTA UNIVERSITY
P.O. BOX 43844 - 00100 NAIROBI
APPROVED
14 JUN 2018
OFFICE OF THE CHAIRMAN

DR. TITUS KAHIGA
CHAIRMAN ETHICS REVIEW COMMITTEE

I ..ABDI MAALIM ISSAKOW.. accept the advice given and will fulfill the conditions therein.

Signature.................................. Dated this day of..22/6/2018........ 2018.-

cc.

DVC-Research Innovation and Outreach

Appendix VII: Research Permit NACOSTI

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

Telephone:+254-20-2213471,
2241349,3310571,2219420
Fax:+254-20-318245,318249
Email: dg@nacosti.go.ke
Website : www.nacosti.go.ke
When replying please quote

NACOSTI, Upper Kabete
Off Waiyaki Way
P.O. Box 30623-00100
NAIROBI-KENYA

Ref: No. **NACOSTI/P/18/88007/23973**

Date: **1st August, 2018**

Dr. Abdi Maalim Issakow
Kenyatta University
P.O Box 43844-00100
NAIROBI

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on ***"Complication of pregnancy among women, a case of Mandera County Kenya"*** I am pleased to inform you that you have been authorized to undertake research in **Mandera County** for the period ending **30th July, 2019.**

You are advised to report to **the County Commissioner and the County Director of Education, Mandera County** before embarking on the research project.

Kindly note that, as an applicant who has been licensed under the Science, Technology and Innovation Act, 2013 to conduct research in Kenya, you shall deposit **a copy** of the final research report to the Commission within **one year** of completion. The soft copy of the same should be submitted through the Online Research Information System.

BONIFACE WANYAMA
FOR: DIRECTOR-GENERAL/CEO

Copy to:

The County Commissioner
Mandera County.

The County Director of Education
Mandera County.

THIS IS TO CERTIFY THAT:
DR. ABDI MAALIM ISSAKOW
of KENYATTA UNIVERSITY, 581-70300
MANDERA, has been permitted to
conduct research in *Mandera* County

on the topic: *COMPLICATION OF PREGNANCY AMONG WOMEN, A CASE OF MANDERA COUNTY KENYA.*

for the period ending:
30th July, 2019

Permit No : NACOSTI/P/18/88007/23973
Date Of Issue : 1st August, 2018
Fee Recieved :Ksh 1000

Applicant's Signature

Director General
National Commission for Science, Technology & Innovation

CONDITIONS

1. The License is valid for the proposed research, research site specified period.
2. Both the Licence and any rights thereunder are non-transferable.
3. Upon request of the Commission, the Licensee shall submit a progress report.
4. The Licensee shall report to the County Director of Education and County Governor in the area of research before commencement of the research.
5. Excavation, filming and collection of specimens are subject to further permissions from relevant Government agencies.
6. This Licence does not give authority to transfer research materials.
7. The Licensee shall submit two (2) hard copies and upload a soft copy of their final report.
8. The Commission reserves the right to modify the conditions of this Licence including its cancellation without prior notice.

REPUBLIC OF KENYA

National Commission for Science, Technology and Innovation

RESEARCH CLEARANCE PERMIT

Serial No.A 19835

CONDITIONS: see back page