THE ROLE OF HEALTH INFORMATION SYSTEM TOWARDS THE ACHIEVEMENT OF UNIVERSAL HEALTH COVERAGE IN MATERNAL CARE: A CASE OF COAST GENERAL TEACHING & REFERRAL HOSPITAL

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DECLARATION

I declare this thesis is My original work and, has not been presented in any other university.

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DEDICATION

I dedicate this work, to my family and, to the Mombasa County Health Department for their support.

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ABSTRACT

The role of Health Information System is fundamental to achieving the goals of Universal Health Coverage. An integrated information system must be in place to generate good quality information to informed-decisions, and monitor progress towards these goals. The purpose of this research was to determine the role of health information systems in obtaining universal health coverage in maternity care in Mombasa. The study objectives include; to determine. The role of quality assurance in free maternal care under UHC, to establish the role of data management in maternal care under UHC, to determine the role of system resources in achieving UHC maternal care, and to evaluate the role of technical competency of healthcare workers in UHC. The study used a cross-sectional descriptive research approach. The study focused on 114 hospital staffs at the Coast general teaching and referral hospital. To create a sample of 89 respondents, the researcher used a stratified-sampling approach. A structured closed-end questionnaire was administered to the respondents using the drop and pick later technique. Data preparation in this study involved, Coding the raw data into a meaningful output using the SPSS-Software. Inferential statistics were utilized to produce the model summary, which comprised frequencies, percentages, mean, and standard deviation, ANOVA and coefficients of determination. The study found and concluded that the four independent variables studied; namely quality assurance, data management, system resources and technical competency; influenced the achievement of universal health coverage in maternal healthcare at CGTRH. Inferential statistics the study found and concludes that system resources (sig0.000) was the most significant factor at 95% level of confidence with a significance values of 0.001 followed by technical competency, data management and quality assurance respectively. Inferential statistics indicated that the four independent variables in the study influence 69.4% of the achievement of universal health coverage in maternal care at the hospital. The study recommended that the hospital should install a system that would act as the database specifically for the mothers during ANC, PNC and CWC. Further recommended that in order to promote productivity, clarity and accuracy of the information produced/processed/submitted the facility should practice the division of labour. Finally, the study recommends that technical competency the hospital management should empower their workers' commitment by being given the autonomy where the employees can make minor decisions without consulting with the management or supervisors.

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LIST OF ABBREVIATIONS AND ACRONYMS

ANC   Antenatal care

ANOVA Analysis of Variance

CGTRH Coast general, teaching & referral hospital

DHIS   District Health Information System

EMR   Electronic medical record

HRIS   Human resource information system

HIS   Hospital Management Information System

HRM   Human resource management

HMIS   Health management information system

ICF   International Coaching Federation

KHPF   Kenya health policy framework

KNBS   Kenya National Bureau of Statistics

MOH   Ministry of Health

MHCP   Maternal Health Care Providers

MDG   Millennium Development Goals

MHC   Maternal health care

NACOSTI National Commission for science technology and innovation

PNC   Postnatal Care

SDG   Sustainable development goals

SERC   Scientific Ethics and Research

SPSS   Statistical Package for Social Sciences

UHC   Universal health coverage

UN   United Nations

WHO   World Health Organization

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

Health Information System (HIS) in an Umbrella framework which illustrates, analyse, and ensures all the health-related issues are kept safely (Haux, 2017). The WHO, 2018 identifies HIS to be among the six key focuses on building a rigid health system all around. Even though the six pillars are fundamental, the HIS is mail and most important since it can coordinate decision making around a health facility. HIS combined with the other five essential blocks or health make a strong foundation for any health system in the globe.

The function of the health information system is critical in achieving the Universal Health Coverage (UHC) aims. It aims at achieving equitable and sustainable health outcomes without financial hardship for citizens. For countries to achieve the UHC goal, they must have a financial health system and need to have an integrated information system that could definitely interact with multiple information systems, and to generate good quality information to informed-decisions and also monitor progress towards these goals (Abdulla, 2019). For nations to determine if their UHC implementation has been effective, they need accurate and timely data (Abdulla, 2019).

A health information system may be used for a variety of reasons, including giving alert and early warning capabilities, as well as aiding patients and health facility management. Other broad aims might include facilitating decision-making, supporting and encouraging operational research, allowing for health situation and trend analysis, directing global health reporting, and reinforcing health problem communication to various health care providers. Health data is meaningless if it is not presented in a way

that satisfies the needs of a wide range of users, including legislators, core planners, managers, health-care professionals, communities, and individuals/clients. As a result, the ability of the health information system to disseminate and communicate information is important (World Health Organization [WHO], 2010).

In a good health information system, all key partners will be brought together to ensure that consumers of health information have access to reliable, authoritative, accessible, understandable, and reliable statistics (WHO, 2010). Kenya has received a lot of help in improving its health information systems during the previous two decades. In order to fulfil the health sector's objective of "delivering equitable and affordable quality health care to all Kenyans," the 1st Medium Term Plan of the Vision-2030 acknowledged the need to improve national health information systems with timely and intelligible health information. In addition, the Kenya Health Sector Strategic and Investment Plan for 2014 to 2018 identified Health Information as a significant investment area for better coordination and alignment of health care resources. Kenya's Health Act of 2017 and Kenya's Health Information Policy of 2014 to 2030 both envision a national health information system that responds to population needs (Kenya Health Information Systems [KHIS], 2010). The present HIS provides inadequate data for tracking health goals and providing timely and clear health information to communities and people. Access to health services and the intensity with which people utilize them have always been major concerns in Kenya's health system. Furthermore, due to a lack of legislative framework to coordinate and control the creation of Health-Related Information across sectors and actors, the culture of using information is not completely adopted in the health sector.

The Health Management and information systems (HMIS) present to address the need of timely and reliable information at national scales across the African continent but

are currently failing to deliver adequate data for quick decision-making. Governments across the developing world have continued to embrace the program due to its ability to bring about equity in accessing of health care, the affordability of health care and the Quality of health care as well as the reduced financial risk because of adoption of the program. As a result, the developing countries in the Sub Saharan region have continued to engage the adoption of the UHC program aggressively (WHO, 2019). Therefore, in order to achieve better health care service delivery, (Gold et al., 2019) has called for enhanced Health information systems.

There have been country-specific challenges to the program's execution in terms of acceptability. High illness burdens, various economic conditions, a lack of health information management, and political issues are only a few of the problems cited (Lagomarsino, et al., 2012). Universal health coverage (UHC) is a key goal that guarantees that everyone has access to the required health care they need without experiencing financial hardship, and it is central to the health-related objectives of the Sustainable Development Goals (SDGs). UHC is a means to achieve a goal as set in SDG target 3.8.1 (Average coverage of essential medical treatment services based on tracer interventions including health care for children, reproductive, maternal, infant, infectious, non-communicable diseases, capacity to provide services and access for the general and disadvantaged population); and a means to an end, as expressed in SDG target. In Bangladesh, adoption of UHC program faced challenges related to poor information management systems, wide coverage, and lack of financing and public ignorance (Adams et al, 2018). In Pakistan, UHC program faced challenges related to decentralization, information management systems and lack of coordination in implementation of the program (Zaidi, 2014).

When nations around the world approved the SDGs in 2015, one of the targets they set was to attain universal health care. Countries from all across the world demonstrated their commitment to UHC during the United Nations General Assembly High Level Meeting on UHC in 2019. Nations that advance toward universal health care will also advance toward other health-related objectives and ambitions. Children and adults may learn and work when they are in good health, helping them to escape poverty and establishing the foundation for long-term economic progress. It is important to improve health service coverage and outcomes by increasing the availability, access, and capacity of health and care professionals to provide high-quality, coordinated services to patients (WHO, 2019).

UHC requires a combination of approaches. It is impossible to overestimate the relevance of basic health care and life course strategies. A primary health care method focuses on organizing and enhancing health systems so that people can receive services for their health and well-being as quickly as possible, based on their needs and preferences, and in their everyday settings. Primary health care encompasses a wide range of services, including primary care as well as public health goods and roles; multi-sectoral policies and actions to address the upstream and wider determinants of health; and engaging and empowering individuals, families, and communities to improve their social and economic well-being.

Universal Health Coverage (UHC) has been a global problem for a long time. It is based on the 1948 World Health Organization (WHO) constitution, which recognized health to be a basic human right, and Rwanda's endorsement of the Alma-Ata Declaration's Health for All agenda in 1978. The World Health Organization defines universal health coverage as making sure that people have access to basic promotion, preventive, curative, and rehabilitative health services of sufficient quality and that their usage does

not put them in financial difficulty. The WHO's idea of universal health coverage (UHC) has three dimensions: Health-care access should be equitable, meaning that those who require it, not just those who can afford it, should be able to obtain it. Health-care services of adequate quality to improve the health of those who get them; Hundreds of millions of people, especially those in the most disadvantaged circumstances, require financial-risk protection, i.e. universal coverage, in order to have hope for better health and protection from poverty (Nyandekwe et al., 2014).

UHC seeks to meet population needs for quality health care, remove financial barriers to access, reduce the incidence of disastrous health expenditures, accomplish national and international health objectives, and aid to long-term poverty reduction and development. There is evidence that universal health care, facilitated by risk pooling and prepayment, leads to increased access to essential treatment and improved population health, particularly among the poor. The 2014 Luanda Commitment on the UHC in Africa renewed a debate on the necessity that the Ouagadougou Declaration procedures should be implemented and, by 2025 to ensure that they can fulfil UHC by all 54 African Union Member States, of whom 47 are in the WHO African Region (Sambo, 2014)

In Africa, Ghana has made strides in adoption of the UHC program due to its investment in infrastructure and massive financing mechanisms (WHO, 2016). In the East Africa region, Tanzania implemented the program but faces challenges especially due to awareness and information management (Lagomarsino, et al., 2017). In Sub-Saharan African countries like Rwanda, universal health coverage remains a serious issue, with millions of households facing high out-of-pocket health-care costs. Nyandekwe et al. (2014). The notion is gaining popularity in countries as varied as South Africa, India, Rwanda, Indonesia, and the United States, according to the 2010 World Report, with

governments throughout the world debating how to extend Universal Health Coverage on a political and technological level (Evans & Etienne, 2010). In a research by (Lagomarsino et al.,2012) nine low- and low-middle-income African and Asian nations were assessed on their progress toward achieving the UHC in their respective nations. Four of the nine African and Asian nations evaluated were found to be making substantial progress toward achieving universal healthcare. The remaining five countries were seen to be in the middle of their reform process. Ghana, Indonesia, the Philippines, Rwanda, and Vietnam were the five advanced nations, whereas India, Kenya, Mali, and Nigeria were regarded to be in the early stages of change (Lagomarsino et al., 2012).

Kenya has made progress toward universal health coverage, as shown by a rise in policy suggestions and revisions in health-related documents such as the Kenya Health Policy, since independence. Through devolution, the County governments have improved geographical access to quality health care by coming up with various term papers in health (Okech & Lelegwe, 2016).

In Kenya, HIS is an integral part of health system strengthening and helps the decision-makers in determining the state of the population, the types of health services being provided and the contribution made through health insurance. This calls for development of infrastructure, logistics of commodities, service delivery and human capacity to collect, process the data and use the information for policy formulation and evidence-based decision-making at all levels (Ministry of Health [MoH], 2010). The county governments in Kenya have been mandated to ensure that universal health coverage policy is implemented. The counties are supposed to initiate, expand and implement health insurance programs as indicated in the Kenyan Constitution. To achieve vision 2030, counties should focus on coming up with policies which aim to

foster partnerships with both the private as well as non-governmental organizations to fast track achievement of the universal health programme (Muiya & Kamau, 2018). The counties have however continued to face challenges in their implementation efforts. reliable and solid All parts of the health system, including governance and regulation, health research, human resource development, health education and training, service delivery, and funding, rely on health data (WHO, 2008). The most essential component of the national health system is the National Health Information System.

The action of public health requires reliable and timely information on health, which eventually contributes to assist with decision-making and assessment to improve accessibility, quality, and efficiency of the Universal Health Coverage both nationally and internationally. Decision-making and better health work hand in hand, which leads to better coverage and better health. Therefore, HIS can act as a positive step in the right direction, in the implementation of UHC to provide better health for Kenyans through better information. That is why the study seeks to find out the role of health information system in universal health coverage with a focus on Mombasa County.

Maternal and child health in underdeveloped nations is becoming more of a concern as incidences of illness and death rise. Accurate and trustworthy health data and information is the foundation for decision-making in the healthcare sector, and it is critical for lawmakers to design and execute health system policies. To successfully use resources for the development of mother and child health, strict monitoring and assessment of the current program design and execution is necessary at the micro level (Panda, 2017).

