ROLE OF SOCIAL NETWORK STRUCTURES ON BIRTH ATTENDANT DECISIONS AMONG WOMEN IN NAKURU COUNTY, KENYA

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A RESEARCH THESIS SUBMITTED IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTER OF PUBLIC HEALTH (MONITORING AND EVALUATION) IN THE SCHOOL OF HEALTH SCIENCES OF KENYATTA UNIVERSITY

OCTOBER 2023

DECLARATION

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

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DEDICATION

To my parents for their unwavering support throughout the entire process. Your words of support were and will always be much appreciated.

ACKNOWLEDGEMENTS

I am grateful to the Almighty God for His ongoing protection and care. Special thanks go to my supervisors, Dr. Mary Gitahi and Dr. George Evans Owino, who guided me from the beginning to the completion of this study. I also thank the Department of Community Health, Kenyatta University, for giving me the opportunity to pursue my academic journey in the University. To Nakuru County Education and Health Department Offices, thank you for giving me permission to conduct this study in Nakuru County. I would like to thank the Medical Superintendents of Bahati Sub-County Hospital, Bondeni Sub-County Hospital, and Elburgon Sub-County Hospital for allowing me to perform this study at their institutions. My deepest gratitude also extends to Betty, Faith, and Janet, the research assistants who assisted me with data collection - thank you for your hard work and time. Finally, I would wish to express my gratitude to my parents for their financial, moral, and spiritual support since the beginning of this academic journey. Thank you all again for your assistance and unending support. God bless you abundantly!

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ABBREVIATIONS AND ACRONYMS

ANC: Antenatal Care

CAI: Computer Assisted Interviewing

CARMMA: Campaign for Accelerated Reduction of Maternal Mortality in Africa

CHWs Community Health Workers

CIDP: Integrated Development Plan

FBOs: Faith Based Organizations

HIV: Human Immunodeficiency Virus

KDHS: Kenya Demographic Health Survey

KEPH: Kenya Essential Package for Health

KHSSPI: Kenya Health Sector Strategic and Investment Plan

KNBS: Kenya National Bureau of Statistics

MMR: Maternal Mortality Ratio

MoH: Ministry of Health

MSM: Men who have Sex with Men

NEM: Network-Episode Model

NGOs: Non-Governmental Organizations

SBAs: Skilled Birth Attendants

SRH&R: Sexual and Reproductive Health and Rights

SDGs: Sustainable Development Goals

UI: Uncertainty Interval

UNFPA: United Nations Population Fund

WHO: World Health Organization

OPERATIONAL DEFINITION OF TERMS

Birth attendant decision: This refers to whether the respondent used a skilled birth attendant in a health institution or had a home birth with an unskilled birth attendant.

Maternal mortality: A woman's death while pregnant or within 42 days after giving birth as a result of complications during the various phases of pregnancy and delivery, but not accidental or incidental.

Social capital: The set of resources to which a person has access in a social network. People, for example, can have access to values through their social network.

Social network: **S**tructure of people who are interconnected by a sequence of relationships.

Social network structure: This refers to the respondent's social network size, network composition (homogeneity) and network content.

Name generator: This question was asked to respondents asking them to list out names of people they engage regularly.

Name interpreters: Questions asked to respondents on the contacts listed to obtain additional details about their characteristics.

Social network size: Count of people the respondent interacts with on a regular basis about their most recent pregnancy.

Social network homogeneity: Kinship on non-kinship status of the people mentioned in the respondent's social network in the name generator question.

This indicator variable was coded as 1 and 0 for kin and non-kin respectively. The summary measure of network composition was derived by dividing the total valid responses in a respondent's network over the count of valid responses.

Social network content: Participants were asked about the sort of advice, suggestions, or opinions received from persons in their network regarding the choice of a birth attendant. Birth attendant decisions are: 0 – giving birth at home under the assistance of an unskilled attendant and 1– skilled birth attendant. To generate the summary measure of SBA endorsement, the total valid responses in a respondent's network were divided by the count of valid responses.

ABSTRACT

Three-fourths of maternal deaths occur from direct obstetric complications. These life-threatening pregnancy-related outcomes are avoidable through ensuring that mothers have access to adequate and proper maternal health services and prompt management of any complications during pregnancy or childbirth process. Most empirical studies that seek to assess maternal healthcare choices in the country focus on individual-level and environmental-level factors as the key barriers to healthcare service utilization. These studies make significant contributions concerning unravelling relevant variables linked to high maternal deaths. However, due to methodological and conceptual limitations, these research studies do not demonstrate the range of social influence mechanisms via which individual networks may influence behaviors and knowledge with a focus on maternal health. This study aimed at demonstrating the relationship between social network structures and birth attendant decisions among women in Nakuru County, Kenya. The study applied a mixed-method approach that employs a convergent parallel design. Interviewer-administered questionnaires and semi-structured interviews were used to collect quantitative and qualitative data among women of childbearing age and community health workers (CHWs), comprising a sample of 370 women and 18 CHWs, respectively. Chi-square tests for independence were used to assess whether the dependent variable and categorical independent variables are independent at $p< 0.05$ significance levels. Binomial logistic regression technique was employed to identify variables that are likely to be essential predictors for the dependent variable. Qualitative data from in-depth interviews with key informants was analyzed through content analysis using NVivo 10. Fifty percent of the mothers were married, 35% had a high school education or higher, 16% were employed, 64% lived in rural areas, 96% were Christians, and 65% delivered under skilled attendance. About 55% were embedded in homogeneous networks, 76% had high Skilled Birth Attendants (SBA) endorsement networks, and the average number of social networks was 2.4 (SD=1.1, median = 2). There was no significant relationship between social network size and birth attendant decision ($\chi2(2)$, p=.072). There was, however, a significant relationship between social network content and birth attendant decision ($\chi2(1)=55.604$, $p< 0.001$). Social network homogeneity was also strongly related to birth attendant choice ($\chi2(1)=21.152$, $p<0.001$). From the logistic regression model, women embedded in social networks with high SBA endorsement had 5.28 higher odds of giving birth in a health facility than their counterparts embedded in low SBA endorsement. When compared to their heterogeneous network counterparts, those embedded in a homogeneous network had a 70% reduction in odds of facility delivery. According to the study findings, social networks can either facilitate or constrain facility utilization during birth, and thus health education and mother mobilization interventions promoting facility birth should leverage on the role of social networks.

CHAPTER ONE: INTRODUCTION

1.1 Background to the study

Reducing maternal and newborn mortality and morbidity is still a key public health priority in many countries in sub-Saharan Africa (SSA) (AbouZahr, 2003). Despite the efforts and successes in addressing issues surrounding maternal mortality, it remains a universally recognized challenge of public health. SDG 3.1 aspires to ensure that no country has an MMR that is more than twice the global mean, and to reduce MMR globally to under 70/100,000 live births by 2030. (WHO, 2016).

According to WHO (2019), 295 000 women died from maternal causes in 2017; this is a significant statistic as it loosely translates to 808 deaths of women worldwide each day from preventable pregnancy and delivery complications. In addition, for each maternal death, nearly 20 additional women suffer significant infections, injuries, or disabilities (WHO, 2019). In 2017, about 86% of the hundreds of thousands of women who died during pregnancy or delivery were from Sub-Saharan Africa (SSA) and Southern Asia (WHO, 2019). SSA had the greatest maternal mortality rate, with 542/100,000 live births, or 196,000 maternal deaths each year. This accounts for sixty-eight percent of all maternal deaths worldwide. Though evidence shows most of these maternal mortality causes are preventable and treatable with timely and consistent attendance of ANCs and delivery under skilled birth, in SSA, still more than half of all births take place outside of healthcare facilities (Doctor et al, 2018).

According to the 2014 KDHS (KNBS & ICF International, 2015), while 96% of expectant mothers had at least one ANC contact, 39% of mothers were not assisted by qualified health practitioner (a doctor, a nurse, or a midwife). Delivery in health facilities was reported to be 52.5 per cent among births to mothers aged 35-49 years, and it decreased with an increase in birth order compared to

approximately 62 per cent among those below 34 years. In urban areas, 82% of children were likely to be delivered under professional care compared to 50% of children from a rural setup.

Individual healthcare-seeking patterns in a community are influenced by intricate interrelationships between socio-economic and physical, as well as human traits and behaviors (WHO, 2014). KNBS & ICF International, (2015) cited the following as reasons why women are not delivering in a health facility; 37% not getting money to seek treatment, 23% cited health facility distance. Eleven per cent of women mentioned not wanting to go alone as a problem, and 6% reported that getting permission to go for treatment was a problem.

Various studies have examined the determinants of birth attendant decisions. However, those studies focus on cultural and general structural hindrances. This study employed the social networks approach which has been examined under numerous economic outcomes and choices. British anthropologists established the social networks concept in the mid-1950s after finding it increasingly harder to comprehend the behavior of groups or individuals through villages, tribes, and kin groups (Berkman, 2015).

A social network is a structure comprising individuals linked through a sequence of relations (Knoke & Yang, 2008). The importance of social networks and health has been demonstrated to related via direct effect and stress buffering mechanisms. Direct effect mechanisms (social control, peer pressure, social influence) in social networks impact people's health through their connection with others as these connections expose people to various effect at either dyadic (interpersonal relationships) or networks that act beyond interpersonal relationships. Networks, on the other hand, provide stress buffering through providing resources, either material or emotional, that are

essential in stressful situations, hence increasing health and wellbeing (Farmer and Sundberg, 2010).

Public health analysts use social networks to understand the underlying linkages between players in a social system and to explain how these social structures constrain network members' behavior. The benefits of social networks for health outcomes have been demonstrated in several studies including health care utilization, health insurance utilization and health behavior patterns (abortion and MSM). Past studies have explored the impact of social network size on various health outcomes. While some research suggests that larger social networks can provide greater emotional support and resources, others have questioned the quality of interactions within larger networks and whether they truly contribute to improved health outcomes. This variable's nuances and potential differential effects on health warrant further investigation.

The content of social networks, including the types of relationships and the nature of interactions, has been recognized as a crucial factor influencing health-related behaviors and outcomes. However, there is a need for deeper exploration into how specific content elements, such as the presence of supportive individuals or exposure to health-promoting information, affect individuals within their social networks. Additionally, Homogeneity within Social Networks, referring to the similarity of characteristics among individuals within a social network, has been shown to influence health behaviors and perceptions. Nevertheless, there remains room for a more comprehensive examination of how homogeneity in terms of demographics, attitudes, or behaviors may impact health outcomes differently across diverse populations. In Kenya, no documented research has been undertaken on the influence of social networks on birth attendant decisions.

Women have more personal social links than men, and they tend to provide greater social support through their ties (Rock, Barrington, Abdoulayi, Tsoka, Mvula & Handa, 2016). Establishing the link between women of birth-giving age social networks characteristics is vital in contributing to the body of knowledge on reducing maternal mortality. This study sought to establish social network structures and their association with birth attendant decisions among women in Nakuru county, Kenya to bridge this lacuna in the literature.

1.2 Problem statement

Kenya's MMR remains high at 342/100,000 live births, with a 1 in 76 lifetime risk of maternal death (WHO, 2019). According to the Nakuru County's Health Department, the County has MMR rate and skilled delivery rates of 191/100,000 livebirths and 66.7% , respectively (UNICEF-Kenya Nakuru County Budget Brief, 2020). While this is an improvement from the previously reported MMR rate of 374/100,000 live births as well as a skilled delivery rate of 63% (KNBS, 2014), the skilled delivery rate is way below the County's target of 80% by 2022 as indicated in the Nakuru CIDP 2018-2022.

Nakuru County Government has made substantial investment in maternal health and child health in the recent past by prioritizing the quality of health infrastructure and human resources. The County government has also implemented cross-cutting initiatives such as improving county health governance structures across all sub-counties. Despite increasing maternity service availability, only 82% of women in Nakuru County have at least one ANC contact, and below 50% have at least four of the WHO-recommended eight ANC contacts (UNICEF-Kenya Nakuru County Budget Brief, 2020). Despite the County's government attempts to enhance access to these services, only 66.7% of women deliver in the presence of SBAs, indicating a large discrepancy in maternity services utilization.

