PERFORMANCE OF PUBLIC HOSPITALS IN KENYA: THE ESSENTIAL ROLE OF MANAGEMENT

BY

FRANCIS KIMANI MWIHIA

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DECLARATION

This thesis is my original work and has not been previously presented for the award of a degree in any institution of higher learning.

Signed…… Date……...

Francis Kimani Mwihia

This thesis has been submitted for examination with our approval as University Supervisors:

Prof. Germano Mwabu

School of Economics, University of Nairobi

Signed…… Date……...

Dr. Elizabeth A. Owiti

School of Economics, University of Nairobi

Signed…… Date……...

Prof. Benson B. A. Estambale Jaramogi Oginga Odinga University of Science and Technology & (UNITID), University of Nairobi

Signed…… Date……..

Dr. Urbanus Kioko

School of Economics, University of Nairobi

Signed…….. Date……

DECLARATION OF ORIGINALITY

University of Nairobi

Declaration of Originality

This form must be completed and signed for all research work submitted to the University for Examination

Name of the Student: Francis Kimani Mwihia

Registration Number: W80/85341/2012

College: College of Health Sciences

Faculty/School/Institute: University of Nairobi Institute of Tropical and Infectious Diseases (UNITID)

Course Name: Doctor of Philosophy (Ph.D) in Medical Statistics

Title of the research work: Performance of Public Hospitals in Kenya: The Essential Role of Management

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DEDICATION

This thesis is dedicated to my beloved wife, Christine Njeri, and my loving children, Mr. Lawrence Muriuki, Ms. Grace Gathoni and Dr. Winfred Wanjiru for their encouragement and moral support throughout the period of this study. To all patients and communities, health workers, and health managers from whom I have learned so much; I say thank you.

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ABSTRACT

Background: Most African governments have made commitments to provide universal health coverage as a human right and to reduce inequalities in health outcomes among their citizens. Achieving these goals requires increased investment in health facilities and greater outlays on ways to improve management practices that will ensure efficient and effective use of available resources so as to attain the intended health goals. Only a limited number of studies in Kenya have assessed the association between management practices and performance of hospitals and other health facilities. This study identified the key management practices in usage in public hospitals in Kenya, and assessed the association between these practices and hospital performance with regard to quantity and quality of care, patients' satisfaction with the care offered, and with regard to health outcomes achieved by hospital managers.

Data and Methods: We collected primary data from 25 hospitals in the central region of Kenya using cross sectional mixed methods, meaning that quantitative and qualitative data collection approaches were used at a given point in time, i.e., 2015. The sample size was 790 patients (400 outpatients and 390 inpatients) and 75 hospital managers. We applied data envelopment analysis (DEA), as the efficiency estimating method, and the OLS and Tobit estimation techniques to analyze determinants of variations in performance efficiency across hospitals.

Results: The study identified eleven commonly used hospital management practices in Kenya that had varying effects on public hospitals' performance. The identified management practices included delegation with follow up; work plans implementation; effective communication; and empowerment of staff. These were found to significantly increase total outpatient visits by at least 49% and total patient admissions by at least58%, thus enhancing hospital performance and increasing the quantity and quality of health care delivered. Consensus building, consultation among health professionals, and hospital residence of senior management staff were found to be significantly and positively associated with quality service delivery, as well as with better health outcomes.

Conclusion and policy implications: The thesis has shown that good management practices improve hospital outputs, increase patients' satisfaction with services and raise hospital productivity. Residence within compounds of health care facilities by the top hospital managers, plus continuous monitoring and evaluation of staff performance, are some of the key policy measures that the government of Kenya can adopt for quick gains in hospital performance and achieve better health outcomes for all citizens.

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ABBREVIATIONS

ABC	-	Activity Based Costing
AD	-	Anno Domini
AE	-	Allocative Efficiency
AIDS	-	Acquired Immune Deficiency Syndrome
AL	-	Action Learning
AMI	-	Acute Myocardial Infarction
AOP	-	Annual Operational Plan
BC	-	Before Christ
CEO	-	Chief Executive Officer
COVID	-	Corona Virus Disease
CRS	-	Constant Returns to Scale
DEA	-	Data Envelopment Analysis
DH	-	District Hospital
DHMT	-	District Health Management Team
DMU	-	Decision Making Unit
DRS	-	Decreasing Returns to Scale
EOQ	-	Economic Order Quantity
FDGs	-	Focus Group Discussions
FIF	-	Facility Improvement Fund
FY	-	Financial Year
GDP	-	Gross Domestic Product
GNP	-	Gross National Product
GPs	-	General practitioners
HIV	-	Human Immunodeficiency Virus

HMP	-	Hospital Management Practice
HNS	-	National Health Service
HSF	-	Hospital Service Fund
IBEA Co.	-	Imperial British East African Company
ICTs	-	Information and Communications Technology
IT	-	Information Technology
IOM	-	Institute of Medicine
IPD	-	Inpatient Department
IRS	-	Increasing Returns to Scale
KDHS	-	Kenya Demographic and Health Survey
KEMSA	-	Kenya Medical Supplies Agency
KHPF	-	Kenya Health Policy Framework
KNH	-	Kenyatta National Hospital
KRCHN	-	Kenya Registered Community Health Nurse
KUTRRH	-	Kenyatta University Teaching, Referral and Research Hospital
L5	-	Level 5 Hospital
LOS	-	Length of Stay
LSE	-	London School of Economics and Political Science
MDGs	-	Millennium Development Goals
MEDS	-	Mission for Essential Drugs and Supplies
MSH	-	Management Sciences for Health
MTRH	-	Moi Teaching and Referral Hospital
NFP	-	Not For Profit
NHSSP	-	National Health Sector Strategic Plan
NPA	-	New Public Administration