According to WHO 2014 Health Statistics, regional coverage of maternal health initiatives in 47 African countries was lower than worldwide norms. In 2013, the

African Region had 75 percent antenatal care (ANC) coverage, compared to 81 percent globally, and 47 percent antenatal care (ANC) coverage, comprising at least four visits with a health worker, compared to 56 percent globally. The coverage of the countries ranged from 15% to 97 percent. ANC coverage involving at least four visits was less than 40% in nine of the 39 countries that reported, between 40% and 60% in 14 countries, and over 60% in 16 countries. In 2013, just 48% of infants in the United States were visited by skilled health workers, compared to 72% globally. This percentage ranged from 10% to 100% depending on the country (WHO, 2014)

1.1.1 Maternal Health Care

The Kenyan government, particularly the Ministry of Health, has made maternal and child health a top priority (MOH). The government has developed a number of programs throughout the years to address different elements of the health sector in general, as well as reproductive health. The adoption of free maternity services by H.E. the President of the Republic of Kenya in his proclamation of free maternity services on June 1, 2013, was a major government initiative. The main goal of this initiative was to improve access to competent delivery services, resulting in a decrease in mother and new born mortality (MOH, 2015). Attendance at Antenatal Care (ANC) and skilled birth attendance is a key factor of mother health. As per Ministry of Health data, births supported by professional caregivers have averaged 44% in the last several years. The advantages of using community-trained birth attendants cannot be overstated. Increased use of trained birth attendants has the potential to reduce maternal and new-born mortality, which are major Millennium Development Goal (MDG) deliverables; MDGs 4 and 5. Furthermore, according to the Kenya Health Sector Strategic Plan (KHSSP) 2014-2018, social health protection via Universal Health Coverage (UHC) is one of the

flagship programs, and Free Maternity Services (FMS) is a key step toward UHC (Ministry of Health, 2010).

Kenya has historically had high rates of maternal morbidity and death. According to the most recent data. The maternal mortality rate is 488 per 100,000 live births, which is substantially higher than the MDG target of 147 per 100,000 by 2015. In Kenya, for every woman who dies during childbirth, another 20-30 women are anticipated to be severely harmed or disabled as a result of complications during pregnancy or delivery. These high rates have remained despite improvements in other health indices in recent decades. A lack of sufficient mother health services, such as prenatal, delivery, and postnatal care, is exacerbating the situation. Despite improvements in health-care infrastructure over the previous decade, many women continue to live far from health-care institutions, cannot afford maternity treatments, and/or experience other barriers to getting adequate treatment. As a result, competent delivery has been especially tough to come by. In Kenya, just 44% of infants are born under the supervision of a certified birth attendant, well short of the goal of 90% by 2015. Traditional birth attendants continue to assist in 28% of deliveries, family and friends in 21% of deliveries, and women receive no support at all in 7% of deliveries (MOH, 2015).

My Ministry commissioned a study to monitor the implementation of the Free Maternity Services program after more than a year of implementation in order to document areas that require policy and operational re-orientation both at the national and county levels in order to maximize the program's benefits. The assessment's main emphasis areas were identifying delivery trends at the facility level, assessing maternal health and welfare, assessing service availability, equity, quality of care, and sustainability in health service provision. This research emphasized the importance of a holistic and complete monitoring system that appropriately recognizes the difficulty

of Universal Health Care and the necessity to include all stakeholders in the monitoring process, particularly through collecting their perspectives on the program at all levels (MOH, 2015).

In order to achieve UHC in any health-care setting, the appropriate policies are required. A focus on providing enough coverage for a well-defined basket of benefits is preferable than offering inadequate coverage for any service with considerable patient cost-sharing. Financial stability must be built into the system from the start, which includes looking for ways to diversify revenue streams and prioritizing resource allocation. Non-hospital services should be prioritized in delivery system improvements, such as strong, high-quality primary and community care services, as well as public health activities. UHC that is both effective and equitable has the potential to enhance and extend people's lives, remove inequity, and spur economic growth. There is a connection between Universal Health Care and improved health outcomes. Failure to do so might lead to a deterioration in public health (Ranabhat et al, 2018).

Many efforts were made to ensure ongoing progress toward UHC through the planning and implementation of health-care policy improvements, but much more may be done. Free PHC services for everyone; free maternity services at all public health facilities; health insurance subsidies for the poor, vulnerable, and old; creation of a health finance plan that ensures that the whole population is covered with some type of insurance; and so on; The creation of a health finance plan that ensures that the whole population is covered with some type of insurance, as well as an expansion in staff and equipment through the managed e-health system, will all assist to improve access and demand for services. The number of health facilities providing KEPH services grew from 41% to 1

55% between 2013 and 2016. Despite the growing demand for services, however, maintaining good quality remains a major challenge (Wangia & Kandie, 2016).

1.2 Statement of the Problem

Health disparities exist both across and within nations. Access to healthcare for vulnerable people is restricted. People in the poorest wealth quintile are less likely to have access to key health services like institutional delivery and professional birth attendance than those in the wealthiest quintile. Gender inequality leads to women's violence, which is still a serious public health issue. It is critical to identify and address health disparities and their factors in order to achieve health equity. Data, on the other hand, continues to lag. For regulators to monitor health inequities and take remedial action, they require reliable, high-quality, and timely disaggregated data. This ensures that no one is left behind in terms of access to and usage of health care (WHO, 2019).

The necessity of health information systems being able to provide trustworthy data is becoming more widely recognized. In many nations, health-care reform and decentralization have resulted in a change in roles between the central and peripheral levels, as well as new information demands arising from shifting data collecting, processing, analysis, and dissemination requirements. Health-care reforms emphasize the need of information uniformity and quality (WHO, 2010).

Kenya continues to make slow progress despite its commitment to improving maternal health care. Kenya is among the countries with a bigger number of little children dying at birth in Africa with a more than 5,000 estimated in maternal deaths per year (Government of Kenya [GoK], 2016). The country did not achieve the UN Millennium Development Goal 5 by 2015. Kenya had committed to reducing these deaths to 147 per 100,000 live births by 2015. Data shows that some of the reasons given for the

continued high mortality rate include financial barriers that prevent poor mothers from accessing maternal health services from skilled birth attendants mainly in modern health facilities (Kingori et al, 2016). Clinical decisions are made based on information about the patient's profile, health-care needs, and therapy at the individual level. The cornerstone of individual clinical therapy is health-care records. When health care workers are overburdened by the data and reporting requirements of many, poorly connected subsystems, issues may arise (WHO, 2010).

While the maternal mortality rate is lower in Mombasa County at 197 per 100,000 as compared to the national rate, it is still above the targeted 147 per 100,000 (Kenya National Bureau of Statistics [KNBS], 2015). This has been attributed to poor quality services offered in the Coast General Training and Referral hospital. The availability and provision of substandard services that leads to dissatisfaction of the clients. This causes the service seekers to keep off seeking and accessing the healthcare services despite the introduction of the UHC through the policy of provision of free maternity services. This study focused on determining the position taken by the introduction of health information systems in alleviating the challenges of poor-quality services facing the hospital characterised by delayed access to medical information as well as overloading the existing workforce and the installed structural infrastructure.

1.3 Purpose of the Study

Study aimed at determining the role of the health information systems in the rolling out of the universal health coverage in maternal healthcare and coverage in CGTRH.

1.4 Objectives of the Study

1.4.1 Broad objective

The study aimed at determining the role of the HIS towards the attainment of the UHC in maternal healthcare at CGTRH.

1.4.2 Specific objectives

i. To determine the influence quality assurance in achieving UHC in maternal care in CGTRH-

ii. To establish the influence of data management in achieving UHC in maternal care in CGTRH-

iii. To determine the influence of system resources in achieving UHC in maternal care in CGTRH

iv. To evaluate the role of technical competency in the attaining UHC in maternal care in CGTRH

1.5 Research Questions

i. What is the influence of quality assurance in the achievement of UHC in maternal care in CGTRH?

ii. What is the influence of data management in the achievement of UHC in maternal care in CGTRH?

iii. What is the influence of system resources in attaining UHC in maternal care in CGTRH?

iv. What is the influence of technical competency in the attaining UHC in maternal care in CGTRH?

1.6 Justification of the Study

As has been indicated, Mombasa County has one of the highest maternal mortality rates at 197 per 100,000. This has been attributed to poor services characterized by delays in service delivery, poor quality services and overburdened health infrastructure and health workforce resources. The introduction of the HIS was hoped to ease the challenges. Health information system is imperative in health system strengthening. This assumption was also influenced in the manner in which information is managed in public health and by the department of health at large. UHC is one of the SDG listed as the third indicator, to guarantee lives which are healthy and the promotion of the societies wellbeing in general (Flora et al., 2016).

The integrated HIS for UHC will encourage bottom-up information management approach, transparency, minimise out-of-pocket expenditures, good communication in all hierarchy and attitudes that do not excel, through the department of health in the County (Kingori et al., 2016). According to WHO (2009), HMIS analysis, systems. The piloting of the UHC can only be successful if there is an effective and efficient HIS all the pioneering counties and those that will follow in the process. Some of the critical Health Information System challenges in Kenya include shortages of human resource, a need for an integrated information system, and policy standards (WHO, 2010). Flawed health information systems, that include a lack of regulations and procedures, inadequate skills of HIS staff, inadequately skilled workforce handling data, poor integration, many parallel data collection systems, and incoordination, are among the critical problems in Kenya's health sector identified in the Vision 2030 document's first Medium Term Plan 2008-2012. Investing heavily in health-care information systems has resulted in a more responsive system that is now more trustworthy for routine monitoring and assessment of service performance in Kenya (MOH, 2010)

1.7 Limitation of the Study

The UHC services are still at the pioneering stage, many health care workers are not fully aware or conversant about its process. Only a few facilities were selected to offer UHC on maternal services and many are yet to be mentored and given on job training on what it actually entails. Therefore, the study faced hitches of knowledge gap and co-operation from health care workers. The study was only focused in CGTRH.

The study also faced challenges in the data collection stage the respondents were not willing to participate and co-operate due to one reason or another such as being busy with work. This can however be delimited to the researcher in obtaining permission from the County management in collecting data as well as assuring the respondents of

their confidentiality. NACOSTI letter was issued so that the researcher could be able to collect data.

1.8 Delimitation of the study

The study focused on the Coast General Teaching and Referral Hospital. This being the health facility with the highest number of deliveries; and due to the fact that it is supporting five other neighbouring Counties on maternal emergencies. Out of a sample population of 114, just 90 respondents were engaged in this research through questionnaires and direct observations on their day-to-day work activities.

1.9 Significance of the Study

This study may be used to determine the criteria in the selection of these primary levels of care during the induction process in the commencement of UHC services. This study may act as a literature review for those who wish to conduct further study about the importance of health information system in UHC, and the factors that affect an effective integration of health information systems in UHC.

The study may also be a reason for the department of health in Mombasa, the Ministry of health and other health related authorities to come up with effective ways of ensuring the success of UHC services through effective and efficient health information systems at every point of health care from the recommendations that will be put forward after this study.

The study outcomes will be of significance to future researchers as the concept of universal health coverage in county governments in Kenya is new and needs more focus. Through the recommendations for further study, more studies can be conducted on the topic to enhance knowledge depth and sharing.

1.10 Assumptions of the Study

This study came up with many assumptions so as the objectives can be adhered to. The study assumed that any information that collected from the respondents in terms of data would not interfere with the variables of the study. Another assumption is that the choice of Mombasa County as a case study among the other 47 counties in Kenya would not have an effect on the quality of data collected due to sampling biasness.

1.11 Operational Definition of Terms

Data management: This is the process by which a stored data is managed, protected and is timely available when required.

Health financial protection: Ensuring that patients do not face catastrophic levels of health spending because of seeking health care.

Health information system: the information that is stored on health implication of individuals so as can be used later for tests and medicinal admission and research.

Health management information system: this is a system that is used for management of the information that is stored on health implication of individuals so as can be used later for tests and medicinal admission and research

Information: This is the obtained data will present them in a sequence that can be manipulated and easily understood in any form.

UHC achievement: UHC achievement means having all the necessary requirements so that a patient does not require money to receive any treatment in a hospital

Universal Health Coverage: this is a manageable system by the government that ensures all people are well covered health-wise

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

Literature reviewed encompasses; data system management, quality assurance, technical competency, system resources and achievements of maternal health care under UHC. This will also present the combination of the studies, theoretical and conceptual framework to highlight the HIS role in rolling out the UHC in maternal health care globally, regionally and locally. The chapter will conclude with the presentation of a theoretical and conceptual framework against which provides a basis for the subsequent evidence gathering and analysis.

Literature review serves the purpose of identifying the areas that the research anticipates to fill through identifying the missing gap, while offering a synopsis of the pertinent and noteworthy literature on the research field. Furthermore, the literature review undertaking on re-evaluates the imperative opinions of prevailing knowledge on the topic under consideration through survey of theses, conference papers, books and articles, which serves as the groundwork of producing the foundation of the study.

2.2 Empirical Literature Review

2.2.1 Quality Assurance on Achieving Universal Health Care in Maternal Health Care

Kenya has implemented the Kenya Quality Model for Health (KQMH) as a national excellent assurance system to guarantee that quality services are given. The KQMH paves the way for improved patient safety, as well as the implementation of joint health inspections checklists that focus on risk-based rating of facilities and enforcement of appropriate follow-up. As a consequence, a locally driven quality assurance framework will emerge, on which a regulatory and certification system may be created to

incentivize facilities to pursue certification and complete quality management. As a result, rivals will have a fair playing field to attain the highest possible standards of care quality, as outlined in the Constitution (Wangia & Kandie, 2016).

Maphumulo and Busisiwe (2019) investigated the assurance and quality to maternal care in South Africa. This was an empirical study. Past literature search incorporated the accompanying PC helped information bases and lists of sources there were seventy-four sample articles chosen from a sample of 1366. The findings revealed that quality assurance played a significant role in the achievement of universal health coverage for maternal care.

Ogbuabor and Onwujekwe (2019) further conducted a study on the influence of quality assurance on the achievement of universal health coverage in maternal care with what they had learned from a programmer that offered a free maternal and child healthcare in Nigeria. The results indicated that quality assurance played a significant role in the achievement of universal health coverage in maternal care by increasing the use and quality of maternal and child services.