Empirical evidence underscores the crucial role of social network characteristics in shaping health outcomes across diverse populations. In a study by Smith et al. (2020), the authors found that individuals with larger and more diversified social networks tend to have better overall health, as these networks provide emotional support, encourage healthy behaviors, and facilitate access to healthcare resources. Moreover, the composition of one's social network matters significantly. For instance, having ties to individuals with similar health goals and behaviors can promote the adoption of healthy practices, while strong social ties have been linked to lower mortality rates (Holt-Lunstad et al., 2017).

Social networks are not limited to close friends and family; they extend to online communities and virtual connections, which can influence health behaviors, such as information-sharing and emotional support (Liu et al., 2021). These findings underscore the multifaceted influence of social networks on health outcomes, suggesting that interventions targeting these networks can yield substantial benefits.

Furthermore, social network characteristics can be particularly influential in low and middle-income countries (LMICs), where health infrastructure may be limited. A study by Gupta et al. (2021) conducted in an LMIC context demonstrated that individuals with stronger social ties had higher levels of health-related knowledge, which translated into improved healthcare-seeking behaviors and ultimately better health outcomes. In these settings, social networks can also play a vital role in disseminating health-related information, debunking myths, and reducing stigmas associated with certain illnesses (Valente, 2012).

Additionally, the density of social ties within a community can influence the diffusion of health innovations and interventions, making social network analysis a valuable tool for designing

effective public health campaigns in LMICs (Hansen et al., 2020). These findings highlight the critical importance of considering social network characteristics when addressing health disparities and improving health outcomes in resource-constrained environments.

While empirical evidence illustrates the influence of social networks on most individual and economic outcomes (Webster, Antonucci, Ajrouch & Abdulrahim, 2015), information on its effect on birth attendant decisions is scant as this area is still relatively unexploited. This study advances research on the role of social networks in understanding birth attendant decisions.

1.3 Justification of the study

Kenya ranks among the countries with the highest maternal deaths burden worldwide – with maternal deaths accounting for fourteen per cent of deaths of women of ages 15-49 (KNBS, 2014). The Kenya government has made some significant effort geared towards the reduction of maternal deaths such as the 2013 declaration on free maternal services in all public institutions across the country. Despite all national efforts to enhance use of SBAs, maternal and neonatal morbidity and death indices have showed little to no improvement. This makes it critical to investigate measures that would strengthen the utilization of health-care systems through interventions designed to improving utilization of maternal health services.

In spite of the recognition on essentiality of utilization of SBAs when making birth attendant decisions, little is known about the roles of interpersonal interactions on birth attendant decisions. Other studies have shown that interpersonal interactions can either facilitate or inhibit healthcare utilization, including maternal services (Clair, Smeriglio, Alexander, & Celentano, 1989). The significant role of social networks cannot be ruled out as indicated in other studies (Ramaswamy et al., 2013; Masoud, 2017).

This study seeks to close this lacuna in knowledge by investigating the intricate interplay of social connections and their impact on maternal healthcare choices. By doing so, it aims to provide invaluable insights for healthcare practitioners and planners, informing the design of tailored interventions that encourage expectant women to opt for skilled birth attendants during this critical phase of their lives when birth attendant decisions are made. The study's focus is on Nakuru County, where effective healthcare planning and the formulation of maternal health policies are of utmost importance in addressing the pressing maternal health challenges facing the region.

1.4 Research Questions

1. What is the relationship between network size and birth attendant decisions among women of reproductive age in Nakuru County?
2. What is the relationship between social network content and birth attendant decisions among women of reproductive age in Nakuru County?
3. What is the relationship between social network homogeneity and birth attendant decisions among women of reproductive age in Nakuru County?

1.5 Hypotheses

1.5.1 Null hypotheses

1. Social network size is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County.
2. Social network content is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County.
3. Homogeneity of a social network is not significantly associated to birth attendant decisions among women of reproductive age in Nakuru County.

1.6 Objectives

1.6.1 Main Objective

This study sought to examine the influence of social network structures on birth attendant decisions among women in Nakuru County, Kenya.

1.6.2 Specific objectives

1. To investigate the relationship between network size and birth attendant decisions among women of reproductive age in Nakuru County.
2. To examine the relationship between social network content and birth attendant decisions among women of reproductive age in Nakuru County.
3. To investigate the relationship between social network homogeneity and birth attendant decisions among women of reproductive age in Nakuru County.

1.7 Significance of the study

Exploring the association between social network structures and birth attendant decisions has both conceptual and practical implications. The study seeks to fill the lacuna in understanding the role of social network structures on birth attendant decisions, and through developing this local knowledge, call for looking beyond the individual, socio-economic and cultural factors when assessing birth attendant decisions.

Findings from the study will be instrumental in the Nakuru County Government plans of promoting advocacy through community units to create the awareness of the benefits of free maternity program in a bid to ensure all mothers are attended by SBAs. The study seeks to inform social work practitioners and policymakers and perhaps influence their decisions around tailoring interventions that seek to improve utilization of SBAs. The findings of the study will serve as an

essential guideline that helps in the formulation of policies which will motivate the use of SBAs in modern health facilities in maternal health care.

1.8 Limitation and Delimitation

1.8.1 Limitation

This study involved asking respondents retrospectively of their network members. First, like other social network studies, this approach presents some source of potential recall bias and inaccurate data errors due to memory lapses and failure from women to report all the contacts in their networks. Second, the information from the respondents was self-reported hence susceptible to misreporting and desirability bias from the respondents. Third, the study was based on cross-sectional data, which makes establishing causality difficult.

1.8.2 Delimitation

The study was conducted in three level four hospitals that offer maternal health services in Nakuru County. The sample size was calculated using the total catchment population of mothers attending the three health facilities. The target population of this study comprised of women between the ages of 15 and 49 who have had live births within the last one year. Community Health Workers also formed part of the study population.

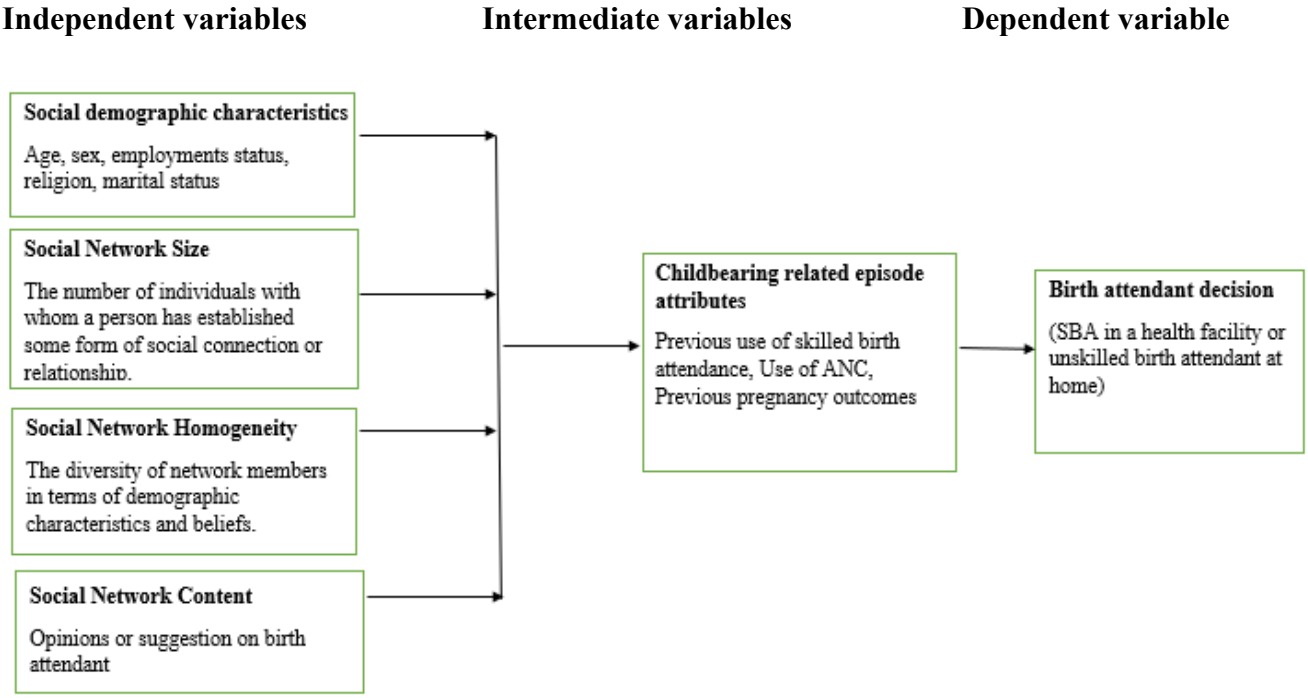
To reduce the possibility of recall bias, research participants recruited into the study were women of birth-giving age who have newborns less than twelve months at the time of data collection. To help improve the accuracy of the respondents' data, they were reminded on a regular basis of the importance of the information collected in influencing the decisions of social work practitioners and policymakers in tailoring interventions aimed at increasing utilization of skilled birth attendants. Finally, logistical regression models were used to estimate the relationships between

the dependent and independent variables to address the temporal limitations of the cross-sectional data used in this study.

1.9 A conceptual framework based on the Network Episode Model

The study proposed the revised Network-Episode Model (NEM) as the foundational conceptual framework due to its focus on dynamic processes and the significance of social influence on individuals. In investigating the relationship between network size and birth attendant decisions, the NEM underscores how the size of social networks can shape access to information and support, potentially molding decisions. Similarly, examining the connection between social network content and birth attendant decisions aligns with the NEM's emphasis on the pivotal role of network content in influencing individual choices. The NEM acknowledges that information and advice shared within networks can profoundly impact decision-making. Lastly, exploring the relationship between social network homogeneity and birth attendant decisions is in line with the NEM's concept of network structure, including homogeneity, exerting a normative influence on behavior.

Figure 1.1 - Conceptual Framework



Adapted from the Network-Episode Model of Utilization and Compliance by Pescosolido (1991)

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

This review of the study's literature was conducted using qualitative and quantitative electronic peer-reviewed journals, along with other relevant publications from the library and online through hand search focusing on Kenya. Section one paints a picture of the maternal morbidity and mortality from a Global and Kenya perspective. The section goes ahead to reflect on some of the initiatives that have been put in place by the Kenyan government towards reduction of MMR through increasing health facility delivery.

Section two goes through a review of existing literature on the determining factors of birth attendant decisions. This section focuses on social network concepts and health service utilization.

The last section provides a summary of the literature review and pinpoints the research gap.

2.2 Global Picture of Maternal Morbidity and Mortality

According to UN inter-agency estimates, the global MMR is currently at 211, a 38% decrease from the previously stated figure of 342 fatalities per 100,000 live births. This translates to a 2.9% annual reduction rate. Though this appears a substantive reduction, it is far below the 6.4% yearly rate required to meet the SDG maternal death goal of 70/100,000 live births. Eighty-six per cent of the maternal deaths worldwide occur in SSA and South Asia. SSA accounts for 68% of maternal deaths worldwide, with Asia accounting for 19 per cent of the global total.

2.3 Efforts Made at Reducing Maternal Mortality in Kenya

The Kenya government has made some significant effort geared towards the reduction of maternal deaths. Kenya has adopted the African Union's CARMMA, which was launched in 2010.

CARMMA's main goal is to promote universal SRH&R access, as outlined in the Maputo Action Plan.

The right to the best possible standard of health is enshrined in Kenya's 2010 constitution. The constitution also devolves health-care functions to counties while also providing direction for policies such as the Kenya Health Policy that guides health care services and initiatives in Kenya. KHSSPI 2013 – 2017 provides an overall plan for the health sector (MOH KHSSPI 2013-2017 (n.d.). In 2013, the Kenyan government declared maternal services to be completely free in all public facilities in the country with its implementation immediate after its pronouncement (Tama, et al., 2018). Kenya's former First Lady, Margaret Gakuo Kenyatta, provided outpouring support in the fight against preventable maternal deaths through the 'Beyond Zero' initiative that was launched in 2014.