Joarder et al. (2019) carried out a study on the influence of quality assurance on the achievement of universal health coverage in maternal health care in Bangladesh. The investigation found that Bangladesh had a thorough arrangement of strategies for UHC, e.g., a health-financing procedure and organized suggestions for pooling of assets to make a public medical coverage plot and extend money related assurance for maternal medical care. The examination likewise uncovered that quality confirmation was decidedly critical in the accomplishment of widespread health issues inclusion in maternal consideration in Bangladesh.

Financial systems must link to clinical systems not just to compensate healthcare practitioners for the expenses of care, but also to accurately analyse outcomes and the efficacy of specific treatments and services. Sharing data between various systems can help create a positive feedback loop for quality improvement (WHO, 2010)

2.2.2 Data Management and Achieving Universal Health Care in Maternal Health Care

The utility of information is determined by its quality. Information must be accurate, current, independent, and trustworthy. Simultaneously, it's critical to eliminate duplication of effort and reduce the burden of data collection on front-line workers, so that data is collected with little disruption to care delivery (WHO, 2010).

The provision of trustworthy information produced from solid data is critical in assisting experts and technicians in making decisions, as well as hospital administrators. Information systems are in charge of creating, analysing, and disseminating such data in this environment. Healthcare information systems (HIS) are increasingly becoming a necessity for care services and significant research institutions all over the world. It is a technology that ensures the continuous and safe collection of standardized data through time and between multiple locations, and it is a vital strategy for obtaining care methods of higher scientific quality, as long as the data integration is guaranteed Interconnecting healthcare data collected at multiple locations is also a step forward in scientific study on health/illness state factors. It enables for the comprehension, prediction, casual demonstration, prevention, and effect assessment of health-care treatments, in addition to the analysis of illness dispersion across time. The hunt for better data quality and an acceptable EHR system also provides a chance to re-evaluate health care as a whole. However, the incapability of a data system to be implemented starts in the concept phase due to a lack of effective participation from

future system users and developers, resulting in the participants' poor definition and understanding of the criteria effectiveness on the field, functionality (ease of use), and interoperability (ability to integrate with other systems) (Juliano et al, 2013).

The District Health Information System Software (DHIS-2) for Kenya is a free and open source database and application that gathers, processes, and analyses health data for the whole country. The DHIS2 system has clearly offered Kenya with unrivalled chances to move from an era of unreliable and dispersed manual HIS systems to a more ideal situation of quality health information availability and use for rational decision making. In addition to relatively low levels of data demand and utilization by the intended consumers in Kenya, data quality concerns, as well as the ability of various health personnel to interpret and utilize DHIS-2 information, have been observed (MOH, 2016)

Kanu (2019) conducted a secondary study to establish the position taken by data management on the achievement of universal health care in maternal health care in Sierra Leone. The paper focused on analyzing the Sierra Leone 2017 Service Availability and Readiness Assessment dataset covering the 1284 health care offices within the nation. The study conducted bivariate as well as the multivariate analysis of the focus variables. In the bivariate investigation, all the autonomous factors indicated factually critical relationship with achievement of universal health care in maternal health care. The study further revealed that the management of data had a significant positive influence on the achievement of universal health care in maternal health care in Sierra Leone.

Amu et al. (2018) also conducted a study on the influence of data managment on the achievement of universal health care in maternal health care in Ghana. The study revealed that data management significantly influenced the achievement of universal

health care in maternal health care in the countries by reducing delays in access to health records and consequently access to maternal health care.

Bruno (2018) also carried out a study on the role of data management in achieving universal health care in maternal health care in Belgium. The study was carried out in public health facilities in Belgium using a quasi-experimental design. An inventory was conducted of available resources for data management and availability of essential equipment for data storage. The researcher requested the heads of the facilities to provide them with data management. Observations of client-provider interactions were also carried out. The study revealed that data management played a positively significant role in achieving universal health care in maternal health care in Belgium.

2.2.3 System Resources on Achieving Universal Health Care in Maternal Health Care

Low-income nations' maternal mortality rates are sluggish to change, and communication and information technology solutions typically fall short of expectations, leaving them unable to meet the fifth Millennium Development Goal (MDG) of improving maternal health. Despite a slew of impressive small-scale tests of mobile phone apps by health workers, the present landscape of ICT interventions is fragmented, with little attention paid to the documenting of criteria needed for solutions to scale and become viable. This issue is not unique to maternal health care; in fact, it affects all health services and programs in most nations where external funding accounts for a significant portion of health spending (Program for Appropriate Technology in Health [PATH], 2012).

In May 2018, the 71st World Health Assembly (WHA) passed a resolution on digital health by an overwhelming majority, acknowledging the potential of digital technology

to enhance the accessibility, quality, and cost of health care services. The resolution calls on nations to make better use of digital technology as a way of ensuring equal and universal access to health care (Deelstra, 2018).

Jat et al. (2011) did a study on the position taken by the system resources in achieving universal health care in maternal health care in Madhya Pradesh state of India. The study employed a combination of subjective and quantitative techniques. The justification for the mix depended on the basic suspicion that the two methodologies supplement one another and offer alternate points of view to investigate the different components of the subject under examination. The examination populace comprised of a purposive example of 20 respondents similarly partitioned between four partner gatherings: government authorities, advancement accomplices, common society and scholastics. The choice of these gatherings depended on their huge function in plan setting and dynamic on maternal wellbeing in the state. Topical investigation was utilized for information examination and the system of John Kingdon's various stream model guided the data analysis process. The study results indicated that there was adequate availability and distribution of infrastructure and technical human resources in the state hospitals. The study also revealed that system resources was significant in achieving universal health care in maternal health care in Madhya Pradesh.

Madaj et al. (2019) did a study on the position taken system resources on the achievement of universal health care in maternal health care in India and Bangladesh. Twenty three policy documents were accomapnied by 36 focus group discussions as well one hundred and thirty KII in each of the targeted countries. From the results, the study revealed that resources such as human resources, physical capital and financing were critical for the achievement of UHC. The study concluded that system resources

were had a positive significant influence on the achievement of universal health care in maternal health care in India and Bangladesh.

Weel and Kidd (2018) did a study on the system resources in achieving universal health coverage in maternal health care in Canada. This was a cross-sectional descriptive study carried at the public hospitals in Ontario Canada. All the staff who worked at the Maternity wings of the hospitals. According to the findings, system resources include the authoritative, administrative, and planning structures required to provide a fully functional HIS, as well as the assets required for such a structure to be viable, for example, faculty, financing, information and communications technology (ICT). The study revealed that system resources were significantly important in realizing UHC in maternal health care in Canada.

A further example of system resources is the Netherlands, where about 40,000 healthcare providers annually generated 100 million claims. As a result, processing paper claims constituted a significant administrative burden for healthcare providers, insurers, and patients. As a result, KPMG (Klynveld Peat Marwick Goerdeler, a Dutch accounting firm) put the annual cost of the Dutch claims procedure at 460 million pounds in 2002. As a result, automation was required to decrease costs and mistakes, as well as the time spent processing claims. Interoperability between the 20 insurance firms and the healthcare providers Standards and interfaces have to be established to allow the 500 various claims software programs to speak the same language. In order to interact in a seamless manner, a national infrastructure based on the internet was established. This comprised a secure claim routing centre and registries that allowed healthcare providers, insurers, and patients to be individually identified. In 2010, 90 percent of claims were created, shared, and processed electronically, thanks to well-established standards, interfaces, and national infrastructure. As a consequence, the

Dutch healthcare system was able to save a staggering amount of money, estimated to be worth between 100 and 300 million pounds each year (WHO, 2010)

Nababan et al. (2017) studied the factors that influence the mobilizing additional resources in improving HIS for universal health system performance in Ethiopia. The study's population was the employees at the Ethiopian public hospitals. The research was conducted using a descriptive research approach. Field data was collected using structured questionnaires. The data was analysed using descriptive statistics. Tables and figures were also used to display the information. The study found that health information system was characterized by significant inefficiencies where almost 20 percent of health spending was wasted. Furthermore, the study discovered that methods and techniques included transparently managing public money for greater accountability, from budget preparation to financial monitoring, and directing resources to inputs and services that provide better results at lower costs. In addition, the study found that developing and enforcing rules and regulations that supported the efficient use of resources, employing incentives in provider payment systems, and enhancing provider autonomy and facility management were all significant aspects of resource management. The study concluded that HIS resources influenced the mobilizing additional resources in improving HIS for universal health system performance in Ethiopia. According to the report, making the case for investing in health and speeding progress toward UHC requires increasing the use of finances and system efficiency. Furthermore, the study suggested that increasing efficiency would include connecting spending to data and shifting from passive to active health-care buying.

2.2.4 Technical Competency of Data Managers on Achieving Universal Health Care in Maternal Health Care

Few poor nations have robust and effective health information systems in place to fulfill all of these disparate information requirements. New technologies can help improve data production, compilation, and interchange, but they will only be of maximum use if there are explicit data quality standards in place (WHO, 2010).

Urquieta-Salomón and Villarreal (2016) also conducted a study on the role of technical competency of data managers on achieving universal health care in maternal health care in Mexico. The study still presented a serious shortage. The paper found hat the technical competency of data managers had significant influence on achieving universal health care in maternal health care in Mexico.

Bashweka (2018) conducted a study on the role of role of technical competency of data managers on achieving universal health care in maternal health care in Indonesia. The study design was an exploratory qualitative approach that employed in-depth interviews in public hospitals. Interviews involved technical health leaders who were involved in maternal health services' data management. The study established that data managers in the hospitals had the necessary knowledge, skills and abilities required for the management of hospital data. The study found that technical competency of data managers had a significant influence on achieving universal health care in maternal health care in Indonesia.

Nguyen (2018) also conducted a study on the role of technical competency of data managers on achieving universal health care in maternal health care in Vietnam. A mixed-methods study method. A literature review of achievement of universal health care in maternal health care was conducted. The study established that technical

competency of data managers had a siginifcant influence on achieving universal health care in maternal health care in Vietnam.

Lee and Satku (2016) studied the influence of data management competency in Achieving Universal Health Care in Maternal Health Care in Singapore. A mixed-methods study method. A literature review of factors affecting the achievement of universal health care in maternal health care was conducted. The study found that innovative partnerships aiming to maximizing the maternal data management should be put in place aimed at informing the decision-making aimed at realizing universal maternal health care. The study concluded that data management competency in achieving universal health care in maternal health care in Singapore.

2.2.5 Achieving Universal Health Care in Maternal Health Care

Decisions on public health must be based on accurate facts. It guides policy, programs, finances, and evaluations, and it serves as the foundation for governments' accountability to their citizens. Furthermore, in more industrialized nations, it is a key tool for implementing Universal Health Coverage (UHC). Developing countries have struggled to manage their health systems and finances due to a lack of information. The main goal of the health information system (HIS) is to improve everyone's access to, quality, and efficiency of health care services. For nations to determine if their UHC implementation has been effective, they need accurate and timely data. Providing Universal Health Care Access by connecting clinical and public health systems, it is possible to get insight into resource mobilization and allocation, as well as the distribution of expenditures by disease, socioeconomic status, and geographical region, using a set of indicators. As well, it provides important surveillance information and contributes to know the purchasing and providing of care, if it is reaching the entire population (Butticè, 2020).

Improving Health-Care Service Quality Not only is it necessary for financial systems to connect to clinical systems in order to properly assess outcomes, sustainability, and the efficiency of certain treatments, but it is also necessary for financial systems to link to clinical systems in order to better evaluate outcomes, viability, and the efficiency of certain treatments. Sharing data between various systems can help create a positive feedback loop for quality improvement. Increasing Health-Care Efficiency and Cutting Costs Unnecessary interventions, redundancy, and clerical mistakes, particularly in poor nations, result in significant waste. As a result, expenses rise, posing a threat to the health-financing scheme's long-term viability. Information systems may aid in the reduction of losses and the more precise tracking of expenditures. The HIS should be developed as soon as key policy choices have been made, and concurrently with the implementation of the UHC (Scherer, 2011).

Health Insurance Information Systems (HIIS) in UHC in addition to preventive and screening services on less timely basis, Health Insurance provides a major scheme for data collection. (HIIS) are critical for bridging the gap between payers and providers. The following are the major components of the HIIS that are engaged in supporting the National HIS: 1) Payer Information System: Its basic business operations include beneficiary enrolment. 2) Provider-side systems (Clinical Information Systems) that can communicate with payer-side systems. 3) A "BRIDGE" between payer-side systems and provider-side systems, allowing them to do business electronically, such as eligibility checks, claims transfer, and so on. 4) Interoperability standards and common coding schemes that allow systems to "speak to one other." As a result, timely and reliable health information is an important foundation for public health action and health system bolstering, which helps with decision-making and evaluation to improve the availability, quality, and efficiency of Universal Health Coverage both nationally

and internationally. Better health data leads to better decision-making, which leads to improved coverage and health (Heitkamp, 2019).

The right to healthcare is a fundamental human right. Universal Health Coverage (UHC) is highlighted in the 2010 World Health Report as a key facilitator of that right. While informatics has been an important tool in the implementation of UHC in more developed nations, poor countries have battled with a lack of data for health financing management, limited technical capacity, and a general misunderstanding of informatics' role in modernizing their health finance environment. For governments to determine whether or not their UHC implementation has been effective, they need accurate and timely data. The purpose of a health information system is to improve everyone's access to, quality, and efficiency of health care services. Several key links between the four independent variables are depicted in the conceptual figure below: quality assurance, data management, system resources and technical competency and the dependent variable achieving universal health coverage in maternal health care.