The initiative has drawn the attention of numerous organizations that have joined the former first Lady and the Kenya government through forging strategic linkages with the initiative with the broad objective of reducing the burden of preventable maternal deaths by 2023. The Kenyan government has also received significant assistance from UNICEF Kenya under the 2018 – 2022 UNICEF Kenya Country Programme, which is dedicated to assisting the Kenyan government in providing equal access to quality health care. Other external organizations have developed programmes such as the DFID-funded Reducing Maternal and Neonatal Death in Kenya programme.

Kenya is one of the pioneer countries in the Global Financing Facility (GFF) for Every Woman Every, which aims to expedite efforts to eradicate avoidable deaths among mothers during birth, newborn, children, and adolescent by 2030. The private sector has also supported the Kenya

Government in reducing the burden of maternal deaths through the Private Sector Health Alliance that was founded by leading corporates in Kenya. The initiative seeks to build on the already existing initiatives in Kenya to tackle the challenge of high maternal (Collective Business Action to Reduce Maternal Mortality in Kenya, 2015).

2.4 Social network Concepts

Moreno's (1937) development of sociograms, which visually portrayed individuals and their relationships as nodes and ties respectively, was a fundamental methodological advance that sparked current networks theory. This breakthrough innovation served as the foundation for numerous social network theorists from various disciplines interested in understanding how vast social networks affect health outcomes, welfare provision, and social stratification (Menzel & Katz 1955, Bott 1957, Suttles 1960).

Network theorists assert that the structure of social institutions impacts the resources accessible to an individual, consequently influencing an individual's behavioral and emotional responses (Berkman & Kawachi, 2015). In his book, Celentano (2010) postulates that social networks are key influencers of individual behaviors through the provision of direct information on opportunities, resources and products. Secondly, social networks also provide individuals or groups with social capital (Celentano, 2010). Social capital is the set of resources to which a person has access in a social network (Lin, 2001). These resources are related to people's interrelationships, network strength, and how network actors obtain information. For instance, access and social capital mobilization for people in a polarized social structure affects the social actors.

Celentano (2010) also claims that people tend to adopt new behaviors once someone they know has done so because they get to see how it is done and also these networks provide people with much-needed support to continue to adapt to a new behavior even when it becomes difficult to do so. This indicates that understanding social networks provides a fertile ground to understand human behavior.

2.5 Social Network Structures and healthcare services utilization

Human beings are interconnected and as a result their health is interconnected (Smith & Christakis, 2008). In the past few decades, there has been a rising focus on the impact of social network structure on health service consumption as a result of recognition of this social fact. According to Deri, (2005) networks affect utilization decision in numerous ways including provision of information on institutional details hence reducing search costs of locating health providers. Devillanova, (2008) found that networks immensely fostered health care utilization among immigrants in Italy with strong network ties reducing time taken to visit health facilities by 30%. Aderito (2006) found out that social networks among the refugees and immigrants' communities and their host were essential in accessing paid employment in Mozambique. Ramaswamy et al., (2013) documented that individual who had strong social ties and where the social ties knew their HIV status, these individuals had higher odds of seeking primary care services.

Masoud (2017) reported that network magnitude had significant predictive capacity in regard to health service and those larger social networks are associated with higher frequencies of health service utilization among Latino immigrants. Similarly, Stafford et al. (2018) found that individuals with poor social connectedness were more likely than their counterparts with good social connectedness to not engage in the entire range of preventive health services.

2.5.1 Social networks and maternal healthcare service utilization

While social networks have been studied in the framework of various economic outcomes, the literature on social network's role in maternal health service utilization is scant. In Kenya, most research studies that have been conducted have vastly focused on reproductive health. For example, Behrman, Kohler, & Watkins, (2001) assessed the relationship of social network structures and social network densities on the uptake of family planning in Kenya. The study findings indicated that social network density and content were fundamental in understanding the contraceptives usage among women in rural Kenya. The study found out that women who had higher network density of social network members and who actively used contraceptives had a higher likelihood to adopt the methods used by their kinship (Behrman et al., 2001).

In a study on how social networks promote clandestine abortions in Western Kenya, Osur, Orago, Mwanzo & Bukusi (2015) found out that social networks were highly influential among women before aborting clandestinely and unsafely where they reported that 95% of the women surveyed consulted their networks. Ono, Matsuyama, Karama, & Honda (2013) found that women received some forms of instrumental support were unlikely to give birth under SBAs compared to their counterparts without instrumental support.

2.6 Social network characteristics

Available literature on social networks has largely focused on structural properties of social networks in relation to various health related outcomes. Even though there are other numerous aspects of social networks beyond network structures, the three widely discussed properties of social networks are network size, content and composition of social networks. By focusing on these three aspects within the context of Nakuru County, the research study aims to build upon this existing foundation and provide a nuanced understanding of how social networks impact birth

attendant decisions among women of reproductive age. Nakuru County serves as a unique setting for this investigation, as its sociocultural and demographic characteristics may yield insights that are both context-specific and broadly applicable, contributing to the evolving discourse on social networks and health behaviors.

2.6.1 Social network size

This is one of the most examined aspects of social networks across the public health domain. Pinquart & Duberstein (2010) found that larger social networks and dyads were substantially linked to decreased relative risk for cancer mortality in a systematic assessment of 87 publications investigating the association of social networks with cancer mortality. Kroenke et al. (2013) reported that larger social network was a strong predictor for a higher quality of life. In Mali, Adams, Madhavan, & Simon, (2002) explored the impact of social networks among women on child survival and found the size of the network significantly increases the likelihood of child survival.

According to Asrese (2014), the probabilities of facility delivery increased by 1.29 for every single increase in contacts in interpersonal relationship. Women with a limited social network (2-6 persons) had a 20% likelihood of a health facility birth, compared to a 63% likelihood for women with larger social networks (Asrese, 2014). Specific to Kenya, in their study Behrman et al., (2001) reported that respondents who had a higher network density of social network members using contraceptives had a higher likelihood to adopt the contraceptive methods used by their network members. These findings are consistent with findings from Montogomery & Caterline (1998) who found that the magnitude of influence for use of contraceptives from social networks depends on a woman's social network size.

2.6.2 Social network content

Information diffusion is a recognized and largely discussed strategy for promoting health habits – this is regardless of whether the information is passively passed or actively sought (Hornik, Parvanta, Mello, Freres, Kelly, & Schwartz, 2013). People are constantly exposed to a range of information sources, according to Hornik et al. (2013), which may influence their subsequent choices. Mediated and informal exposure from non-medical sources including relatives, friends, social media and other internet sources may affect decisions (Mills & Davidson, 2013).

Whenever people seek health related information, they are often doing so to inform a decision (Johnson, 1997) – therefore, the quality of the information sought can help them make better decisions, confirm their beliefs, and resolve uncertainties. Individuals sample information from their social network contacts to infer what the general public believes (Zhang & Centola, 2019). Zhang & Centola (2019) further argue that the that the accuracy of people's health-related views in a social network is closely tied to the network information process. This argument by Zhang & Centola is identical to the arguments by Kohler et al., (2001) who reported that social learning among women in a social network through conversations and interactions reduces uncertainty resulting in women adopting a behavior.

According to Berkman et al., (2000) shared behavioral norms might be powerful sources for the behavior of network members. For instance, women network members may suggest home delivery through emphasis of traditional values around this or on the other hand advocate for using SBAs during birth process whilst stressing possible risks of home delivery. Using longitudinal data from Malawi, Helleringer & Kohler (2005) found that interpersonal relationships are vital sources of disease information, as well as providing support to respondents in assessing their infection risks.

Devillanova (2008) found reliance on social network ties reduced time to visit health care by thirty per cent – confirming the quantitative value of networks as an information device. Adams, Nababan, & Hanifi, (2015) suggest that one of the major advantages of social networks as an information source is their empathy and commitment over long term delivery of information and providing supportive linkages. These findings are consistent with those of Edmunds (2010), who found that content from interpersonal interactions was more significantly correlated with place of birth than individual traits of a woman such as parity, wealth, and education in a retrospective study of women in Matlab, Bangladesh.

2.6.3 Social network homogeneity

Social networks provide a plethora of causal pathways through which individual wellbeing can be influenced (Berkman et al., 2000) making homogeneity of social networks an important correlate of health and well-being. In a study on the relation of network characteristics and common cold virus, Cohen et al., (1997) found that people with heterogenous networks were less susceptible to infectious illnesses, which was attributed to the diversity in terms of information exposure that results from an increase in network diversity. Similar findings were observed in a study by Barefoot, Grønbæk, Jensen, Schnohr & Prescott (2005), who found wider array of social network contacts to have a protective role for health with specific focus on ischemic heart disease.

Godley (2001) found that the more external kinship links a household has, the more probable it is for women to use modern day temporary contraception. Claire et al., (1989) found that mothers embedded in heterogeneous networks, were more inclined to give birth under a SBAs than their homogeneous network counterparts. The findings correspond to those of Musalia's (2005) study, which found that interacting with network members, as well as being encouraged to take contraception, had a positive effect on contraception use. Colleran & Mace (2015) found that the

contraceptive behavior of network ties has a greater influence on women's contraceptive use than their personal characteristics.

2.7 Summary of Literature Review

Health facility utilization for delivery among women in developing countries where morbidity and mortality rates are unacceptably high is very important. From the literature, social networks may influence health choices people make through numerous mechanisms such as social influence and control, provision of social support, feeling of belonging and shared identity, establishment of health beliefs and normative behaviors and access to resources. Social networks have also been illustrated to transmit attitude, information and behaviors that may influence health outcomes and decisions including those on birth attendant.

Research on social networks and health facility utilization is extensive and it provides clear evidence on social networks' role on health and wellbeing. However, the body of literature covered in this chapter has some significant gaps. First, studies conducted in this area focus on health facility utilization during births which is a single aspect of birth attendant decision. There has been no research into the influence of social networks on women's decisions to give birth at home rather than in a health facility. Secondly, studies in this area also focus on either quantitative or qualitative descriptions of factors influencing facility utilization for delivery. This study seeks to address these gaps through providing an opportunity to advance research on social networks structures role in understanding birth attendant decisions through a convergent parallel design to explore the linkages between social networks and birth attendant decisions.

CHAPTER THREE: MATERIALS AND METHODS

This chapter focuses on the following topics: the study design, the outcomes of interest, the study area, the study population, the sampling technique and procedures, the survey procedures and data analysis.

3.1 Research Design

The study utilized a convergent parallel design, a mixed-methods design. This method entails gathering complementary quantitative and qualitative data simultaneously on the same phenomenon (Creswell & Pablo-Clark, 2011). They also suggest that the mixed methods design is necessary for the ability to formulate a larger degree of understanding than if a single approach were used for specific studies. For this study, the research design was selected also for its ability to develop a complete understanding of the research problem particularly in this case where there are gaps in the literature (Creswell & Plano-Clark, 2011).

Integration of these data types occurred at various stages, including data interpretation, convergence, and validation, yielding a holistic and nuanced exploration of the research phenomenon. This mixed methods approach facilitated triangulation, enhancing the validity of our findings, and allowed for a robust exploration of the intricate interplay between social networks and maternal healthcare decisions, ultimately contributing to a more comprehensive understanding of this critical public health issue.

3.2 Variables:

3.2.1 Independent Variable

Socio-demographic characteristics (educational status, employment status, age, religion, marital status, and place of residence) were among these variables, as were social network variables (size, homogeneity and content of social interactions). Each independent variable was measured as follows:

Network size: The name generator question requested study participants to list people with whom they had discussed birth attendant options in their most recent birth. The network size was determined by aggregating the network members stated by the respondent.

Network content: A summary measure for social network content to determine the extent to which women received SBA endorsement from links in their social networks was computed through asking the respondents about the nature of advice, suggestion or opinions of people in their network about the birth attendant decision. This was a binomial variable where birth attendant decision was 0 for advice to giving birth at home under the assistance of an unskilled attendant and 1 for skilled birth attendant. The summary measure of SBA endorsement was derived by dividing the total valid responses in a respondent's network over the count of valid responses. SBA endorsement values that were above the median value were recoded as high SBA endorsement while those below the median value were categorized as low SBA endorsement.