According to a study by Anna (2018), the UHC approach provides a window of opportunity to speed up the (equitable) universalization of maternal health care services, and particularly care during childbirth, which can contribute enormously to reducing maternal and neonatal deaths. Women, adolescents and children need to be given priority by UHC strategies because they generally lack the financial means to pay for even the most basic health care.

 World Bank (2016) report indicates that strong economic growth lately has decreased poverty to 43 percent of the populace. Numerous nations actually fight with elevated levels of youngster and maternal mortality, lack of healthy sustenance is very normal, and most health frameworks cannot manage scourges and the developing weight of present infections, for example, diabetes. These difficulties call the rule that everybody

gets required health administrations without money related issues. The essential purpose behind putting resources into UHC is an ethical one: it is not satisfactory that a few individuals should confront passing, handicap, weakness or impoverishment for reasons that can be resolve at restricted measure.

Countries utilize various instruments in their future to accomplish UHC. In the past decades, the agenda aimed at improving the access to medical care and lessening money related difficulty, their methodologies share basic attributes (Savedoff, et al., 2017). There is a trademark change from individual cash-based use towards prepayment and danger pooling, regularly through another system, for example, a public medical coverage conspires. Government appropriations uphold the individuals who cannot manage the cost of charges. Expanded sponsorships are done through more noteworthy government use on health, frequently utilizing income from new charges, global help, and different components (Limwattananon et al., 2016). Expanding the advantages of UHC for women likewise requires fortifying health frameworks at different levels, including financing, HR, and network contribution. Helpless plan can strengthen gender disparities, with females getting lost in protection plans, and too slim a scope of regenerative health administrations accessible.

According WHO (2018), Rwanda is one of the African nations that have made notable strides towards the realization the UHC of maternal health care. This African nation have managed to reach 96.15 percent of health insurance cover. Further, the outcome shows that there was an approximately 1.07 patient visits to the health facilities which surpasses the recommended the world health organisation's 1-visit every year. Additionally, this outcome its equitability is at 24 percent of the needy citizens as compared to the citizens of 24.1% of citizens living in poverty. The addition, the people of Rwanda manages to access health services that meets the standards set by WHO in

terms of quality. Finally, another interesting aspect was the raised level of life expectancy from initial 49.74 years in 2001 to currently 68.21 in 2019. Therefore, the distribution of heath employees as well as the medical supplies was balanced in all the provinces within Rwanda.

Another example is that the Country of Madagascar where the citizens were given exemptions from paying out of pocket in order to receive healthcare services (WHO, 2018). Before the waiver a proportion of less than 33% of the country's population who required health services visited the facilities but when the government removed the consultation fee the number of health care seekers elevated to over 65% of the country's population. Further the number of children under five years of age increased by fifty-two percent while the maternal care visits increased by twenty-five percent for an expenditure of 0.60 US dollars (Kshs. 65) for each health service seeker.

In the Country of Ghana, government health insurance scheme brought about an increase by 70 percent in the proportion of delivery of new born babies for mothers with at least four visits for the antenatal care. The presence of the cover for one year significantly influenced the assisted deliveries recorded in health facilities and the number increased by 10%. In addition, the Malawian health system was to a great extent affected by a combination of a number factors which included the health employees' shortages, shortages in the medical supplies, low levels of transparency as well as the delayed payment of bills. Furthermore, the period between 1990 and 2019 the Ghanaian health system recorded an elevation in the number of professional health care givers where this was marked by an increased employment of nurses, midwives and doctors by 260%, 185% and 1300% respectively. This represents a portion of more than fourteen thousand heath care workers who were given the skills and absorbed into the health system which representing a population that was four times the population in

1990. The equitable distribution of healthcare workers guided by the strategic plan set played a key role in the increment of the citizens who accessed quality health care services (WHO, 2018).

While the number of insured patients in many hospitals increased and the patient share decreased over the four years of study, patients' out-of-pocket payments increased, particularly for hospitalized in-patients, according to a study conducted in Rwanda between 2011 and 2014 on the role of hospital health information systems in universal coverage monitoring. As a result, this study emphasizes the relevance of integrated hospital information systems for health economics research on universal health care in low-income countries (Gustave et al, 2015).

2.3 Theoretical Framework

2.3.1 Information System Success Model

The article will be driven by DeLone and McLean's revised and suggested Information System Success Model (2003). It is proposed that information system utilization and user satisfaction are determined by IS and service quality, as well as their shared impacts. This model and metric have been widely used by researchers to analyse the performance of information systems, particularly electronic health records in hospitals (Bossen, et al., 2013; Tilahun & Fritz, 2015).

IS success model, in Figure 2.1, will be used in this study because it will help to describe how data system management, quality assurance, technical competency, and system resources individually or collectively influence data quality and information use.

Figure 2.1:

(ISS Model).
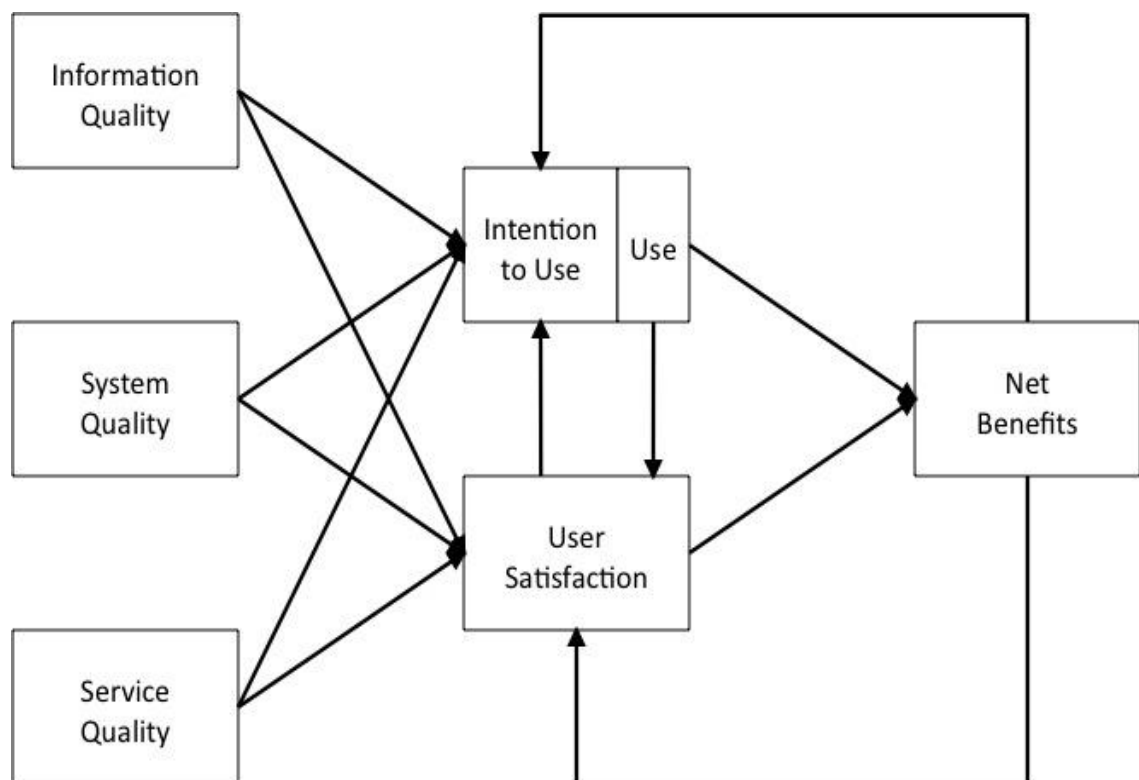
2.4 Research Gap

The study has reviewed literature related to the role of the health IS towards the attainment of the UHC in maternal healthcare. From the reviewed literature, several gaps emerge. For instance, there is a gap in literature from the local perspective. Most of the reviewed studies are from other jurisdictions with contextual differences from those of Kenya. These studies include Joarder et al. (2019) done in Bangladesh, Bruno(2018) carried out in Belgium, Jat et al. (2011) conducted in India, Weel and Kidd (2018) conducted in Canada, Urquieta-Salomón and Villarreal (2016) conducted

in Mexico, Bashweka (2018) conducted in Indonesia and Nguyen (2018) conducted in Vietnam. All these nations are either developed or emergent nations and so have varying contextual differences from Kenya which is a developing nation and therefore their fingings can not be generalized to the local context. The paper bridged the gap by presenting the local context of the role of the health information systems towards the attainment of the universal health coverage in maternal healthcare.

2.5 Literature Review Summary

This chapter has reviewed literature in relation to the role of the health information systems towards the attainment of the universal health coverage in maternal healthcare. Specifically, literature on quality assurance, data system management, system resources and technical competency as well as how they relate to attainment of the universal health coverage in maternal healthcare has been reviewed. Additionally, the chapter has presented and discussed the theoretical framework underpinning the study. The research gap highlighted from the reviewed literature has also been presented. Similarly, the relationship between the study variables has been presented in the conceptual framework.

2.6 Research Gap

There is not enough data to back up the given statistics except what is being uploaded to the DHIS2 at the facility. The primary source are the month summary tools used to submit health information from the various departments in the referral hospitals.

2.7 Conceptual Framework

Conceptual framework is how individuals presume their belief on effect to the others (Robson, 2011). The dependent variable will be; achieving UHC in maternal health care in Mombasa County while the independent variables include; health quality assurance,

data management, system resources, technical competency of data managers and their role in achieving UHC maternal care. These variables and their relationship are as illustrated in figure 2.2.

Figure 2.2:

Conceptual Framework

Independent Variables

Quality Assurance
- Quality information
- Quick access
- Accuracy

Data management
- Data storage
- Compilation
- Analysis of data

Dependent variable

Achieving UHC Maternal Care
- Quality
- Affordability
- Accessibility
- Reliability

System Resources
- Financing
- Personnel
- Logistics support

Technical Competency
- Knowledge
- Skills
- Abilities
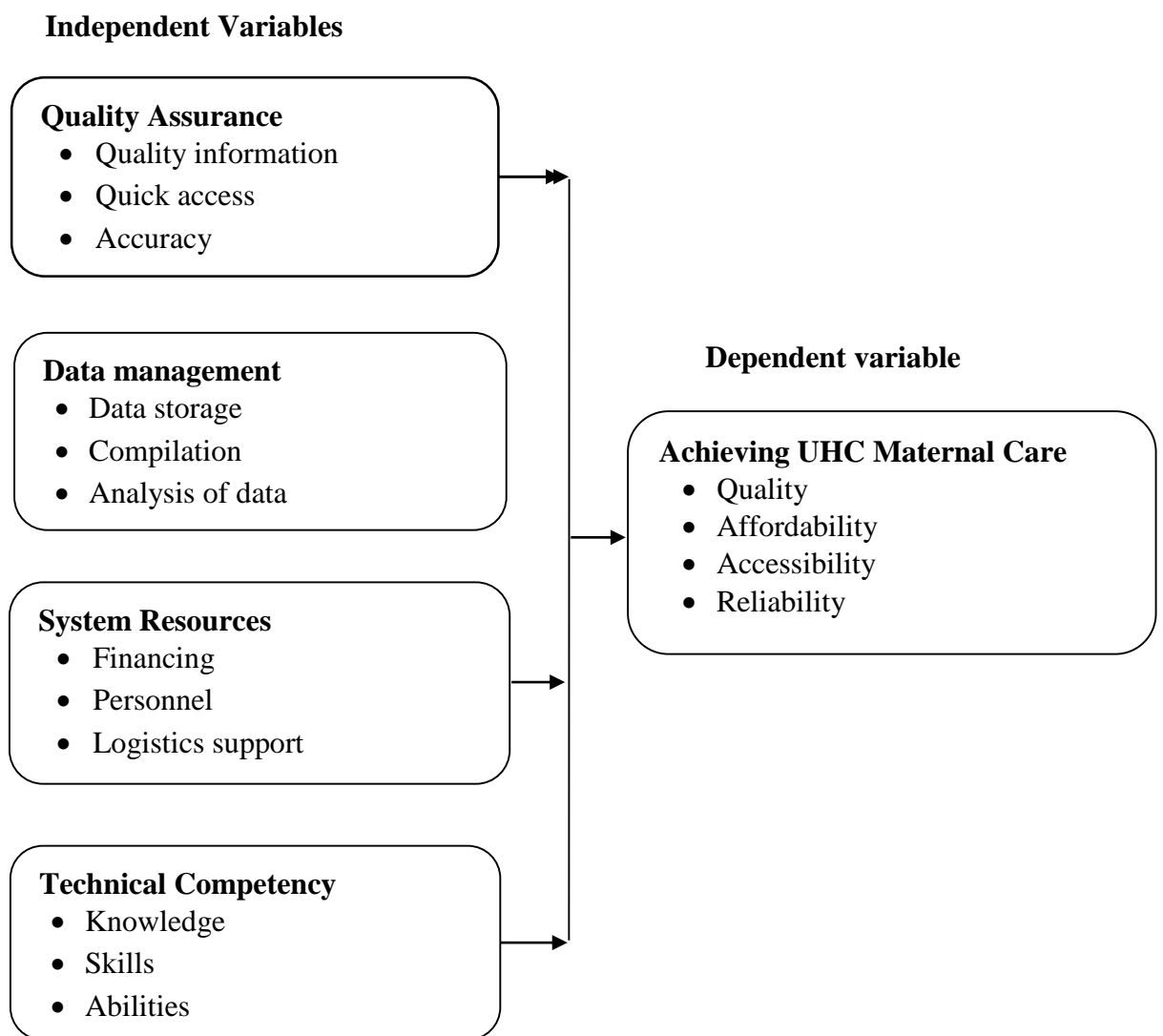
CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The section explored the methods and approach employed in fulfilling the purpose of this paper are reviewed considering the most appropriate. The research design, research region, target population, procedures to be used for data collection, equipment to be used for data collection, methods and analyses to be used for data collecting, and ethical issues are all described in this chapter.

3.2 Research Design

The objective of this study was met through the use of a descriptive-cross sectional study design. The mixed approach produced both quantitative and qualitative data. It is a design that is meant to make it easy to obtain information of the current phenomena on HIS for simplified analysis, presentation and interpretation through collecting information from a sample that completely represented the study population (Keith, 2009). Qualitative and Quantitative methods provide diverse views of the same phenomenon, and give a holistic exploration of service delivery in the health sector.

3.3 Target Population

Kothari (2008) posits that a set objects, elements, events, people, groups etc. from which the sample is selected defined is referred to as the target population. The study focused on 114 hospital staffs at the Coast general teaching and referral hospital who used the health information systems directly in four departments; health records department, finance department, clinical services department and heads of department as the managing group who directly supervises data generation and reporting though HIS. The staffs to be included in the research are those who directly interacted with the

35

HIS, Staff who do not directly use HMIS are excluded from the study. The target group was reached by considerations of the fact that the direct users of the system had more information on its usefulness and the effect it has in alleviating some of the challenges hindering achievement of universal health coverage in maternal healthcare. This population was distributed as presented in table 3.1.

Table 3.1

Target Population

Department	Population	Percentage (%)
Management	15	13
Clinical	30	26
Health Records	45	40
Finance	24	21
Total	**114**	**100**

3.4 Sample Size and Sampling Techniques

Sampling is the process of selecting a given number of subjects to represent the whole population (Orodho, 2008). The subject selected should be a true representative of the whole population. The paper employed the stratified sampling technique to realise the study sample whereby the population that was targeted was divided into strata according to functional departments. Further, the study used the simple random method in the selection of the study respondents from the respective strata.

Thereafter sample size was determined by applying the use of Yamane's 1967 formula. Below is the sample size calculation.

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

Where: n= number of samples selected, N= number of Population selected e= Precision's Level.

At 95% level of confidence and P=5%,

$$n = \frac{114}{1+114(0.05)^2} = \frac{114}{1+0.285} = \frac{114}{1.285} = 89 \text{ which is 78\% of the target population.}$$

The number of respondents apportioned to a department, will be proportional to their targeted population.

Table 3.2

Sample Size Table

Department	Population	Sample
Management	15	12
Clinical	30	23
Health Records	45	35
Finance	24	19
Total	**114**	**89**

3.5 Research Instrument

The research used structured questionnaires, which were physically administered to the respondents at their department of work. The Questionnaires was used for collecting primary data. Questionnaires are preferred since provides objectivity with limited bias resulting from the personal characteristics as explained by (Earl, 2013), they present some form of confidentiality to the respondent, potentials to reach. Scheduled visits to the health facilities which was as well requested, to observe and obtain information on the implementation and utilisation of health information system especially in the implementation of UHC in maternal care.

3.6 Pre-testing

A pre-test was carried out at the Likoni sub county since it utilizes similar HIS processes as Coast general teaching and referral hospital, which integrates all hospital functions; both administrative and clinical challenges and deficiencies in the proposed research instruments can be noted and considered early enough. According to the rule of thumb, 10% of the respondents should be included to establish a pre-test (Mark & Adrian, 2007). Consequently, 9 respondents and in-charges were used to test consistency and instrument's reliability through administration of questionnaires. The data obtained coded and analysed in SPSS version 25. During the pre-test, irrelevant, confusing or ambiguous questions was identified and the questions rephrased without losing content

3.6.1 Validity of the Instruments

The correctness and relevance of conclusions in light of study findings are measured by an instrument's validity (Mugenda & Mugenda, 2003). As a result, the information gathered by the questionnaire should correctly reflect the research variables. In the determination of the validity of the content contained in the study instruments, the study conducted the content validity. External validity was determined by the level to which the outcomes of the study can be generalized from a sample to a population, by ensuring that respondents sampled are an accurate representation of a population.

Content validity is the data that was collected, represents accurately what the researcher would like to know, was ensured through pilot testing. The theoretical relations in variables and comparing with the outcome of the relationships in the pilot testing determined the construct validity.

3.6.2 Reliability of the Instruments

When data is used often, it should produce comparable results. Random mistakes caused deviations from real measurements, which affected the results. Interviewer bias, unclear instructions to respondents, and interviewee weariness all contributed to the random mistakes (Mugenda & Mugenda, 2003). The reliability of the research instrument was determined using Cronbach's coefficients.

3.7 Methods of Data Collection

Data collection procedures refers to the steps and processes involved in realizing the required information from the field guided by the study variables/objectives (Cresswell, 2014). A structured questionnaire was used in realizing primary data from the field. The study instruments contained closed ended questions. The researcher personally delivered the questionnaires to the respondents by the use of the "drop and pick later" technique. The respondents were given a period of one week to fill the questionnaires and return and those who had not finished in the one week were given an additional one week to complete which was accompanied by follow ups by the use phone calls and emails to the respondents reminding them to complete the filing of the questionnaires. At the end of the second week the researcher collected all the questionnaires filled questionnaires; checked them for completeness and prepared them for the analysis.

3.8 Operationalization of Variables

Operationalization of Variables

Variable	Variable Type	Indicators	Measurement Scale	Type of analysis
Quality assurance	Independent	Quality information Quick access Accuracy	Nominal & Ordinal	Descriptive Inferential
Data management	Independent	Data storage Compilation Analysis of data	Nominal & Ordinal	Descriptive Inferential
System resources	Independent	Financing Personnel Logistics support	Nominal & Ordinal	Descriptive Inferential
Technical competency	Independent	Knowledge Skills Abilities	Nominal & Ordinal	Descriptive Inferential
Attaining UHC maternal care	Dependent	Quality Affordability Accessibility Reliability	Nominal & Ordinal	Descriptive Inferential

Table 3.3:

3.9 Data Analysis and Presentation

The data realised from the field was sorted and inspected for completeness in preparation for analysis. SPSS version 25 was used in coding, entering as well as analysing the data (Nehme, 2016). Descriptive statistics such as the mean, frequencies, percentages, standard deviations were used in the analysis of the data. The data was

further presented in tables and figures where the interpretation and explanation was done in prose. Finally, the study conducted the bivariate logistical analysis as well as the multivariate analysis. The study was guided by the following regression model;

$Y = Y = a + bX_1 + cX_2 + dX_3 + eX_3 + \epsilon$

Where:

Y- Dependent variable

X_1, X_2, X_3, and X4 - Independent (explanatory) variables

a – Intercept

b, c, d, e – Slopes.

ϵ – Residual (error)

3.10 Ethical considerations

As Geffner et al. (2018) posits that the objectives of a study should be fulfilled in an efficient and effective way that upholds the norms of conducting studies. All the norms of conducting research were adhered to in this study. Permission to was sought from KeMU directorate of Scientific Ethics and Research Committee (SERC) and NACOSTI letter. Authorization was also sought from Mombasa county health department as well as from CPGH. The given information was kept secret. Prior to the start of the study, the respondents were asked for their informed permission. To ensure the respondents' privacy and ease their fear of victimization, codes were employed to represent respondent names, assuring anonymity.

CHAPTER FOUR

DATA ANALYSIS, INTERPRETATION AND DISCUSSION

4.1 Introduction

This section analyses and presents the data realized from the field. The study aimed at determining the role of the HIS towards the attainment of the UHC in maternal healthcare in CGTRH. Finally, the chapter presents the discussion of the findings.

4.2 Pre-test results

The researcher performed a pre-test study on 9 respondents in Likoni sub-county with the goal of determining the study instrument's validity and reliability. Cronbach's alpha was utilized to determine the questionnaire's internal consistency. The 5-Very good, 4-Good, 3-Fair, 2-bad, and 1-Very poor Likert scales were used to evaluate validity. The results are shown in Tables 4.1 and 4.2.

Table 4.1

Validity

Response	Frequency (N)
Very good	2
Good	6
Fair	1
Poor	0
Very Poor	0
Total	**9**

Focusing on the Covariance(s) a summarized Cronbach's coefficients is presented in table 4.2

Table 4.2

Summarized Cronbach's Coefficients

	Cronbach's Alpha	N of Items	Conclusion
Quality Assurance	0.774	5	scale reliable
Data Management	0.851	5	scale reliable
System Resources	0.813	5	scale reliable
Technical Competency	0.781	5	scale reliable
Achieving Universal Health Care	0.811	5	scale reliable
Overall	**0.806**	**25**	**Instrument reliable**

The alpha value for the four items is 0.806, meaning that the items had reasonably high internal consistency, which is desirable because a reliability coefficient of 0.70 or higher is regarded good and acceptable, according to the data in table 4.2.

4.3 Response Rate

Eighty-nine hospital staff at Coast general teaching and referral hospital formed the study sample. Out of the 89 questionnaires issued out, 80 respondents completed the questionnaires contributing to 90% on rate of resoonse. The response rate can be termed as good for data analysis. As per Mugenda and Mugenda (2009) held that a respose rate of 50% and above is sufficient to analyse and report as it allows for th egenrazqtios of the study findings as presented in table 4.3 ;

Table 4.3

Response Rate

Response	Frequency (N)	Percentage (%)
Completed questionnaires	80	90
Uncompleted questionnaires	9	10
Total	**89**	**100**

4.4 Demographic Information

4.4.1 Respondents' Age

The study requested the respondents to indicate their age and the results are tabulated in table 4.4;

Table 4.4

Age

	Frequency (N)	Percent (%)
18-25 Years	20	25
26-40 Years	33	41
Above 40 Years	27	34
Total	**80**	**100**

As illustrated in table 4.4, most (41%) of the of the respondents were 26-40 years of age, 34% were aged above 40 years while 25% of the respondents were 18-25 years. This implies that the largest age group of respondents fell between ages 26-40 years representing the group with the highest productivity index. The group represents employees who are at their prime productivity levels and hence optimised utilization of the health information system towards the realisation of the universal health care.

4.4.2 Respondents' Gender

Establishing the respondents' gender was a requirement for this study and the outcomes are shown in figure 4.1;

Figure 4.1

Respondents' Gender
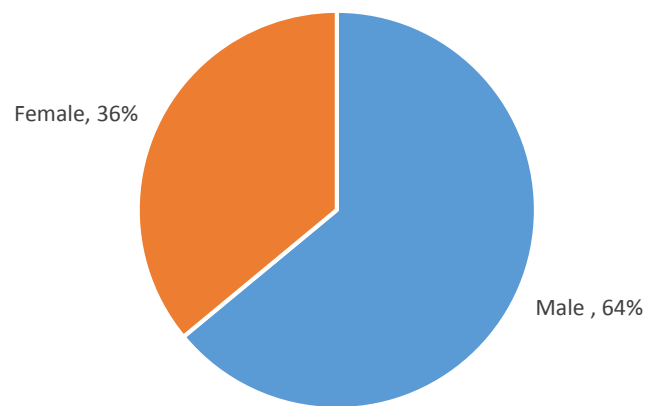
Results in figure 4.1 shows that majority (64%) of the respondents were male while 37% were female. Therefore, the workforce at coast general and referral hospital had the males being more responsive compared to females.

4.4.3 Department/Division of affiliation

The study aimed at establishing the Departmental/Divisional respondent affiliation. The results are presented in table 4.5

Table 4.5:

Department/Division of affiliation

	Frequency (N)	**Percent (%)**
Clinical	7	8.8
Pharmacy	25	31.3
Maternity	20	25.0
Administration	24	30.0
Other	4	5.0
Total	**80**	**100**

Results in table 4.5 shows that most (31.3%) of the respondents worked at the pharmacy department, 30% were under the administration division. Further 25% were at the maternity wing, clinical department composed of 8.8% of the respondents while 5% of the respondents was realized from other departments not included in the list for example the national health insurance fund facility staffs under Linda Mama. The results imply that the respondents were well distributed in all the hospital basic departments that use health information system (HIS) and directly influence the utilization of the health care.

4.4.4 Level of education

Determining the respondent highest academic achievement was a basic requirement for this study. Figure 4.2 shows the distribution;

Figure 4.2

Level of education
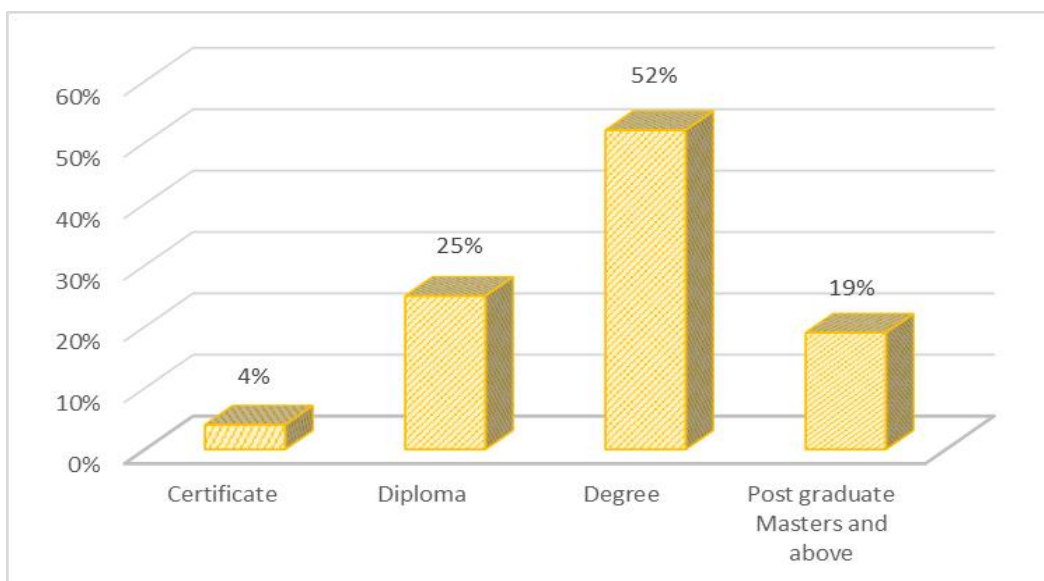
From the results in figure 4.2; majority (52%) of the respondents were degree holders, 25% had diploma qualifications, 19% had postgraduate masters and above while 4% of the respondents had certificate academic level. Implying that the respondents were informed, open and acknowledged IS.