Network homogeneity: Social network homogeneity measure was first constructed through asking respondents on whether the person mentioned as a link in their networks was kin or non-kin. The response was coded as 1 for kinship networks which comprised of relatives and biological relationships and 0 for non-kinship associations which are networks established from colleagues, members of same church, friends, neighbors and any other non-biological relationships. The summary measure of social network homogeneity was derived by dividing the total valid responses in a respondent's network over the count of valid responses. Social network homogeneity above the median value was recoded as homogenous network while those below the median value were categorized as less homogenous.

3.2.2 Intermediate variables

These variables include childbearing related episode attributes (previous use of skilled birth attendants, use of ante-natal care and previous pregnancy outcomes.

3.2.3 Dependent variable

The study's outcome variable is birth attendant decision. This refers to either the use of SBAs at a health facility or the use of unskilled birth attendant at home.

3.3 Study location

The study was conducted in Nakuru County, Kenya, which has 11 Sub-counties (Constituencies), 55 Wards, and 110 villages. (Nakuru CIDP, 2018). Nakuru County has an area of 7,462.4 sq km and a population density of 290 people per km^2, with an average household size of 3.5 (Nakuru CIDP, 2018). It has a population of 2,162,202 people, with a male population of 1,077,272 (49.82%), a female population of 1,084,835 (49.8%), and an intersex population of 95 (0.004%). The age distribution for years 0-14, 15-64, and 65+ is 41.8 percent, 55.1 percent, and 3.0 percent, respectively, according to the 2019 census. According to the Ministry of Health facility list, Nakuru has 508 health facilities that are managed and owned by different bodies including the MoH, private practitioners, NGOs and FBOs as tabulated in Appendix 3: Table 2.

3.4 Study Population

The study's target population comprised women of ages 15-49 in Nakuru County, Kenya who bore children within twelve months prior to the survey. In Nakuru county, women of reproductive age account for 51.14% of the county's population and this is projected to increase to 59% by 2022 (Nakuru County Integrated Development Plan, 2018). Community Health Workers formed part of the study population as the key informants. Information from the CHWs has been used to qualify the details from the mothers surveyed. The study population was stratified by place of delivery.

3.5 Sampling Techniques

This study focused on Kenya Essential Package for Health (KEPH) level four and five facilities, owned and managed by the Ministry of Health. This is because these facilities are large and serve a heterogenous population. Nakuru County has fifteen level four health facilities and one level five health facility that are owned by the Ministry of Health as listed in appendix 5 Three facilities (see Appendix 5: Sample Frame) were randomly selected from the sample frame through simple random sampling technique algorithm using STATA 15.1 (StataCorp, 2015). Mothers attending the post-natal clinic at the randomly selected health facilities were screened for eligibility and randomly selected to participate in the study. Community Health Workers were purposively selected with the help of local community members in the study's area.

3.6 Sample Size Determination

The needed sample size was established using Fisher et al., 1998 formula

$$n = \frac{z^2 pq}{d^2}$$

Where:

n = size of sample desired, where target population > 10,000

z = standard deviant at 95% Cl

p = the frequency in characteristics being measured. P is assumed at 0.667, Nakuru county's skilled delivery rate

q = 1-p

d = Set statistical significance level, z at 1.96

Hence n = $\frac{(1.96)^2 . (0.667) . (0.333)}{(0.05)^2}$ = 342 respondents

Additional respondents were surveyed to cover for non-responses, 8% of the targeted sample. The total sample size was 370 respondents. According to Guest, Bunce, & Johnson (2006), saturation

during qualitative interviews often occurs at around 12 participants in homogeneous groups. For this study, eighteen interviews with Community Health Workers were conducted.

3.7 Construction of Research Instruments

This study employed both quantitative and qualitative approaches, structured questionnaires, and key informant interviews respectively. The research instruments were created based on literature review, and study objectives.

3.8 Pre-Test

The survey tools were pre-tested on a comparable sample drawn from a non-study facility in Nakuru County within a similar demographic context. This pretest phase involved 22 interviews. The pretest was used to assess the consistency and clarity of the survey questions, following which the survey instruments were revised and finalized.

3.9 Validity

To ensure content validity, an exhaustive literature review was conducted to extract related items. Many of the questions are adapted from peer reviewed sources and internationally recognized institutions. Content validity was enhanced through providing response options for most of the questions. Internal validity of the questionnaires was checked through a pilot test, while external validity was achieved through ensuring adequate effort is made to select and survey a representative sample.

3.10 Reliability

For this research, the researcher used the Test-retest method on a representative sample where the measuring tool (questionnaire) was administered to the same subjects on two separate occasions – the initial test was done during pre-test with a follow up round conducted one week apart for each subject. The correlation between the two separate measurements was estimated under the premise

that the underlying conditions did not change between test 1 and test 2. A test-retest correlation of +.80 or above was regarded satisfactory reliability. Areas of the questionnaire that were deemed to be inadequate were adjusted accordingly.

3.11 Data Collection Technique

The eligible mothers in the study's sample population were interviewed using a structured interviewer-administered questionnaire. Once consent had been obtained from the respondents, the survey was administered at the respondent's convenience either at the facility or the respondents home depending on time and site agreed between the respondents and the research assistants. Qualitative data was collected through KII with CHEWs through semi structured interview guides. The researcher recruited three data collectors, who were trained for two days across all domains and were prepared with all possible questions prior to interviews.

3.11.1 Structured Questionnaires

For quantitative data, 370 interviews were administered to eligible women of birth giving age in the sample using a computer-assisted interview method whereby all the data was entered in a pre-programmed software using a tablet. Data was then aggregated across all the sampled subjects in one data file. To analyze the data, appropriate statistical software (STATA & excel) and analytical methods were used.

3.11.2 Semi Structured Interviews

Eighteen semi-structured interviews were administered to the key informants, Community Health Workers, using guides that used open-ended questions which were developed according to standard protocols. Probing and the general, flexible trajectory of the semi-structured interviews allowed for emergent insights that were not possible through close-ended questionnaires.

3.12 Data analysis

The quantitative data was processed and analyzed using STATA 17.1 program (StataCorp, 2017). Descriptive statistical analysis was employed to describe the study sample's background characteristics, with frequencies and percentages generated and presented on graphs and tables. Chi-square tests were conducted to assess whether the dependent variable and categorical independent variables were significant at $p< 0.05$ significance levels. Binomial logistic regression technique was employed to find variables that were likely to be essential predictors for the dependent variable. Qualitative data was analyzed by thematic analysis using NVivo 10 (QSR International, Melbourne, Australia). The researcher searched for recurrence, the usage of meaning intensifiers, and the number of participants expressing similar views. Descriptive data obtained from the qualitative analysis provided further interpretation of the quantitative data.

3.13 Inclusion and Exclusion Criteria

3.13.1 Inclusion Criteria

The study sample comprised of postnatal women who bore children within twelve months prior to the survey. Only the respondents who consented to the study and were attending the randomly selected Health Facilities were interviewed.

3.13.2 Exclusion Criteria

Respondents who were unwell, mentally incapacitated, or had sick children were excluded from participating in this study because they were likely to encounter challenges with concentration and giving the required information. Similarly, respondents who refused to consent to the research study were excluded.

3.14 Ethical Consideration

3.14.1 Approval and informed consent

Kenyatta University Graduate school provided clearance for the study, and Kenyatta University Ethics Review Committee (KUERC) granted ethical approval for the research study. The researcher successfully made an application for a study research permit from National Commission for Science, Technology and Innovation (NACOSTI) to carry out the study in Nakuru County.

Informed consent/assent: This was obtained from the research participants prior to administering the surveys. The researcher assumed the study posed minimal risk to the participants since the survey included questions that did not pose any undue psychological or physical risk to subjects. No adverse events were reported.

Before administering the survey instruments to women who met the eligibility criteria, the interviewers obtained consent using an adult informed consent form. Parents/guardians of women under the age of 18 who were asked to provide consent, and in addition these women were also asked to provide assent using the informed assent for children before the interviews were administered.

3.14.2 Risks to the subject

Intended participants of this study included women of ages 15-49 in Nakuru County, Kenya who bore children within twelve months prior to the survey. There were no anticipated or known potential risks for the participants in this study, besides potential breach of confidentiality. Participants were informed during the consent process that they were allowed to refuse to participate or refuse to answer any question they did not want to answer, and no harm would come to them regardless of their participation decisions. The researcher has extensive training on

research ethics and confidentiality from Collaborative Institutional Training Initiative (CITI) and adhered to a strict confidentiality policy.

3.14.3 Benefits to the subjects

There were no direct benefits to subjects participating in this study. The results from the study are expected to be useful to the Kenyan government, policymakers and researchers when designing solutions geared towards improving maternal health in the study region. Because the risks to subjects were expected to be very minimal, they were reasonable in relation to the anticipated benefits of improved understanding of social networks' role in understanding birth attendant decisions.

3.14.4 Confidentiality

To ensure care and protection of research participants, all data collected were kept as confidential as possible. Individuals will not be named in any report or publication. Everyone who participated in the survey was given a unique identifying number. All files (including those containing personally identifying information) were encrypted.

3.15 COVID-19 mitigation and preparedness

In light of the COVID-19 pandemic, the researcher ensured full adherence to the COVID-19 safety protocol according to the Ministry of Health guidelines to ensure safety of the participants. The safety measures included ensuring all the individual surveys were conducted outdoors as much as reasonably possible or done in well-ventilated areas while maintaining social distance. Prior to any interaction with the respondent, the researcher and the respondents sanitized their hands at the start and at the end of the interaction. The researcher sanitized shared pens (for consent signing) prior to and at the end of every interaction.

CHAPTER FOUR: RESULTS

4.0 Introduction

This chapter presents the study's quantitative and qualitative results. The quantitative data analysis involved the use of statistical approaches with numeric data to produce descriptive statistics and measures of association between the variables. The qualitative data analysis provides an understanding of the roles of social networks on birth attendant decision through exploring the thoughts of the Community Health Extension Workers (CHEWs). To ensure a coherent flow of the qualitative content, participant quotes and observation field notes were incorporated into the findings.

4.1 Socio Demographic Characteristics

4.1.1 Demographic data from questionnaires

Table 4.1 indicates the demographic summary from the questionnaires. The study included 370 women of childbearing age with children under the age of one year. The mothers interviewed ranged in age from 15 to 47, with an average age of 27.8 years (SD 6.4). Thirty-eight percent (n=142) of the mothers were between the ages of 15 and 24, while 43% (n=159), 18% (n=67), and 1% (n=2) were between the ages of 25 and 34, 35-44, and over 45, respectively. Fifty percent (n=185) of the mothers were married, 49% (n=181) were single, 3% (n=3) were separated and 1% (n=1) were widowed. Only 35% of the mothers interviewed had a high school education or higher and only 16% were employed.

Two hundred and thirty-five (n=235) of the mothers reported living in rural areas, while the remaining 46% (n=135) reported living in urban areas. Four percent (n=14) of the mothers were Muslims, 81% (n=283) were protestants, and 15% (n=54) were Catholics, with 19 mothers

refusing to answer the question. Respondents were asked about the location of their most recent delivery and 65% (n=240) of the mothers reported having delivered under skilled attendance. Forty-two percent of the mothers were first time mums with 46% (n=170) and 12% (n=46) reporting to have 2-3 and more than 3 previous births respectively.