4.4.5 Designation

Respondents' profession was required for this study. The professions were categorized as Nurse, Doctor, Pharmacist, Clinical Officer, Health record & information officer, Hospital Administration/supervisors, Laboratory technician and others. Table 4.6 presents the outcomes;

Table 4.6:

Designation

	Frequency (N)	**Percent (%)**
Clinical Officer	10	12.5
Nurse	36	45.0
Pharmaceutical personnel	27	33.8
Medical officers	4	5.0
Hospital Administration	2	2.5
Other	1	1.3
Total	**80**	**100.0**

Results shows that most (45%) of the respondents were nurses, 33.8% were pharmaceutical personnel, 12.5% were clinical officers, 5% were medical officers, 2.5% were hospital administrators while 1.3% of the respondents came from department(s) that was not included in the list. The results imply that the data was realised from workforce that majority was directly involved with the HIS towards achieving universal health care.

4.4.6 Period of working at the facility

The paper aimed at establishing the period of time the respondents had served in the current stations. The results are tabulated in table 4.7

Table 4.7:

Period of working at the facility

	Frequency (N)	Percent (%)
1-5 years	48	60.0
6-10 years	31	38.8
11years and more	1	1.3
Total	**80**	**100**

Outcomes presented in table 4.7 above shows that majority (60%) of the respondents had served in the hospital for 1-5 years, 38.8% had served for 6- 10 years while 1.3% of the respondents had served for 11years and more. This implied that the respondents had been in the facility for a sufficient period hence conversant with the operations of the HIS aimed at promoting the realization of the universal health care as a considerable portion of the respondents had served for five years.

4.4.7 Recording and Reporting health services

Establishing the involvement of the respondents in recording and reporting health services in their departments was a basic requirement for this study. The results are presented in the figure 4.3

Figure 4.3:

Recording and Reporting health services
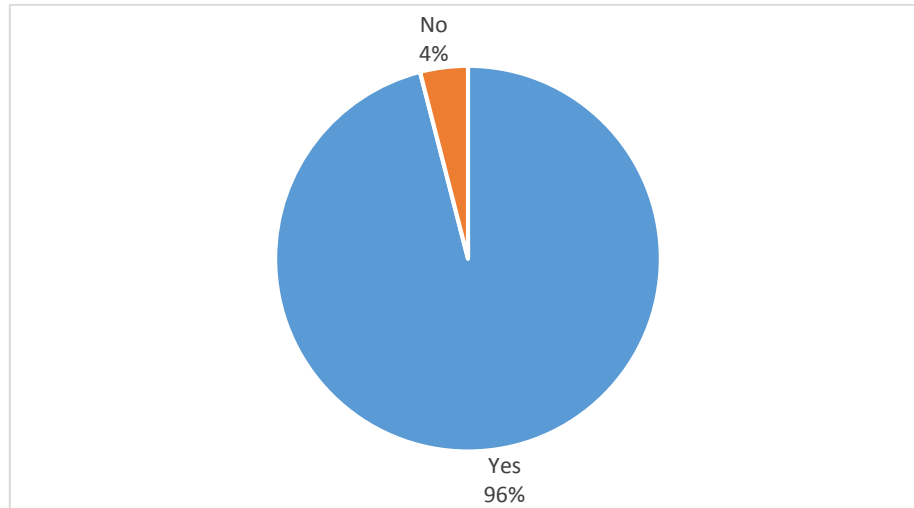
Outcomes in figure 4.3 shows that majority (96%) of the respondents were involved in recording and reporting health services in their departments. The outcome implies that the respondents were directly involved in the operations at the coast general teaching and referral hospital aimed at realizing the universal health care in maternal care.

4.4.8 Presence of Health Information Systems

The study further aimed establishing whether there were any health information systems in place for recording health information. The results are presented in the figure 4.4 below

Figure 4.4

Presence of Health Information Systems
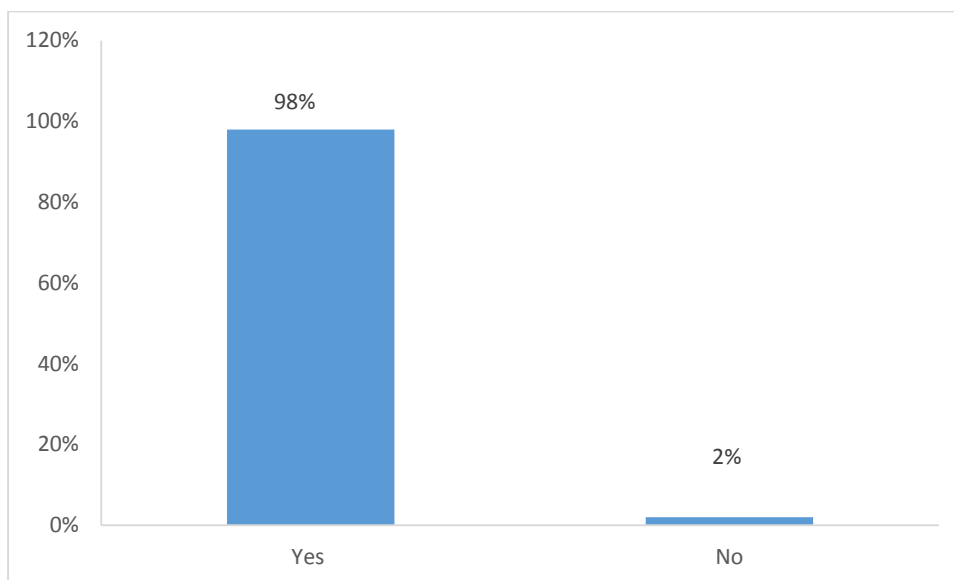
Findings in figure 4.4 shows that majority (98%) of the participants were aware of Health Information Systems in place for recording health information while only two percent indicated otherwise. This implies that the facility recognizes the importance of having a health information system, which helps in developing a database that would guide in decision-making and developing frameworks towards the universal health care in maternal health.

4.5 Utilization of HIS at CGRH

Determining the level of utilization of hospital information system at the management, finance, clinical and health records departments was a basic requirement for this study. A 5-point scale (1-5) was used where 1- Not utilized at all and 5 – Highly Utilized. Table 4.8 presents the outcomes:

Table 4.8

Utilization of HIS at CGRH

Module	Mean	Std Dev.
Management utilizes of HIS at CGRH	4.5750	0.49746
Finance department utilizes of HIS at CGRH	4.5175	0.52756
Clinical department utilizes of HIS at CGRH	4.4500	0.54888
Health Records department utilizes of HIS at CGRH	4.4375	0.54888

Results presented 4.8 shows that the respondents largely agreed that hospital information system was highly utilized in the management department (Mean= 4.5750) and Finance department (Mean=4.5175). Further, the results show that HIS was utilized at the Clinical department and health records with mean score of 4.4500 and 4.4375 respectively. The results imply that the fundamental departments of the facility have adopted and use the HIS in their day-to-day operations.

4.6 Quality Assurance in UHC

The study used a scale of 1-5 where 1-strongly disagree while 5-Strongly agree, participants were asked to rate the statements below that relate to the role of Quality Assurance in UHC. Table 4.9 presents the study results;

Table 4.9

Quality Assurance in UHC

	Mean	Std. Dev.
Monthly reports are submitted on or before 5th of every month to the health records department.	4.6000	0.58677
Data compiled is used to make informed decision to improving health care at the facility.	4.4125	0.60991
The data records in the DHIS2 are similar to the data on the primary source.	4.4000	0.58677
Key data series from the monthly reports are completely filed.	4.3500	0.57589
System can generate a complete record report without discrepancies	4.3125	0.56465

Outcomes in table 4.9 indicates that the respondents strongly agreed that monthly reports were submitted on or before fifth of every month to the health records department (Mean=4.6000). In addition, the respondents agreed that data compiled was used to make informed decisions to improving health care at the facility (Mean=4.4125) and that data records in the DHIS2 were mostly similar to the data on the primary source(s) (Mean=4.4000). Also agreed the key data series from the monthly reports were completely filed (Mean=4.3500) and that the facility system generate complete record reports without discrepancies (Mean=4.3125). This implies the hospital staffs knew the role played by assuring quality in the realization of the universal health care in maternal care.

The results agree with the findings of Ogbuabor and Onwujekwe (2019) on the influence of quality assurance on the achievement of universal health coverage in maternal care with what they had learned from a programmer that offered a free maternal and child healthcare in Nigeria where the systems installed in the study facilities generated complete record reports without discrepancies to satisfaction of the service seekers and the providers.

4.7 Data Management in UHC

The respondents were asked to rate their level of agreement to the statements below that relate to the role of Data Management in UHC. The results are tabulated in table 4.10;

Table 4.10

Data Management in UHC

	Mean	Std. Dev.
Processing of registration for women seeking maternal services is done within 24 hours	4.6125	0.53943
Health facility data is used to monitor performance of service delivery.	4.5125	0.55103
Data processed is used to make decisions toward improved health outcomes.	4.4875	0.55103
Health records information officer in the facility coordinates submission of all health records to NHIF office for women seeking maternal care	4.3750	0.55972
Health data uploaded on DHIS comes from patients' medical records	4.3250	0.54599

Results shows that the respondents strongly agreed that processing of registration for women seeking maternal services was done within 24 hours (Mean=4.6125) and that the health facility data was used to monitor performance of service delivery (Mean=4.5125). Further the respondents agreed that data processed was used to make decisions toward improved health outcomes (Mean=4.4875). Also agreed that health records information officer in the facility coordinates submission of all health records to NHIF office for women seeking maternal care (Mean=4.3750) and that Health data uploaded on DHIS comes from patients' medical records aggregated in their monthly reports (Mean=4.3250). The results imply that data management is key component in guiding decisions aimed at realizing universal health care.

The outcomes agree with the findings by Kanu (2019) where all the independepnt variables under data management had a positive significant influence on the realisation of universal health care in maternal health care. Further the findings agreed with findings by Amu, *et al*. (2018) that data management reduced delays in accessing the health records and consequently access to maternal health care.

4.8 System Resources in UHC

The study required the respondents to rate their level agreement with statements below that relate to the role of System Resources in UHC. Table 4.11 presents the results;

Table 4.11

System Resources in UHC

Statement	Mean	Std Dev.
Adequate technology infrastructure has been laid down for the HIS operation	4.5625	0.57023
Adequate financing has been done on operational maintenance of the Health Information System in the facility	4.5250	0.55060
Logistics of commodities have been well streamlined to ensure smooth implementation of the HIS	4.5000	0.50315
The Health Information System in the hospital has been integrated with other systems like health insurance for better decision making	4.3750	0.55972
There are enough personnel that have been employed to actualize the Health Information System in this facility	4.2875	0.55561

The respondents strongly agreed that adequate technology infrastructure had been laid down for the HIS operation (Mean=4.5625) and that adequate financing had been done on operational maintenance of the Health Information System in the facility

(Mean=4.5250). In addition, logistics of commodities had been well streamlined to ensure smooth implementation of the HIS (Mean=4.5000). Moreover, the respondents further agreed that the Health Information System in the hospital had been integrated with other systems like service delivery points, national health insurance for better outcomes and improved decision making (Mean=4.3750). In addition, there were enough personnel that had been employed to actualize the Health Information System in the facility (Mean=4.2875). The results depict that the investment done in the actualization of the system was crucial in the realization of the universal health care specifically in the maternal care.

The findings support the findings by (Jat et al.,2011) that availability and distribution of infrastructure and technical human resources in the state hospitals which was key in the success towards the UHC in maternal care. In addition, the study findings agreed with Madaj, Bar-Zev and van den Broek (2019) who arued that system resources were had a positive significant influence on the achievement of universal health care in maternal health care.

4.9 Technical Competency in UHC

The respondents were requested to indicate their level of agreement with statements on the role of Technical Competency in UHC. Table 4.12 presents the findings;

Table 4.12

Technical Competency in UHC

Statement	Mean	Std Dev.
The DHIS is user friendly and efficient	4.5500	0.54888
Health data indicators are used as performance indicators by health managers	4.5125	0.54988
All required HIS reporting tools are available in the facility	4.4500	0.57147
Monthly data review meetings are being conducted to analyse the information generated	4.4125	0.54410
Healthcare workers are all skilled to utilize the HIS and interpret data	4.3250	0.52229

The respondents strongly agreed that the DHIS was user friendly and efficient (Mean=4.5500) and that health data indicators were used as performance indicators by health managers (Mean=4.5125). Additionally, the respondents agreed that all required HIS reporting tools were available in the facility (Mean=4.4500) and that monthly data review meetings were being conducted to analyse the information generated (Mean=4.4125). Moreover, healthcare workers were all skilled to utilize the HIS and interpret data (Mean=4.3250). The outcomes imply that the hospital's management gave the necessary training/skills and mentorship that would allow the staff to utilise the HIS purposed to realise the universal health care under the maternal health.