Table 4.1: Descriptive Summary of Data From Structured Questionnaires

Respondent Age:	**Home Birth**	**Facility Birth**	**Total**	**X^2**
15-24 years (n=142)	44 (31%)	98 (69%)	142 (38%)	$X^2(3)=$ 9.084, $p=.028$
25-34 years (n=159)	51 (32.1%)	108 (67.9%)	159 (43%)	
35-44 years (n=67)	34 (50.7%)	33 (49.3%)	67 (18%)	
Over 45 years (n=2)	1 (50%)	1 (50%)	2 (1%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	
Respondents' marital status:				
Single (n=181)	124 (68.5%)	57 (31.5%)	181 (49%)	$X^2(3)=$ 173.184 $p<.001$
Married /Living together (n=188)	6 (3.2%)	179 (96.8%)	185 (50%)	
Separated/Widowed (n=4)	0 (0%)	4 (100%)	4 (1%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	
Respondents' religion:				$X^2(2)=$ 1.939, $p=0.379$
Muslim (n=14)	7 (50%)	7 (50%)	14 (4%)	
protestant (n=283)	98 (34.6%)	185 (65.4%)	283 (81%)	
Catholic (n=54)	22 (40.7%)	32 (59.3%)	54 (15%)	
Total (n=351)	127 (36.2%)	224 (63.8%)	351 (100%)	
Level of education:				$X^2(1)=$ 101.344 , $p<.001$
Primary education (n=242)	129 (53.3%)	113 (46.7%)	242 (65%)	
High school and above (n=128)	1 (0.8%)	127 (99.2%)	128 (35%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	
Employment status:				$X^2(1)=$ 29.264, $p<.001$
Currently unemployed (n=309)	127 (41.1%)	182 (58.9%)	309 (84%)	
Currently employed (n=61)	3 (4.9%)	58 (95.1%)	61 (16%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	
Usual residence:				$X^2(1)=$ 105.629, $p<.001$
Rural (n=235)	128 (54.5%)	107 (45.5%)	235 (64%)	
Urban (n=135)	2 (1.5%)	133 (98.5%)	135 (36%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	
Parity:				
First Birth (n=154)	64 (41.6%)	90 (58.4%)	154 (42%)	$X^2(2)=$ 5.288, $p=0.071$
2 - 3 previous births (n=170)	54 (31.8%)	116 (68.2%)	170 (46%)	
more than 4 births (n=46)	12 (26.1%)	34 (73.9%)	46 (12%)	
Total (n=370)	130 (35.1%)	240 (64.9%)	370 (100%)	

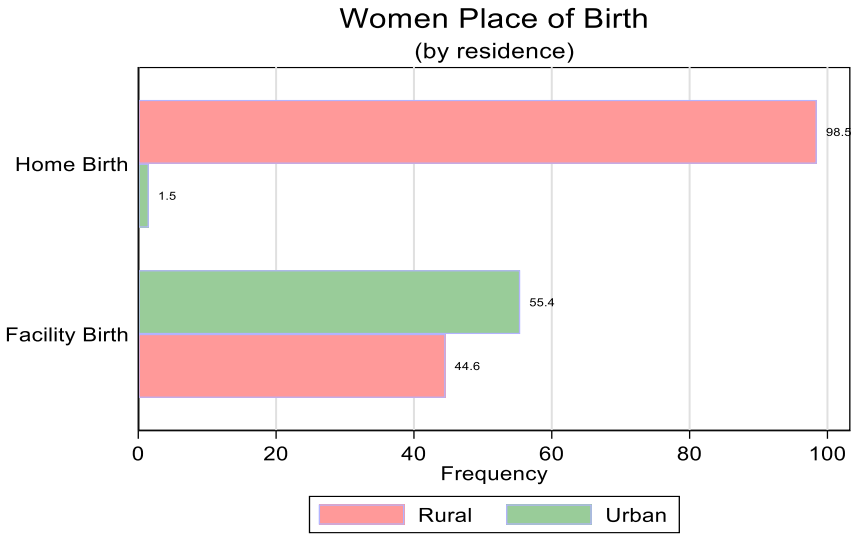
4.1.2 Demographic data from interviews

A total of 18 Community Health Workers (CHEWs) were interviewed through semi-structured individual interviews with open questions. The CHEWs who participated in these interviews included 15 women and 3 men. They were all government employed and their key mandate in the community was to provide health services at the community and household levels through making referrals and acting as links to the health facilities. The 18 CHEWs all reported to have completed at least high school education. Their work experience ranged between 3-6 years.

4.2 Women's Delivery Place by Residency

Of the 370 women who were interviewed, 35% (n=130) and 65% (n=240) had home births and facility births respectively as illustrated in figure 4.1. For those who had a home birth, 98.5% (n=240) were from the rural areas while only 1.5% (n=2). Similarly, urban areas accounted for 55.4% (n=133) of all the facility births.

Figure 4.1: Women Place of Birth by Place of Residence



4.3 Social Network Size and Birth Attendant Decisions

Respondents were asked to identify and list people they interact with on a regular basis particularly those whom they were in constant communication with in their most recent birth experience. The number of social networks reported ranged between 1 and 5, with a mean of 2.4, standard deviation of 1.1 and a median of 2. The results show that those who had home births had a slightly higher mean number of social networks *(M= 2.03, SD=1.09)* than those who had facility births *(M= 1.74, SD=1.0)*.

The continuous variable of network counts was summarized to a categorical variables with three categories; 1 - 2 network members, 3 - 4 network members and 5 or more network members. Table 4.2 indicates that seventy seven percent (n=282) of the respondents had between one and two network members, 21% (n=76) had 3-4 network members while only 2% (n=7) reported to having had more than 5 members in their networks.

Table 4.2: Respondent Distribution By Network Characteristics

Social Network Size:	**Home Birth**	**Facility Birth**	**Total**	**$\chi 2$**
1 - 2 network members (N=282)	92 (70.8%)	190 (80.9%)	282 (77.3%)	$\chi 2(2)=5.27$, $p=.072$
3 - 4 network members (N=76)	34 (26.2%)	42 (17.9%)	76 (20.8%)	
5 or more network members (N=7)	4 (3.1%)	3 (1.3%)	7 (1.9%)	
Total (N=365)	130 (100%)	235 (100%)	365 (100%)	
Social Network Homogeneity:				
less homogenous network (N=168)	38 (29.2%)	130 (55.3%)	168 (46.0%)	$\chi 2(1)=22.93$, $p<.001$
homogenous network (N=197)	92 (70.8%)	105 (44.7%)	197 (54.0%)	
Total (N=365)	130 (100%)	235 (100%)	365 (100%)	
Social Network Content:				
Low SBA endorsement (N=90)	61 (46.9%)	29 (12.3%)	90 (24.7%)	$\chi 2(1)=53.88$, $p<.001$
High SBA endorsement (N=275)	69 (53.1%)	206 (87.7%)	275 (75.3%)	
Total (N=365)	130 (100%)	235 (100%)	365 (100%)	

The study hypothesized that social network size is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County. To test this hypothesis, women were asked a name generator question where they were asked to identify and list people kin or non-kin who they interacted with on a regular basis particularly with reference to their most recent birth experience. A cross tabulation of social network size and the dependent variable, birth attendant decision, showed there was no significant relationship between the size of the social network and birth attendant decision ($\chi 2(2) = 5.2725$, $p=.072$).

Table 4.3: Cross Tabulation - Social Network Size and Birth Attendant Decision

Social Network Size	Home Birth	Facility Birth	%
1 - 2 network members	92	190	77.3
3 - 4 network members	34	42	20.8
5 or more network members	4	3	1.9
Total (N=365)	130	235	

According to the cross-tabulation results, table 4.3, 97% (n=358) of respondents had four or fewer members in their social networks. Only 19% (n=45) of those who had a facility birth had three or more network members, compared to 29% (n=38) of those who had home births. The results indicate that those who had home births had more members embedded in their social networks than those who had facility births. However, this is most likely due to chance, as additional statistical tests indicate no significant relationship between social network size and birth attendant decisions. As a result, we cannot reject the null hypothesis.

4.4 Social Network Content and Birth Attendant Decisions

The study hypothesized that social network content is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County. The results from the cross tabulation of social network content and birth attendant decision indicated that 68% (n=61) of those who had a home birth had a low SBA endorsement from their networks compared to 32%

(n=29) among their counterparts who had a facility birth. In contrast, Table 4.4 indicates that 75% (n=206) of mothers who delivered under skilled care had high SBA endorsement compared to 25% (n=69) who delivered at home.

Table 4.4: Cross tabulation: social network content and birth attendant decision

Social Network Content	Home Birth	Facility Birth	Total
Low SBA Endorsement	61 (68%)	29 (32%)	90
High SBA Endorsement	69 (25%)	206 (75%)	275
Total (N=365)	130	235	365

A test for association between the two variables, social network content and birth attendant decision, indicated there was a significant relationship between the two variables ($\chi 2(1)=53.88$, $p<.001$). The bivariate analysis results show that SBA endorsement significantly predicted birth attendant decision, with those who received high SBA endorsement from their social networks more likely to give birth in a health facility than those who received low SBA endorsement. The findings therefore demonstrate that birth attendant decisions can be explained by social networks content due to the significant association between social network content and birth attendant decision. We therefore reject the null hypothesis which indicated that social network is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County.

Similar results were found in the qualitative part of the study where the participants mentioned that social network do play a significant role when it comes to the choice of birth attendants among women of birth giving age. Majority of the CHEWs reported that social networks were a great source of advice to women such as recommendations on which facilities to go to, nutritious meals to consume as well as on preparation for the delivery. In the text below, CHEWs described the level of advice women receive from their social networks.

Participant A noted that, "Mothers also receive distorted negative information about things like forced cesarean section in some facilities. Such information creates fear among the mothers leading to some of them preferring to deliver from home as they are uncomfortable of having someone perform c-section interventions, which they are told are very painful and even take very long to heal."

Participant B stated that, "People share ideas with the mothers including why it would be safe to go to a facility instead of delivering at home. In return, this helps the mothers make an informed choice on the preferred type of birth attendant."

Participant C stated that, "Mothers share notes and ideas particularly with those who had recent births who may not be necessarily their kins or better than them financially. The key determinant on who the mother goes to for advice is dependent on how strong their network ties are."

Participant D alluded that, "Maternity should only be secluded for trained practitioners because this information spreads and will eventually scare other mothers away because mother do share and seek information before making decision about their birth attendant."

From the participants interviews it was evident that though there are other forms of support such as financial support or assistance with chores that mother receive from their social networks, the social networks largely provide women with advice and birth attendant recommendations based on their personal experiences.

4.5 Social network homogeneity and birth attendant decisions

Homogeneity was assessed through determining kinship composition of the respondents social network. Social networks were considered homogenous if it comprised of kinship members specifically those who had biological relationships. The total number of people identified as kin was divided by the total number of people in the respondent's network to calculate the aggregate measure of social network homogeneity. This yielded a final network homogeneity score ranging from 0 (no kin individuals in the respondent's network) to 1 (respondent had an all-kin network).

Table 4.5: Cross Tabulation - Social Network Homogeneity and Birth Attendant Decisions

Social Network Homogeneity	Home Birth	Facility Birth	%
Less Homogenous Network	38	130	46.0
Homogenous Network	92	105	54.0
Total (N=365)	130	235	

A test for association between the two variables, social network homogeneity and birth attendant decision, indicated there was a significant relationship between the two variables ($\chi 2(1)=22.93$, $p<.001$). From the cross tabulation, Table 4.5, 71% (n=92) of home births were among respondents embedded in homogenous networks, compared to 46% (n=110) of facility births among the respondents embedded in homogenous networks.

The findings show that social network homogeneity can help explain birth attendant decisions, as they demonstrate that respondents who were embedded in more kinship networks were less likely to use health facilities for delivery compared to their counterparts in less homogeneous networks who were more likely to use health facilities. Based on these findings, we therefore reject the null hypothesis which indicated that social network homogeneity is not significantly related to birth attendant decisions among women of reproductive age in Nakuru County.

Interviews with CHEWs also revealed that social network homogeneity influences birth attendant decisions. Below quotes are sentiments from participants in the semi-structured interviews.

> Participant F noted that *"Non-kins are likely to influence mothers' birth attendant decisions. They do this through sharing their past personal experience with specific facilities and the treatment they received from the nurses. The mothers are unlikely to return or go to a facility that has ever been reported to have maternal deaths by anyone in their social networks."*
>
> Another participant K stated that *"Social networks affect negatively because there are cases where the mothers are referred and influenced to go to a traditional birth attendant who are not skilled birth attendants which may result in risky delivery and poor services. This is actually seen among those who live with their mothers in law."*

Participants frequently described how kin and non-kin networks can influence birth attendant decisions, with interaction with mothers-in-law repeatedly mentioned of playing a dominant role.

4.6 Logistic Regression Analysis of Birth Attendant Decision and Individual Characteristics

To better understand the relationship between the dependent and independent variables in the social network, independent variables with p-values less than 0.1 were subjected to a second logistic regression that adjusted for specific individual level factors that were consistently associated with birth attendant decisions in the literature. The logistic regression model results in table 4.6 showed that women immersed in social networks with high SBA endorsement had 5.28 times the odds of giving birth at a health facility than their counterparts embedded in low SBA endorsement.

On the other hand, table 4.6 illustrates that the odds of facility delivery among women who were embedded in homogeneous networks shrunk by a factor of 0.30. This means that a mother who is embedded in a homogenous network experiences a reduction of 70% in the odds of having a facility delivery compared to a mother embedded in heterogeneous networks.

Table 4.6: Summary of Logistic Regression Analysis

Birth Attendant Decision Predictor	Adjusted Odds Ratio	P-Value	Lower Bound	Upper Bound
Respondent Age	0.93	0.05**	0.87	1
Employment Status:				
Currently Unemployed	1	.	1	1
Currently Employed	5.27	0.24	0.33	84.93
Education:				
Primary Education	1	.	1	1
High School and Above	88.67	0.00***	7.23	1086.61
Marital Status:				
Single	1	.	1	1

Married / Living Together	31.48	0.00***	9.57	103.58
Residence:				
Rural	1	.	1	1
Urban	32.8	0.00***	3.4	316.42
Social Network Content:				
Low SBA Endorsement	1	.	1	1
High SBA Endorsement	5.28	0.00***	2.03	13.75
Social Network Homogeneity:				
Less Homogeneous Network	1	.	1	1
Homogeneous Network	0.3	0.01***	0.12	0.71
Observations	361			
Wald Chi2(7)	70.2			
Prob > Chi2	0			
Log Pseudolikelihood	-64.018728			
Pseudo R2	0.7286			

Note: Entries with 1 AOR are the base/reference categories; *** p<.01, ** p<.05, * p<.1

CHAPTER FIVE: DISCUSSION, CONCLUSION & RECOMMENDATION

5.0 Introduction

This section includes a discussion, conclusion, and recommendation on socio-demographic variables and the role of social network structures on birth attendant decisions among Nakuru County reproductive-age women.

5.1 Discussion

This section discusses the key findings of this study and compares them with the current body of literature.

5.1.1 Overview of socio-demographic characteristics

There were some significant differences between women who gave birth at home and those who had a facility delivery. The marital status, level of education, employment status, and place of residence of the two groups of women (home birth vs facility birth) differed significantly. When compared to those who had a home birth, those who delivered under skilled care had higher levels of education (99.2% vs 0.8%), with frequencies of 127 and 1, respectively. Those who had been employed accounted for 95.1% (n=58) of those who had facility births, compared to 4.9% (n=3) among those who had home births.

The demographic descriptive statistics findings are consistent with previous research. In Ghana, for example, Cofie et al (2017) found that women who had homebirth were unemployed or did unpaid work (81% vs. 53%, $p < 0.01$) compared to their counterparts who had a facility birth. Additionally, the study also found that majority of the mothers who had facility births were married (94% vs. 82%, $p < 0.01$), compared to their counterparts who had their births at home. According

to the study, the proportion of women with low education was greater among homebirth mothers than among facility birth mothers (69% vs. 32%, p 0.01).

Previous research on predictors of health facility delivery by Crissman et al., (2011); Edmonds et al., (2012), Moyer & Mustafa, (2013); Asrese & Adamek, (2017) also reported marital status, education level, and economic status as key determinants for facility health in Sub-Saharan African countries.

5.1.2 Influence of Social Network Size Birth Attendant Decisions

The study hypothesized that social network size is not significantly related to birth attendant decisions to determine the role of social networks on birth attendant decisions. The study's findings revealed no significant relationship between social network size and birth attendant decisions.

The findings of this study agree with those of McTavish and Moore (2015), who found no link between social network size and maternal health care utilization in rural Cameroon. The findings also support those of Edmonds, Hruschka, Bernard, and Sibley (2012), who observed that network structural features (network density/size) have no explanatory value in understanding factors that influence health facility utilization during delivery. The findings also extend those of Cofie et al. (2017), who found that network size was not significantly connected with facility birth among women in rural Ghana in a study on structural and functional network characteristics and facility delivery.

However, the findings contradict those reported by Asrese (2014), who found that the probabilities of facility delivery increased by 1.29 for every single increase in contacts in interpersonal relationships, and that women with a small social network (2-6 people) had a 20% chance of having a health facility birth, compared to a 63% chance for women with larger social networks. Similarly,

in a study on family planning adoption in Kenya, Behrman et al. (2001) reported that women with a higher density of social network members who actively used contraception had greater odds to adopt the contraceptive options used by their kinship. Similar findings have been observed in other health-related research. In a study on the role of social networks in clandestine abortions, for example, Osur et al. (2015) found that 95% of the women surveyed consulted their networks, concluding that seeking clandestine abortions was a shared responsibility.

According to the Network Episode Model, social influence among individuals operates by taking the decision out of the individual's hands and placing it on social networks, or by acting as a utility for individual choices. According to this model, social network size should have had a greater explanatory value on the role of social networks. This contradicts the study findings and the plausible explanation for this could be due to the study's retrospective nature, which requires mothers to recall their network members for an event that happened close to a year ago, which could be susceptible to memory lapses.

Additionally, the nature of the interaction was not clearly defined in the name generator question. As a result, it is very likely that mothers interpreted interaction as face-to-face, and the reported network size numbers may have excluded non-face-to-face interactions. Other unobserved effects, such as community variation, could explain the lack of explanatory power from social network sizes as expected in the NEM.

5.1.3 Influence of Social Network Content on Birth Attendant Decisions

The findings of this study indicated a significant association between social network content and birth attendant decision-making, with mothers with high SBA endorsement having 5.28 odds of delivering under skilled care compared to their counterparts with low SBA endorsement. The

findings build on previous research that found social network content to significantly promote health behaviors (Niederdeppe et al. 2007; Edmonds, Hruschka, Bernard, & Sibley, 2012; Hornik, Parvanta, Mello, Freres, Kelly, & Schwartz, 2013; Mills & Davidson, 2013; Zhang & Centola, 2019).

Similarly, informants in the qualitative component of the study stated that information provided in social networks has a significant influence on birth attendant decisions. Based on their personal experiences, network members provide advice and recommendations to pregnant mothers on key aspects ranging from referral to recommendations for birth attendants. According to the majority of informants, social networks also provide more granular information on facility delivery, such as reported cases of maternal deaths and the quality of care provided by facility providers.

The qualitative findings also revealed health providers' proxy role in ensuring birth facility utilization. The findings indicate that information from mothers who give birth in health facilities, particularly information about the characteristics of healthcare providers, influences health facility utilization to some extent. These qualitative findings are consistent with those of a qualitative study on disrespect and abuse during labor and delivery care in Ethiopia conducted by Burrowes, Holcombe, Jara, Carter, and Smith (2017), which found that patient mistreatment during labor and delivery processes was associated with lower demand for the service.

These findings highlight the critical role of social networks in providing information exposure and social learning through interactions and conversation, thereby reducing uncertainty and leading to behavior adoption by women (Kohler et al., 2001), regardless of the birth attendant option supported by the advice.

5.1.4 Social Network Homogeneity on Birth Attendant Decisions

Findings from this study indicate that a mother who is embedded in a homogeneous network has a 70% lower chance of having a facility delivery than a mother who is embedded in heterogeneous networks. The findings build on the findings of a previous study on the role of kinship networks on contraceptive choices among mothers in rural Thailand, in which Godley (2001) found that extended kinship connections influenced contraceptive choice - the more external kinship relations a household had, the more likely women were to use modern contraception options. Similarly, the findings are supported by an empirical study by Claire et al. (1989), which found that women in heterogeneous networks had greater odds for delivery under skilled care compared to their counterparts in homogeneous networks. Other previous studies have found that heterogeneous networks, or those with a diverse set of social networks, to play a protective role in health (Musalia's, 2005; Colleran & Mace, 2015).

From the qualitative interviews, mothers with large kin networks were reported to be less likely to deliver under skilled care. According to the majority of participants, pregnant women who were embedded in homogeneous networks, particularly those living with their in-laws, had very little influence on birth-related decisions. *"In my region, it is quite common for mothers not to go to health facilities because they have to go to the mother-in-law who organizes their circumcision"* - this description by one of the CHEWs highlights the normative influence that women's network members can have on their facility delivery decision.

This finding builds on the findings of a study in Bangladesh, where husbands played a similarly important role in birth facility utilization (Edmonds et al., 2012). According to the study, husbands who believed in the importance of facility birth provided their wives with all necessary financial

and social support to give birth in health facilities, whereas those who believed childbirth should take place at home did not provide their wives with the necessary level of support.

5.2 Conclusion

To fully understand the role of social networks in birth attendant decisions, a convergent parallel mixed method research design was required for this study. In investigating the relationship between network size and birth attendant decisions revealed some noteworthy aspects. Ninety seven percent of the study participants had four or fewer members in their social networks with those who had home births found to have more individuals in their social networks. However, statistical test indicated that social networks size did not have significant explanatory value for birth attendant decisions.

The study illuminated the substantial influence of social network content on birth attendant decisions. Women who were embedded in social networks with high endorsements for skilled birth attendants were more likely to deliver under skilled care. Interviews with the CHEWs also indicated that social networks have a normative influence on birth attendant decisions due to the social capital they provide in the form of information on provider quality of care and the usefulness of health facilities during delivery.

Notably, the study uncovered the significant impact of social network homogeneity on birth attendant decisions. Mothers who were embedded in homogenous networks were less likely to utilize health facilities during birth with further statistical tests reporting that a mother embedded in a homogenous network experiences a reduction of 70% in the odds of having a facility delivery compared to a mother embedded in less homogenous social networks. Similar findings were also reported from the interviews which revealed that pregnant women who were embedded in

homogeneous networks, particularly those living with their in-laws, had very little influence on birth-related decisions.

Overall, the findings of this study open the possibility of better understanding the role of social networks in birth attendant decisions, particularly in countries with similar contexts to Kenya. The findings show that social networks can either facilitate or constrain facility utilization during birth, and thus health education and mother mobilization health interventions promoting facility birth should capitalize on the role of social network members.

5.3 Recommendations

5.3.1 Implications for policy

a) The study's findings have revealed that the size of social networks does not significantly influence birth attendant decisions among women of reproductive age. Consequently, this suggests that policy makers involved in maternal health interventions should redirect their focus. Instead of solely expanding the size of social networks connected to a mother, the emphasis should shift towards enhancing the quality of relationships within these networks. Specifically, efforts should be directed towards educating and involving specific groups, such as family members, who play pivotal roles in influencing decisions related to childbirth.

b) The study's findings demonstrated the critical role of social networks in facilitating or constraining mothers from using skilled birth attendants during delivery. These findings emphasize the essence of leveraging the power of social capital in maternal health interventions to increase birth facility utilization. Social workers and maternal interventions should therefore consider leveraging kinship homogenous social networks'

by influencing the behavior of people who receive information directly; consequently, indirectly benefiting many others in their network.

c) Maternal interventions should also develop strategies and synergies to help enrich women's social capital resources, particularly those embedded in kinship homogeneous networks, which have been shown to influence deliveries outside of health facilities. Social networks have been shown to significantly impact decisions regarding deliveries outside health facilities. Recognizing that social relationships are dynamic and require active maintenance, policies and interventions should focus on sustaining and nurturing homogeneous networks, as they demand less effort to maintain and can be highly effective in influencing birth attendant decisions (Höllinger & Haller, 1990).

5.3.2 Further research

a) Additional research can be conducted to determine which specific players in heterogeneous networks have the greatest influence in facilitating facility utilization during birth.

b) Maternal health care decisions have been shown to be influenced by those close to a woman, particularly mothers-in-law. With this study focusing primarily on the woman's social capital, more research in this area would be beneficial to help understand the role of the social capital of those close to the woman in birth attendant decisions.

c) Prospective study can be done to better understand the influence of social networks in birth attendant decisions.

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APPENDICES

8.1 Appendix 1: Informed Consent Form

Hello! I am **John Mungai**, a Kenyatta University student pursuing a Master of Public Health Student. I am conducting research study entitled "Role of social network structures on birth attendant decisions among women in Nakuru county, Kenya. The goal of this study is to identify incentives to promote mothers in this region to give birth in health facilities with professional help in order to enhance maternal care and minimize maternal mortality during childbirth. The information will be used by social work practitioners and policy makers to influence their decisions around tailoring interventions that seek to improve utilization of skilled birth attendants in modern health facilities in maternal health.