The findings agree with Nguyen (2018) that technical competency of data managers had a siginifcant influence on achieving universal health care in maternal health care. Further the findings supported the findings of Urquieta-Salomón and Villarreal (2016)

that the technical competency of data managers had a significant influence on achieving universal health care in maternal health care.

4.10 Achieving Universal Maternal Health Care

The participants were asked to evaluate their agreement with the following statements on attaining universal maternal health care. The results are shown in Table 4.13.

Table 4.13

Achieving Universal Health Care

Statement	Mean	Std Dev.
Women who seek maternal care in the facility receive 100% free services	4.5875	0.52032
There is an increase in maternal care services in the facility after free maternal care services begun	4.4000	0.51803
All the required drugs are available for maternal care services	4.3875	0.51543
The rate of morbidity and mortality is low due to quality of care	4.3625	0.53353
Registration of child births for national scheme waiver is done within 24 hours	4.3515	0.50925

The results indicate that the respondents strongly agreed that women who sought for maternal care in the facility received around 100% free services (Mean=4.5875). Further the respondents agreed that there was an increase in maternal care services in the facility after free maternal care services begun (Mean=4.4000) and that all the required drugs were available for maternal care services (Mean=4.3875). Further the participants agreed that the rate of morbidity and mortality reduced due to quality of care (Mean=4.3625) and that registration of childbirths for national scheme waiver was done within 24 hours (Mean=4.3515). The results imply that activities aimed at realizing universal health care were incorporated and coordinated towards the universal health coverage.

4.11 Inferential Statistics

A linear regression model was used with the aim of establishing determine the predictive power of the independent variables in achievement of universal health coverage in maternal care. This included the Model, ANOVA of regression and coefficient of determination. SPSS version 25 was used in transforming and computation of regression statistics.

Coefficient of determination (R^2) is the level of changes recorded by the dependent factor is better interpreted by the changes in the independent factors or by the variation percentage exhibited by the dependent factor (the achievement of universal health coverage in maternal care) which is explained by independent factors (Quality assurance, Data management, System resources and Technical competency).

Table 4.14

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0. 863a	0.745	0.694	0.050769

   a. Predictors: (Constant), Quality assurance, Data management, System resources and Technical competency

The four independent variables influence 69.4% of the achievement of universal health coverage in maternal care at the coast general and referral hospital as represented by R^2. Therefore, this an implication that other factors not covered in this study influence 30.6% of achievement of universal health coverage in maternal care at the coast general and referral hospital. Hence in the future a study should be conducted in order to establish the other factors that influence 30.6% of achievement of universal health coverage in maternal care at the coast general and referral hospital.

*Ta*ble 4.15

ANOVA of regression

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	3.793	4	0.948	17.716	0.000[b]
Residual	4.015	75	0.054		
Total	7.808	79			

a. Dependent Variable: Universal Health Coverage in Maternal Care

b. Predictors: (Constant), Quality assurance, Data management, System resources and Technical competency.

The model was statistically significant in the prediction of how quality assurance, data management, system resources and technical competency influenced the UHC in maternal care at CGTRH as it recorded a significance value of 0.000 and is below 0.05. At 5% significance level the F critical was 17.716. The calculated F was bigger than the F critical implying that the model was overall significant.

4.11.1 Coefficient of Determination

The study conducted the multiple regression analysis aiming at determining the degree to which each independent variable influences the universal health coverage in maternal care at coast general and referral hospital. The table 4.15 indicates that the four independent factors were significant predictors of universal health coverage in maternal care at coast general and referral hospital, $p < 0.05$.

Table 4.16:

Coefficient of Determination

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.444	0.360		4.013	0.000
	Quality Assurance	0.631	0.110	0.103	1.923	0.003
	Data Management	0.735	0.110	0.114	2.841	0.002
	System Resources	0.713	0.134	0.266	4.009	0.000
	Technical Competency	0.782	0.117	0.474	5.078	0.001

a. Dependent Variable: Universal Health Coverage in Maternal Care

As per the SPSS generated table above, the regression equation is: ($Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \beta_4X_4 + \varepsilon$) becomes:

$Y = 1.444 + .631X_1 + .735X_2 + .713 X_3 + .762 X_4 + \varepsilon$

The regression model shows that (quality assurance, data management, system resources and technical competency) to be constant at zero, universal health coverage in maternal care would be 1.444. The study findings show that holding all factors at zero; a unit increase in quality assurance leads to a 0.631 increase in universal health coverage in maternal care; a unit increase in data management leads to a 0.735 increase in universal health coverage in maternal care. In addition, a unit increase in System Resources leads to a 0.713 increase in universal health coverage in maternal care; a unit increase in Technical Competency leads to a .782 increase in universal health coverage in maternal care. The results infer that the four factors studied were significant in the realization universal health coverage in maternal care where system resources (sig0.000) was the most significant factor at 95% level of confidence followed by

Technical Competency, Data Management and Quality Assurance with significance values of 0.001, 0.002 and 0.003 respectively. System resources have the greatest contribution to achieving Universal Health Coverage in Maternal Care followed by Technical Competency and Data Management with significance value of 0.001, 0.002 while quality assurance have the least influence towards achieving Universal Health Coverage in Maternal Care.

4.11.2 Bivariate Logistical Analysis

Finally, a bivariate logistical analysis was conducted in determining the connection that exits between the study variables by the use of the spearman's rho. Table 4.17 presents the findings;

Table 4.17:

Bivariate Logistical Analysis

			Quality Assurance	Data Management	System Resources	Technical Competency
Spearman's rho	**Quality Assurance**	Correlation Coefficient	1.000	0.575	0.704	0.716
		Sig. (2-tailed)	0.0	0.000	0.000	0.000
		N	80	80	80	80
	Data Management	Correlation Coefficient	0.575	1.000	0.610	0.534
		Sig. (2-tailed)	.000	0.0	0.000	0.000
		N	80	80	80	80
	System Resources	Correlation Coefficient	0.704	0.610	1.000	0.661
		Sig. (2-tailed)	0.000	0.000	0.00	0.000
		N	80	80	80	80
	Technical Competency	Correlation Coefficient	0.716	0.534	0.661	1.000
		Sig. (2-tailed)	0.000	0.000	0.000	0.0
		N	80	80	80	80

Table 4.17 results shows that the independent variables correlate with each other as follows; the quality assurance variable positively correlates with data management with a correlation coefficient of 0.575. Also, quality assurance positively correlates with system resources with a correlation value of 0.704. In addition, the quality assurance factor positively correlates with technical competency of the employees with correlations coefficient of 0.716. Further, the results indicate that data management positively correlates with the system resources with a correlation coefficient of 0.610. In addition, the data management showed a positive and significant connection with technical competency of the workers with correlations value of 0.534. Finally, the bivariate logistical analysis established that the technical competency and system resources affects each other positively with a correlations value of .661. The quality assurance and the system resources had the strongest correlation between each other. Further the weakest correlation existed between the the data management and the technical competency of the workers with correlations value of 0.534. The variables with positive correlations implies that when one increases the other one also tends to increase as well. For example, in this case an increase in technical competency leads to a corresponding increase in data management determined by the multiplier of 0.534.

The findings agree with Maphumulo and Busisiwe (2019) that quality assurance played a significant role in the achievement of universal health coverage for maternal care. Also the findings agree with findings of Ogbuabor and Onwujekwe (2019) that quality assurance significantly influenced the achievement of universal health coverage in maternal care by increasing the use and quality of maternal and child services in Nigeria.

Further the study findings agree with the findings of Kanu (2019) that the management of data had a significant positive influence on the achievement of universal health care

in maternal health care in Sierra Leone. Moreover, the study results are in line with the findings a study by Bruno (2018) that data management played a positively significant role in achieving universal health care in maternal health care in Belgium.

In addition, the study agrees with (Jat et al.,2011) that system resources was significant in achieving universal health care in maternal health care in Madhya Pradesh. Further, the study findings agreees with the findings of a study done in India and Bangladesh by Madaj et al.(2019) which found that system resources were had a positive significant influence on the achievement of universal health care in maternal health care.

Also, the results agrees with Urquieta-Salomón and Villarreal (2016) that technical competency of data managers had a significant influence on achieving universal health care in maternal health care in Mexico. Moreover, the study findings agrees with the findings of a study by Nguyen (2018) that technical competency of data managers had a siginifcant influence on achieving universal health care in maternal health care in Vietnam.

Finally, the results agrees with Limwattananon et al (2016) that the health information systems play a vital role in monitoring and achieving the universal maternal care in the case of Rwanda health system.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS.

5.1 Introduction

The section summarises the findings, derived conclusions as wells the recommendations on the role of health information system towards the achievement of UHC in maternal care: a case of coast general teaching and referral hospital. The section also includes areas that require additional study.

5.2 Summary of Findings

The study found that hospital information system was utilized in all the key departments focused on realizing the universal maternal health care. The departments include management department, finance department, clinical department, health records department, pharmaceutical division, maternity wing as well in the administration department.

5.2.1 Quality Assurance in UHC

The study found that monthly reports were submitted on or before fifth of every month to the health records department and that, data compiled was used to make informed decisions to improving health care at the facility. In addition, found that data records in the DHIS2 were similar to the data on the primary source(s). Also, found that key data series from the monthly reports were completely filed and that the facility system generate complete record reports without discrepancies.

5.2.2 Data Management in UHC

The study found that processing of registration for women seeking maternal services was done within twenty hours and that the health facility data was used to monitor

performance of service delivery. Further the study findings show that data processed was used to make decisions toward improved health outcomes. The study further found that health records information officer in the facility coordinates submission of all health records to NHIF office for women seeking maternal careand that Health data uploaded on DHIS comes from patients' medical records implying that data management is key component in guiding decisions aimed at realizing universal health care.

5.2.3 System Resources in UHC

The study found that adequate technology infrastructure had been laid down for the HIS operation and that adequate financing had been done on operational maintenance of the Health Information System in the facility. In addition, the study found that logistics of commodities was well streamlined to ensure smooth implementation of the HIS. Moreover, the study found that that the Health Information System in the hospital had been integrated with other systems like health insurance for better decision making and that there were enough personnel that had been employed to actualize the Health Information System in the facility.

5.2.4 Technical Competency in UHC

The study found that the DHIS was user friendly and efficient and that health managers used health data indicators as performance indicators. Additionally, the study found that all required HIS reporting tools were available in the facility and that monthly data review meetings were being conducted to analyse the information generated. Moreover, the study found that healthcare workers were all skilled to utilize the HIS and interpret data. Further the study found that the hospital's management gave the necessary

training/skills that would allow the staff to utilise the HIS purposed to realise the universal health care.

5.2.5 Achieving Universal Maternal Health Care

The study found that the DHIS was user friendly and efficient and that health data indicators were used as performance indicators by health managers. Additionally, the paper found that all required HIS reporting tools were available in the facility and that monthly data review meetings were being conducted to analyse the information generated. Moreover, the study found that the healthcare workers were all skilled to utilize the HIS and interpret data and the hospital's management gave the necessary training/skills that would allow the staff to utilise the HIS purposed to realise the universal health care.

In the inferential statistics the study found that that the four factors (system resources technical competency, data management and quality assurance) studied were significant in the realization universal health coverage in maternal care. Finally, the study found that system resources (sig0.000) was the most significant factor at 95% level of confidence followed by technical competency, data management and quality assurance with significance values of 0.001, 0.002 and 0.003 respectively.

5.3 Conclusions

The study concludes that hospital information system was utilized in all the key departments focused on realizing the universal maternal health care. The departments include management department, finance department, clinical department, health records department, pharmaceutical division, maternity wing as well in the administration department.

The study concludes that monthly reports were submitted on or before fifth of every month to the health records department and that, data compiled was used to make informed decisions to improving health care at the facility. In addition, the study concludes that data records in the DHIS2 were similar to the data on the primary source(s). Also, concludes that key data series from the monthly reports were completely filed and that the facility system generates complete record reports without discrepancies.

The study concludes that processing of registration for women seeking maternal services was done within 24 hours and that the health facility data was used to monitor performance of service delivery. Further the study findings show that data processed was used to make decisions toward improved health outcomes. The study further concludes that health records information officer in the facility coordinates submission of all health records to NHIF office for women seeking maternal careand that Health data uploaded on DHIS comes from patients' medical records implying that data management is key component in guiding decisions aimed at realizing universal health care.

The study concludes that adequate technology infrastructure had been laid down for the HIS operation and that adequate financing had been done on operational maintenance of the Health Information System in the facility. In addition, the study concludes that logistics of commodities was well streamlined to ensure smooth implementation of the HIS. Moreover, the study concludes that that the Health Information System in the hospital had been integrated with other systems like health insurance for better decision making and that there were enough personnel that had been employed to actualize the Health Information System in the facility.

The study concludes that the DHIS was user friendly and efficient and that health managers used health data indicators as performance indicators. Additionally, the study concludes that all required HIS reporting tools were available in the facility and that monthly data review meetings were being conducted to analyse the information generated. Moreover, the study concludes that healthcare workers were all skilled to utilize the HIS and interpret data. Further the study concludes that the hospital's management gave the necessary training/skills that would allow the staff to utilise the HIS purposed to realise the universal health care.

The study concludes that the DHIS was user friendly and efficient and that health data indicators were used as performance indicators by health managers. Additionally, the paper concludes that all required HIS reporting tools were available in the facility and that monthly data review meetings were being conducted to analyse the information generated. Moreover, the study concludes that the healthcare workers were all skilled to utilize the HIS and interpret data and the hospital's management gave the necessary training/skills that would allow the staff to utilise the HIS purposed to realise the universal health care.