Procedures to be followed

I'll ask you a few questions about yourself and your personal interrelationships in order for you to participate in this study. I will use a questionnaire to keep track of your responses.

Voluntarism

Your participation in this research project is fully voluntary, and you may decline to participate without consequences. You may end the interview at any point or ask questions regarding the study at any time.

Risks and Discomforts

Some of the questions we will ask are about personal matters, which may be unsettling. If this occurs, you have the option of not answering these questions. The interview might take up to 30 minutes of your time.

Benefits

Participating in this study will not provide you with any direct benefits. However, we expect that the results from the study were useful to the Kenyan government, policymakers, researchers, and women in your community since the information you offer will help us produce data aimed at improving maternal health in this region.

Reward

If you agree to be interviewed for this study, you will get no compensation or rewards.

Confidentiality

Your interview responses, as well as any other details you share for the study, will treated as completely private and anonymous. The data will only be accessible to the researcher. Your identify will never be revealed in the research results that are published.

Contact Information

For enquiries concerning the interview, please contact Mr. John Mungai on 0729 206 208 or Dr. George Owino on 0722 614 878, Dr. Mary Gitahi on 0722 934 732. You can also contact the Kenyatta University Ethical Review Committee Secretariat at chairman.kuerc@ku.ac.ke.

Participant's statement

I am aware of the above information regarding my participation in the study. The study was explained to me, and I had the opportunity to ask questions, which were appropriately answered. My participation in this study is entirely voluntary. I accept that my records will be treated confidentially and that I may withdraw from the study at any time. I understand that whether I leave the research or not, I will continue to receive the same care and medical treatment, and that my decision will have no impact on the care I receive today or from any other clinic at any other time.

Name of Participant: _____

_____ _____

Signature or Thumbprint Date

_____ _____

Name of Representative/Witness (where necessary) Relationship to Subject

Investigators statement

I, the undersigned, have described to the participant in a language s/he understands the procedures to be followed in the study, as well as the risks and benefits connected with them.

_____

Name of Interviewer

_____ _____

Signature Date

8.2 Appendix 2: Informed Assent For Children

Project Title: Role of social network structures on birth attendant decisions among women in Nakuru county, Kenya
Protocol Number: PKU/2465/11597
Principal Investigator: John Mungai

Brief introduction on research studies:

We would like to request your participation in this research project. Research is a method of putting fresh ideas to the test. We discover new things thanks to research. It is entirely up to you whether or not to participate in this study. You have the option of saying Yes or No. Whatever you determine is OK. We will continue to look after you.

What is the study about?

I am conducting research study entitled "Role of social network structures on birth attendant decisions among women in Nakuru county, Kenya. The goal of this study is to identify incentives to promote mothers in this region to give birth in health facilities with professional help in order to enhance maternal care and minimize maternal mortality during childbirth.

Why am I being asked to take part in this study?

We are requesting you to participate in our research project because you live in this town and are between the ages of 15 and 17.

What will happen throughout this research?

If you agree to be in this study, I'll ask you a few questions about yourself and your personal interrelationships. I will use a questionnaire to record your responses.

Will the study hurt/risks?

You may be uncomfortable or embarrassed answering some of the questions, but I will make sure that we talk in a quiet place where no one can hear you. I will also not share your answers with anybody in this household or community. I will use your answers to better understand how friends and relatives (social networks) influence birth attendant decisions.

What else should I know about the study?

If we share the data from this study outside, you will not be identified. We will ask for your names and a few other personal information relevant to make interview easier, but we will not keep this information in the data. If you sign this form, it will be kept in a locked room separate from the responses you provide and from the information that we collect.

What are the good things that might happen when I participate in the study?

People may experience good fortune as a result of their participation in a research project. These are referred to as "benefits." There are no direct benefits from participating in this study. However, we anticipate that the study's findings will be beneficial to the Kenyan government, policymakers, researchers, and women in your community since the information you offer will help us produce data aimed at improving maternal health in this region.

What if I don't want to be in this study?

There will be no consequences if you do not participate in the study. You have the option of declining to respond to any questions you do not wish to answer. You can stop taking the questionnaire or withdraw from the research at any time. You can accept to participate now and later change your mind. All you have to do is let us know. The interview might take up to 30 minutes of your time and will take place in a private area. We will only interview you once during this study.

In case of any questions:

For enquiries concerning the interview, please contact Mr. John Mungai on 0729 206 208 or Dr. George Owino on 0722 614 878, Dr. Mary Gitahi on 0722 934 732. You may also contact the Kenyatta University Ethical Review Committee Secretariat at chairman.kuerc@ku.ac.ke.

Is it necessary for me to participate in the study?

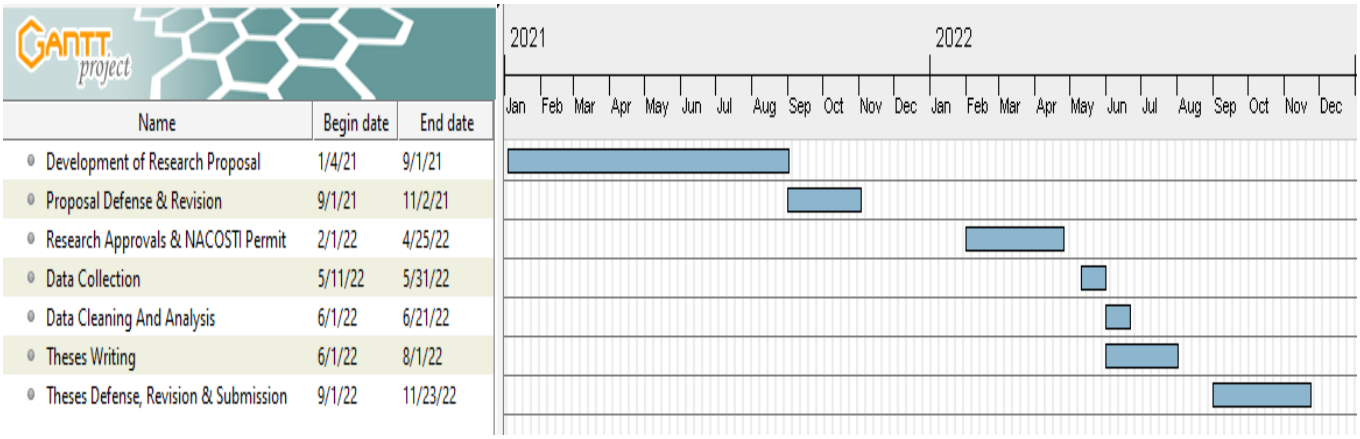
It is not mandatory for you to take part in the study. Even if you say yes now, you can change your mind later. It is all up to you. Nobody will be angry with you if you refuse to do it.

Signatures

Ask any questions you have before deciding whether or not to join in the study. While in the study, you can also ask questions. If you sign your name or put a checkmark below, it means you agree to take part in this research project.

_____	_____
Your Name (Printed)	Age
_____	_____
Your Signature	Date
_____	_____
Signature of Person Obtaining Consent	Date
_____	_____Signature of Witness
Date	

8.3 Appendix 3: Workplan



Name	Begin date	End date
Development of Research Proposal	1/4/21	9/1/21
Proposal Defense & Revision	9/1/21	11/2/21
Research Approvals & NACOSTI Permit	2/1/22	4/25/22
Data Collection	5/11/22	5/31/22
Data Cleaning And Analysis	6/1/22	6/21/22
Theses Writing	6/1/22	8/1/22
Theses Defense, Revision & Submission	9/1/22	11/23/22

8.4 Appendix 5: Facility Sample Frame

SUBCOUNTY	WARD	FACILITY_NAME	KEPH LEVEL
RONGAI	SOIN	SOIN SUB COUNTY HOSPITAL	LEVEL 4
MOLO	**ELBURGON**	**ELBURGON SUBDISTRICT HOSPITAL**	**LEVEL 4**
GILGIL	GILGIL	GILGIL SUBCOUNTY HOSPITAL	LEVEL 4
SUBUKIA	KABAZI	KABAZI SUBCOUNTY HOSPITAL	LEVEL 4
NAKURU EAST	FLAMINGO	LANGA SUBCOUNTY HOSPITAL	LEVEL 4
NAKURU EAST	NAKURU EAST	MIRUGI KARIUKI SUBCOUNTY HOSPITAL	LEVEL 4
MOLO	MOLO	MOLO DISTRICT HOSPITAL	LEVEL 4
NAKURU WEST	LONDON	NAKURU PROVINCIAL GENERAL HOSPITAL	LEVEL 5
NJORO	NJORO	NJORO SUBCOUNTY HOSPITAL	LEVEL 4
KURESOI SOUTH	AMALO	OLENGURUONE SUB-DISTRICT HOSPITAL	LEVEL 4
NAKURU NORTH	**BAHATI**	**BAHATI DISTRICT HOSPITAL**	**LEVEL 4**
NAKURU EAST	**BIASHARA**	**BONDENI SUBCOUNTY HOSPITAL**	**LEVEL 4**
NAKURU WEST	LONDON	ANNEX HOSPITAL (NAKURU)	LEVEL 4
KURESOI SOUTH	KERINGET	KERINGET SUB COUNTY HOSPITAL	LEVEL 4
NAIVASHA	VIWANDANI	NAIVASHA DISTRICT HOSPITAL	LEVEL 4
SUBUKIA	SUBUKIA	SUBUKIA SUB COUNTY HOSPITAL	LEVEL 4

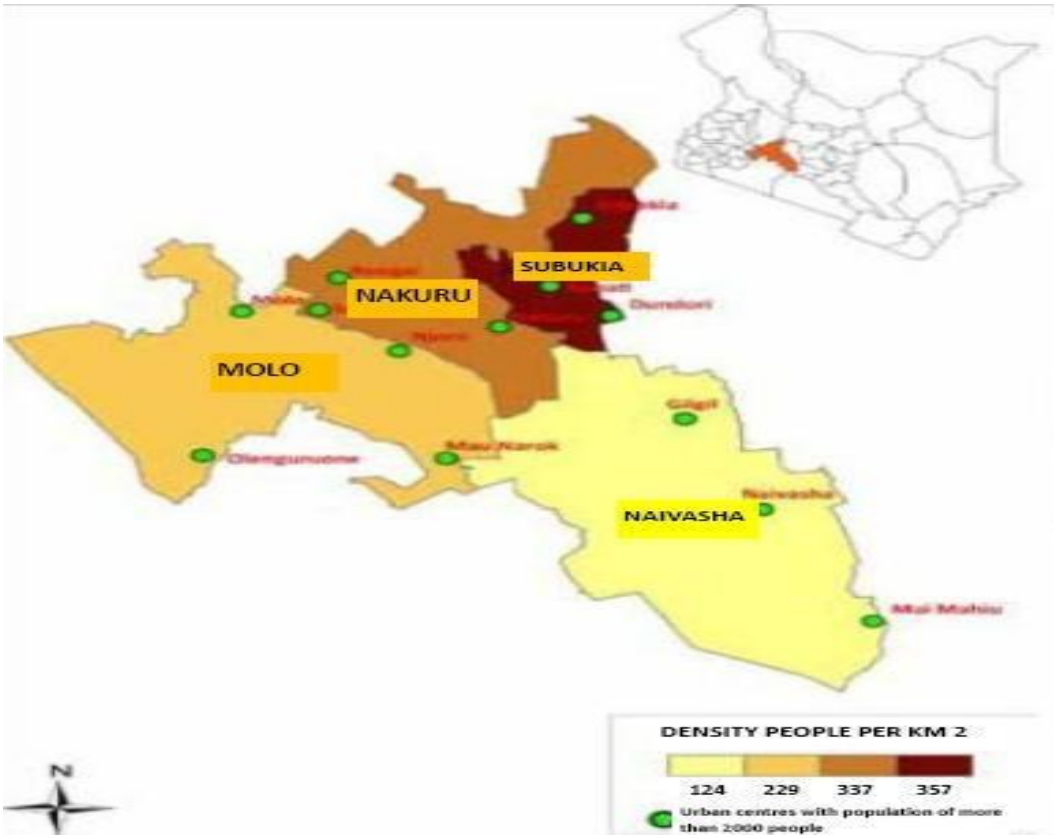
NB: Hospitals in bold were randomly selected for the study

Level 4 and 5 health facility managing body in Nakuru County

Managing body	KEPH level		
	Level 4	Level 5	Total
Armed Forces	1	0	1
Faith Based Associations	1	0	1
Kenya Episcopal Conference Catholic Secretariat	1	0	1
Ministry of Health	15	1	16
Non-Governmental Organizations	1	0	1
Owned/Managed by Clinical Officer	2	0	2
Owned/Managed by General Practitioner	12	0	12
Owned/Managed by Medical Specialist	1	0	1
Owned/Managed by Nurse Midwifery	1	0	1
Owned/Managed by Private Company	2	0	2
Owned/Managed by Private Institution Academic	4	0	4
Public Institution Academic	1	0	1
Total	42	1	43

8.5 Appendix 6: Map of Nakuru County

The Map below illustrates the geographical location of the 11 constituencies in Nakuru County – the image has been retrieved from the County Assembly of Nakuru Official Website



8.6 Appendix 7: Quantitative Questionnaire

Variable name	Question	Choices
enumerator_name	Enumerator's name	
consent_intro	CONSENT: INTRODUCTION AND STUDY PURPOSE:	
Consent	Enumerator: read the consent verbatim Ask the respondent: Do you consent to participate in the study?	0 No 1 Yes
Intronote	A. SOCIO-DEMOGRAPHICS :	
first_name	A.1.1 Respondent's first name	
second_name	A.1.2 Respondent's second/middle name	
last_name	A.1.3 Respondent's family name	
birth_date	A.1.5 What is your date of birth?	
estimated_birthdate	A.1.6 is this an estimated year of birth?	0 No 1 Yes
current_age	A.1.7 What is your current age in completed years?	
marital_status	A.1.8 Respondents marital status	1 Never married 2 Married / Living together 3 Divorced/ Separated 4 Widowed -222 Others, specify
marital_status_oth	A.1.8 Respondents marital status Relevant if marital_status=-222	
religion	A.1.8.9 Respondents religion	1 Catholic 2 Protestant 3 Muslim -222 Others, specify
religion_oth	Other (specify) Relevant if religion=-222	
educ_level	A.1.10 Your level of education? (last completed level)	1. No formal learning 2. Primary education not completed 3. Primary education completed 4. Secondary education not completed

		5. Secondary education completed 6. Post-secondary education -999 Don't Know -777 Refused
emplymnt_status	A.1.11 Current employment status?	1 Currently employed 2 Currently Unemployed 3 Not employed in the 12 months leading to the survey
usual_residence	A.1.12 Usual residence?	1 Rural 2 Urban
permanent_residence	A.1.13 Permanent residence in relation to your relatives?	1 At my birthplace 2 At marital home 3 At own residence
delivery_location	A.1.14 Residence at the time of delivery?	1 At my birthplace 2 At marital home 3 At own residence
given_birth	B1. Have you ever given birth?	0 No 1 Yes
age_lastborn_child	B2. How old is your last child? Relevant if given_birth=1	1 Less than a year old 2 over a year old
eligible_group	eligible_group Relevant if age_lastborn_child =1	
women_attributes	B. WOMEN'S CHILDBEARING-RELATED ATTRIBUTES	
b3_recent_delivery	B3. Where was your most recent delivery?	1 At home 2 At home of a traditional birth attendant 3 Other Place (Not a health facility) 4 Hospital or Maternity Home 5 Health Center 6 Other type of health

		facility
b4_advised_deliverhospital	B4. Were you advised to give birth in a hospital during your recent pregnancy due to any problems or complications with the pregnancy?	0 No 1 Yes
b4_birth_order	What's the birth order of your recent born children?	
b4_used_anc	For children born previously, did you ever attend SNC services? Relevant if b4_birth_order>1	0. No 1. Yes
b4_used_sba	Did you use SBAs services when delivering your other children? Relevant if b4_birth_order>1	0. No 1. Yes
opinion	Now I'd want to hear your thoughts on the following.	
b5_future_delivery	B5. If you become pregnant again, where would you want to deliver from?	1 Home 2 Facility , if complications arise 3 Facility, even if no complications arose 4 I don't want to be pregnant once more.
b6_advise_other_women	B.6 Where do you think other women should give birth whether or not they experience complications during pregnancy or delivery?	1 Home 2 Facility , if complications occur 3 Facility, even if no complications
nonSBAuse	C. NON-SBA USE REASONS Relevant if facility_birth=0	
c1_non_sba_reason	You mentioned that your recent delivery happened at home. Why did you not use a skilled birth attendant (medical practitioner) Note: Multiple responses allowed.	-222 Other specify 1 Labor pains started late at night 2 Labor was easy and rapid 3 There's no hospital nearby 4 Could not find transport means to the Health facility

		5 I did not experience any complication during labor 6 I was advised by my kins/relatives 7 This is not my first birth at home 8 Health facilities lack necessary privacy 9 Poor quality of health facility services
socialnetworks	PART I: MEASURES OF SOCIAL NETWORK CHARACTERISTICS	
socialnetworks_note	We'll ask you a few questions about your present social relationship. We'll start by determining those individuals you interact with on a regular basis. These are people you really care about, particularly those who come quickly into your mind when you think about your latest pregnancy and birth experience. We're not interested in knowing who these people are, so feel free to list them in whatever order you like and even use nick names to keep track of who we've mentioned. HINT: You may input up to five names in this field. Try probing the respondent further if they hesitate or indicate they don't know.	
network_count	D.1 Number of you regularly interact with as described above? These can include relatives and non-relatives who you can talk about personal problems and even ask for support from HINT: Enter: -999 Don’t Know -777 Refused -555 Not applicable	
network_first_name	D.1.1 First name of the network member.	
network_second_name	D.1.1 second name of the network member.	

network_last_name	D.1.1 Third name of the network member.	
network_age	D.1.2.1 Age of {network_name} HINT: Enter: -999 Don't Know -777 Refused -555 Not applicable	
network_age_status	D.1.2.2 a. Is {network_name} older, younger, or around the same age as you? Relevant if network_name=-999	-999 Don't Know -777 Refused -555 Not applicable 1 Older 2 Younger 3 Same age
network_gender	D.1.3 Gender of the {network_name}	1 male 2 female
network_educ	D.1.4 What is {network_name} level of education?	1. No formal learning 2. Primary education not completed 3. Primary education completed 4. Secondary education not completed 5. Secondary education completed 6. Post-secondary education -999 Don't Know -777 Refused
network_kinship	D.1.5 {network_name} Kinship	1 Non-kin 2 Kin
network_known_years	D.1.6 For how many YEARS have you known {network_name} HINT: Enter: -999 Don't Know -777 Refused -555 Not applicable	
network_known_months	D.1.6 For how many MONTHS have you known {network_name} HINT: Enter: -999 Don't Know -777 Refused -555 Not applicable	

network_proximity	D.1.8 How far from you does {network_name} live?	1 Same household 2 Same neighborhood 3 Same town 4 Different town 5 Different county 6 Different country
network_same_rosca	D.1.10 Are you and {network_name} members of the same savings/ credit cooperative (SACCO), ROSCA/ merry-go-round, or mutual benefit society (illness, health)?	0 No 1 Yes
network_same_church	D.1.11 Are you and {network_name} members of the same church?	0 No 1 Yes
network_econ_status	D.1.12 Is {network_name} economically better off, worse off or the same as you?	-999 Don't Know -777 Refused -555 Not applicable 1 worse 2 same 3 better
network_advise_deliver	D.1.13 Which place of delivery did {network_name} recommend?	1 Home 2 Facility
thankyou_note	We have reached the end of the survey. Thanks for your time!	

8.7 Appendix 8: Key Informant Interviews

Key Informant Interview Guide: CHWs	
1	Who are your patients?
2	What services do you offer?
3	In your view, who do the majority of the women in this community turn to for help during childbirth? Why?
4	What factors influence the decision to seek delivery assistance? Why?
5	What types of issues do women face during labor and delivery here?
6	When compared to delivery, the most women seem to seek professional help in hospitals during antenatal care. Any thoughts on why this is the case?
7	What factors, in your opinion, may prevent women from receiving skilled delivery care?
8	Do you think a woman's kinship or non-kinship relationship impacts her choice for place of delivery?
9	How does a woman's kinship or non-kinship relationship impact place of delivery?

8.8 **Ethical Approval - KUERC**

KENYATTA UNIVERSITY
CENTRE FOR RESEARCH ETHICS AND SAFETY

Fax: 8711242/8711575
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Nairobi, 00100

P. O. Box 43844,

Website: www.ku.ac.ke
Our Ref: **KU/ERC/APPROVAL/VOL.1**

Tel: 8710901/12

Date: 13th /04/2022

Mungai J. Mwangi
P.O Box 43844, 00100
Nairobi.

Dear Mr. Mwangi,

APPLICATION NUMBER: PKU/2465/11597 - ROLE OF SOCIAL NETWORK STRUCTURES ON BIRTH ATTENDANT DECISIONS AMONG WOMEN IN NAKURU COUNTY, KENYA

This is to inform you that ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** has reviewed and approved your above research proposal. Your application approval number is **PKU/2465/11597**. The approval period is ***13th /03/2022 to 13th /03/2023***

This approval is subject to compliance with the following requirements;

i. Only approved documents including (informed consents, study instruments, MTA) will be used
ii. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***
iii. Death and life threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours of notification
iv. Any changes, anticipated or otherwise that may increase the risks or affected safety or welfare of study participants and others or affect the integrity of the research must be

reported to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE*** within 72 hours

v. Clearance for export of biological specimens must be obtained from relevant institutions.
vi. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal.
vii. Submission of an executive summary report within 90 days upon completion of the study to ***KENYATTA UNIVERSITY ETHICS REVIEW COMMITTEE***

Prior to commencing your study, you will be expected to obtain a research license from National Commission for Science, Technology and Innovation (NACOSTI) https://research-portal.nacosti.go.ke and also obtain other clearances needed.

To serve you better, researchers are kindly requested to access and complete a customer feedback form and sent it back online as you continue with research and upon completion of data collection found on the following website link; ;(https://docs.google.com/forms/d/1ytWefDwvvz5h1oz_VIn0xbxg3uGdlDzMXFWNDsMrRPQ/edit?usp=sharing

Yours sincerely

Prof. Judith Kimiywe

Director: Centre for Research Ethics and Safety

8.9 Research Authorization - NACOSTI

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Ref No: 539638

Date of Issue: 22/April/2022

RESEARCH LICENSE

This is to Certify that Mr.. Mungai John Mwangi of Kenyatta University, has been licensed to conduct research in Nakuru on the topic: ROLE OF SOCIAL NETWORK STRUCTURES ON BIRTH ATTENDANT DECISIONS AMONG WOMEN IN NAKURU COUNTY, KENYA. for the period ending : 22/April/2023.

License No: NACOSTI/P/22/17004

539638

Applicant Identification Number

Director General
NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

8.10 County Department of Health Approval

DEPARTMENT OF HEALTH SERVICES
NAKURU COUNTY

COUNTY DIRECTOR, PUBLIC HEALTH
P.O. BOX 2060 – 20100
NAKURU

REF: NCG/CDPH/RES/VOL.1/2022/506

10th May, 2022

To
Medical Superintendents
- Bahati Sub County Hospital
- Bondeni Sub County Hospital
- Elburgon Sub County Hospital

Received 11 MAY 2022
Received

RE: RESEARCH AUTHORISATION – MUNGAI J. MWANGI

This letter serves as an authorization from the County Department of Health Services Nakuru for the above named to conduct research in your facility. The title of the study is "***Role of Social Network Structures on Birth Attendant decisions among women in Nakuru County, Kenya***".

The purpose of this letter therefore is to request you to allow him to carry the study for academic purpose.

Kindly accord him the necessary support.

COUNTY DIRECTOR
PUBLIC HEALTH & SANITATION
NAKURU COUNTY
P.O. Box 2060-20100,
NAKURU

ELIZABETH KIPTOO
Ag. COUNTY DIRECTOR, PUBLIC HEALTH
NAKURU

C.C:
- Mungai J. Mwangi