In the inferential statistics the study concludes that that the four factors (system resources technical competency, data management and quality assurance) studied were significant in the realization universal health coverage in maternal care. Finally, the study concludes that system resources (sig0.000) was the most significant factor at 95% level of confidence followed by technical competency, data management and quality assurance with significance values of 0.001, 0.002 and 0.003 respectively.

5.4 Recommendations

The study recommends that in order to promote quality assurance towards universal health coverage in maternal healthcare, the hospital should install a system that would act as the database specifically for the mothers during Antenatal Care, Postnatal Care and Child Welfare Clinic. Establishing the focused database separates the generalisation of the maternal information with the services offered at the facility.

The study further recommends that in order to promote data management aimed at achieving universal maternal health care, the hospital management should ensure that data from all the respective departments handling maternal information is submitted every week as monthly submission makes it bulky and tedious to handle and would to mixing up of data.

In addition, the study recommends that in order to promote the exploitation of system resources towards the universal maternal health care, the facility should practice the division of labour and specialisation and the employees are assigned to tasks that they are good at. This would promote the productivity, clarity and accuracy of the information produced/processed/submitted.

The study recommends that in order to promote technical competency the hospital management should empower their workers by giving them the autonomy where the employees can make minor decisions without consulting with the management or supervisors. The autonomy gives the workers the ownership and power in managing a task assigned to them aiming at promoting the realisation of the universal maternal health care.

5.5 Areas for Further Research

In conducting the study, areas that need further research were noted. A similar study should be done to find out the other health information system related factors that affect the achievement of universal health coverage in maternal care CGTRH. In addition, the study recommends a study be conducted to establish the factors that influence the interventions by the government in curbing the spread of Covid-19 focusing on expectant mothers. Further, a study should be conducted on the effectiveness of e-learning on patient outcomes under the UHC package.

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APPENDICES

Appendix I: Introduction Letter

Dear Sir/madam.

RE: <u>Request to Fill in the Questionnaire</u>

Dear Respondent,

I am a Kenya Methodist University student carrying out a study on the role of the health information systems towards the attainment of the universal health coverage in maternal healthcare within Mombasa. This is to fulfil the requirement of the University Master of Science in Health Systems Management program.

Completing the questionnaire is anticipated to go for less than 20 counted minute. Please ensure you give an accurate answer for all the questions asked of you. Your participation to this proposal will not go un-noticed. Be assured that the data you share with me will be secured and protected to the later. Use all the information given to the questionnaires will only for all the academic purposes.

Kindly save some time to complete the questions asked.

Yours faithfully,

Zahra M Awadh

Appendix II: Informed Consent Form

Kenya Methodist University

P. 0 Box 267-60200

MERU, Kenya

SUBJECT: INFORMED CONSENT

Dear Respondent,

My name is Zahra Mbarak Awadh, I am a Msc student from Kenya Methodist University. I am conducting a study titled: The Role of health Information in the attainment of Universal Health Coverage in maternal care.

All the finding from this study will be utilised to helping the health sector in Kenya and the entire region of Africa. This will be as a win to not only countries in Africa but the communities and people in the nations. The proposal will not only help the health sector but also it will help to enforce more knowledge to the policy makers to be able to anticipate in the future health issues.

Procedure to be followed

As a researcher there are some question I will require you to answer and I will record most of them if need be. All the department of the hospital will be reviewed to corporate for me to ensure that the questionnaires are well filled.

You can ether chose to answer the questions or not since it is not by force. No one will be able to penalize you by not answering some or all the questions in the questionnaire. You will be ensured that no one will tamper with your working schedule in your working station.

Participating in this study is by volunteering. Any question that is related to the study is highly welcomed and will be answered accordingly. You have the right to not to answer any question asked and you can walk out of the interview if you wish or not comfortable with the question asked. Not all this will be penalised by any person or institution.

Benefits

Your participation to this study will help in stabilizing all the health system m in Kenya and Africa at large. People and organisation will benefit because of your participation from this study to the health system. There will be generation of new knowledge to policy makers and government institution in charge with health and in the future people will be able to receive treatment as needed.

Rewards

There will be NO prices or rewards of any kind given to any person who wish to partake this study.

Confidentiality

The proceedings of this study will be done in a more private place selected in the hospital. There will be NO recording of names and any other individual identification and if need be the information given will be put in a well-protected place in the university.

Contact Information

The following supervisors will be presence and ready to help if contacted due to any question or quarrel:

1. Dr Caroline Kawila.

2. Dr. Kezia Njoroge: **H.O.D,** Health Systems Management. KeMU

Participant's Statement

The given statement above concerning how to handle this document is clear to me. I have been provided with the freedom to do what I wish as per the guideline highlighted above. I am participating in this study by volunteering. There will be no rewards given before or after the study is complete. I have under stood each detail and no one will victimize me and I can leave the interview as I wish and if am not comfortable with the proceedings. Finally, I understand that the study will not interfere with my work schedule at my workstation.

Name of Participant………………………..Date…………………………..

Signature……………………………………….

Investigator's Statement

I, the undersigned, have explained the procedures to be followed in the study, to the volunteer in a language s/he understands.

Name of Interviewer…………………………………… Date…………………….

Interviewer Signature…………………………………………

Appendix III: Questionnaire

Introduction:

The purpose of this questionnaire is to collect data on the perception and views from Administrator, departmental heads, health providers and health record officers on 'the role of health information system towards the achievement of universal health coverage in maternal care: a case of Mombasa county'.

Section A: Background Information

Tick the most appropriate

4   What is your Age?

      a) 18-25   ☐

      b) 26-40   ☐

      c) Above 40   ☐

5   What is your Gender?

      (a) Male   ☐

      (b) Female   ☐

6   What is your Department/Division of affiliation?

      a) Clinical department   ☐

      b) Pharmacy   ☐

      c) Maternity   ☐

      d) Administration   ☐

      e) Other...............................☐

7   What is your Level of education?

    a) Certificate ☐

    b) Diploma ☐

    c) Degree ☐

    d) Post graduate Masters and above ☐

8   What is your Designation?

    a) Nurse ☐

    b) Doctor ☐

    c) Pharmacist ☐

    d) Clinical Officer ☐

    c) Health record & information officer ☐

    d) Hospital Administrator ☐

    e) Laboratory technician ☐

    f) Other.. ☐

9   For how long have you been working in this facility?

    a) Less than 1 year ☐

    b) 1-5 years ☐

    c) 6-10 years ☐

    d) 11years and more ☐

10 Do you record, and report health services in your department?

    a) Yes

b) No

11 Are there any health information systems in place for recording health information?

a) Yes

b) No

Section B: The Role of Quality Assurance in UHC

12 The extend at which you agree with the statements on The Role of Quality Assurance in UHC given scale is. 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree.

STATEMENT	1	2	3	4	5
Monthly reports are submitted on or before 5th of every month to the health records department.					
The data records in the DHIS2 are similar to the data on the primary source.					
Key data series from the monthly reports are completely filed.					
Data compiled is used to make informed decision to improving health care at the facility.					
System can generate a complete record report without discrepancies					

13 What other roles does quality assurance play in the achievement of UHC in maternal care?

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....84...

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Section C: Role of Data Management in UHC

14 The extend at which you agree with the statements on Role of Data Management in

UHC. Given scale is. One= Strongly Disagree, two= Disagree, 3= Neutral, 4=

Agree, 5= Strongly Agree.

Statement	1	2	3	4	5
Data processed is used to make decisions toward improved health outcomes.					
Health records information officer in the facility coordinates submission of all health records to NHIF office for women seeking maternal care					
Health facility data is used to monitor performance of service delivery.					
Processing of registration for women seeking maternal services is done within 24 hours					
Health data uploaded on DHIS comes from patients' medical records					

15 What other roles does data management play in the achievement of UHC in

maternal care?

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

……………………………………………………………………………………………

Section D: Role of System Resources in UHC

16 The extend at which you agree with the statements on Role of System Resources in

UHC. Given scale is. 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5=

Strongly Agree

Statement	1	2	3	4	5
Adequate technology infrastructure has been laid down for the HIS operation					
There are enough personnel that have been employed to actualize the Health Information System in this facility					
The Health Information System in the hospital has been integrated with other systems like health insurance for better decision making					
Adequate financing has been done on operational maintenance of the Health Information System in the facility					
Logistics of commodities have been well streamlined to ensure smooth implementation of the HIS					

17 What other roles do system resources play in the achievement of UHC in maternal

care?

……………………………………………………………………………………

………………………………………………86…………………………………………

……………………………………………………………………………………

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Section E: Role of Technical Competency in UHC

18 The extend at which you agree with the statements on Role of Technical Competency in UHC. Given scale is. 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Statement	1	2	3	4	5
The DHIS is user friendly and efficient					
Healthcare workers are all skilled to utilize the HIS and interpret data					
Monthly data review meetings are being conducted to analyse the information generated					
All required HIS reporting tools are available in the facility					
Health data indicators are used as performance indicators by health managers					

19 What other roles do technical competencies play in the achievement of UHC in maternal care?

……………………………………………………………………………………

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Section E: Achieving Universal Health Care

20 The extend at which you agree with the statements on Achieving Universal Health Care. Given scale is 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Agree, 5= Strongly Agree

Statement	1	2	3	4	5
Women who seek maternal care in the facility receive 100% free services					
The rate of morbidity and mortality is low due to quality of care					
Registration of child births for national scheme waiver is done within 24 hours					
There is an increase in maternal care services in the facility after free maternal care services begun					
All the required drugs are available for maternal care services					

21 To what extent do the mentioned departments utilize HIS in the hospital (On the scale of 5-1? Indicate 5 – Highly Utilised, 4 – Utilised, 3- Moderate utilization, 2- Rarely Utilised, 1- Not utilised at all).

Module	1	2	3	4	5
Management					
Clinical					
Health Records					
Finance					

March 23, 2021   KeMU/SERC/HSM/13/2021

Zahra Mbarak Awadh
Kenya Methodist University

Dear Zahra,

SUBJECT: THE ROLE OF HEALTH INFORMATION SYSTEMS TOWARDS THE ACHIEVEMENT OF UNIVERSAL HEALTH COVERAGE IN MATERNAL CARE: A CASE OF COAST GENERAL TEACHING AND REFERRAL HOSPITAL

This is to inform you that Kenya Methodist University Scientific Ethics and Review Committee has reviewed and approved your above research proposal. Your application approval number is KeMU /SERC/HSM/13/2021. The approval period is 23rd March 2021 –23rd March 2022.

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 Kenya Methodist University Scientific Ethics and 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 KeMU SERC 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 KeMU SERC 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 KeMU SERC.

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

Yours sincerely,

Dr. A. WAMACHI
Chair, SERC

V: INTRODUCTION LETTER:

KENYA METHODIST UNIVERSITY

P. O. Box 267 Meru - 60200, Kenya   Fax: 254-64-30162

Tel: 254-064-30301/31229/30367/31171   Email: deanrd@kemu.ac.ke

DIRECTORATE OF POSTGRADUATE STUDIES

March 23, 2021

Commission Secretary,
National Commission for Science, Technology and Innovations,
P.O. Box 30623-00100,
NAIROBI.

Dear sir/ Madam,

RE: ZAHRA MBARAK AWADH (HSM-3-7624-3/2011)

This is to confirm that the above named is a bona fide student of Kenya Methodist University, Department of Health Systems Management undertaking a Degree of Master of Health Systems Management. She is conducting research on 'The role of health information systems towards the achievement of universal health coverage in maternal care: A case of Coast General Teaching and Referral Hospital'.

We confirm that her Research proposal has been defended and approved by the University.

In this regard, we are requesting your office to issue a permit to enable her collect data for her research.

Any assistance accorded to her will be appreciated.

Thank you.

Dr. John Muchiri, PHD.
Director Postgraduate Studies

VI: NACOSTI

NATIONAL COMMISSION FOR SCIENCE,TECHNOLOGY & INNOVATION

P O Box 30623 - 00100 Nairobi
Tel.: 020-3310571,020-2241349
INVOICING DATE-09/Apr/2021

INVOICE: **10550**

INVOICE TO:
Zahra Mbarak Awadh
Kenya

ITEM DESCRIPTION	CATEGORY OF RESEARCH	PROCESSING FEE	TOTAL AMOUNT (KSHS)
Application Fees For - Research (Masters) Health Sciences - Kenyan Citizens	Research (Masters)	1,000	1,000
Total Amount Payable (Kshs)			1,000

Issued By : -

Payment to be made to our account as detailed below:

East African Citizens - Kenya Shillings Account

Mobile money: Mpesa Express or Paybill Number **680907**
or
Account Name: National Commission for Science, Technology and Innovation
Account No.:   **1104162547**
Bank: KCB Bank, Kipande House Branch, NAIROBI

Non-Kenyans - US Dollar Account

Account Name: National Commission for Science, Technology and Innovation
Account No.: **1001467375**
Bank: NCBA Bank, City Centre Branch, NAIROBI

National Commission for Science, Technology and Innovation is ISO 9001:2015 Certified
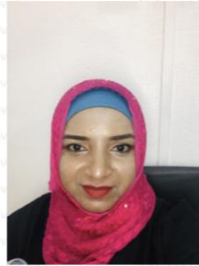
NACOSTI LETTER:

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR
SCIENCE,TECHNOLOGY & INNOVATION

Ref No: **538211**

Date of Issue: **28/July/2021**

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