NPM	-	New Public Management
OECD	-	Organization for Economic Co-operation and Development
OLS	-	Ordinary Least Squares
OOP	-	Office of the President
OPD	-	Outpatients Department
PATH	-	Performance assessment tool for quality improvement in hospitals
PCEA	-	Presbyterian Church of East Africa
PCO	-	Primary Care Organization
PCT	-	Primary Care Trusts
PHO	-	Primary Health Organization
R and D	-	Research and Development
RAC	-	Resource Allocation Criteria
RBM	-	Results Based Management
RED CAP	-	Research Electronic Data Capture
RRI	-	Rapid Results Initiative
SD	-	Standard Deviation
SDGs	-	Sustainable Development Goals
SDH	-	Sub District Hospital
SFA	-	Stochastic Frontier Analysis
TB	-	Tuberculosis
UK	-	United Kingdom
UNITID	-	University of Nairobi Institute of Tropical and Infectious Diseases
US	-	United States

VRS	-	Variable Returns to Scale
WHO	-	World Health Organization

OPERATIONAL DEFINITIONS OF TERMS

Management – Management is a process, a discipline, and a science. In general, management is the act of coordinating, directing or managing organization's programmes, resources or health workers with the aim of achieving the stated goals.

Management as a discipline – Management as a discipline involves the study of practices and principles that are essential for performing formal managerial duties; it, also pinpoints the code of conduct administrators need to adhere to in the handling of their duties.

Management as a process – Encompasses interconnected activities by which the administrator within an institution develops, safeguards and overseas the resources of the organization to achieve the stated goals.

Management of personnel – Utilizing and retaining a satisfied workforce is an important part of the management function which is concerned with workforces at work and with their association within themselves, and with the organization for the purpose of contributing to achievement of organizational, individual and societal goals.

Management as a career - Management as a career is the process of forecasting one's activities and engagements in one's professions, to ensure growth and fulfilment in the course of one's working life**.**

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Globally, the demand for health care services continues to increase. The changing demographic trends with more elderly people, the changing lifestyles and increasing urbanization has resulted into high prevalence of non-communicable diseases. The unending communicable diseases in developing countries and the outbreak of global pandemic—novel coronavirus disease (COVID-19), shows the need for functional, efficient and sustainable health care facilities.

Most governments in developed and non-developed countries have committed to achieve Sustainable Development Goal 3 (SGD 3), that is, to "ensure healthy lives and promote the well-being for all at all ages". This is a broad health goal pushing for universal health coverage (UHC), that implies access to quality health services by all population groups in need, irrespective of their economic status without financial hardship. To meet the increasing need for population health care and achieve these universal health coverage goals, the countries need to increase investment in the health sector, especially in hospitals, where the most difficult disease cases are dealt with. For improved quality and efficient use of resources to gain the desired health outcomes, improved leadership and management is necessary. Effective management guides efficient resource allocation, achieve quality service delivery, increases hospital productivity and foster processes for ensuring patients' satisfaction with the services offered by health facilities.

Management is a critical administrative duty that ensures progress in organizations whether business, non-profit making organization or government bodies. It is a decision-making role

aimed at providing strategic leadership for an organization towards the attainment of set goals (Black, Hashimzade, & Myles, 2009). Management process remains a central problem solving function in many business operations with the key element in this role being the decision making unit (DMU), typically a manager (Sagimo, 2002; Cole, 2004). It's a process involving organizational ranks from the lowest to the highest, where rules, policies, and measures governing the activities of the organization are made (Black, et. al., 2009). In a more simple and comprehensive way, management means the process, whereby, a single person or a small group of people ensures that things that achieve an organization's stated goals are done through the effort of other people (Saleemi, 2011; Cole, 2004).

As the world strives to contain the COVID-19 and to achieve Sustainable Development Goal 3 (SDG 3), the need for health sector leadership including management and efficient utilization of resources remains important. This is also relevant to Kenya, which like other countries is facing the COVID-19 crisis. Further, the country is adjusting to challenges associated with devolution of health sector, with provision of universal health coverage in line with the Constitution of Kenya 2010, which dictates the need for proper management of health systems and healthcare facilities (Republic of Kenya- Ministry of Health (RoK-MoH, 2014).

The need for application of the management discipline in the running of healthcare institutions is well stipulated in the World Health Organization (1988) mandate, which states that in any healthcare institution or unit of service delivery, there is need to have someone or a group of people responsible for making routine decisions, such as those related to the day-to-day running of hospitals, and accepting responsibility for achieving the desired and intended health outcomes. It is this individual or group that is responsible for executing the vision, mission and mandate of a hospital for example; and for entrenching the core values

and professionalism in that organization. The WHO (1988) document, observes that management is the linchpin for the process by which a health care facility plans, controls and reviews of its performance.

According to the Centre for Economic performance, the London School of Economics and Political Science (LSE), (2016), there exist a strong link between practices employed in health facilities management, clinical outcomes, financial performance and patient satisfaction of hospitals. The Centre concludes that in order to ensure better health facility performance, management practices must include, shared clinically trained managers, a high degree of competition among health facilities, proper hospital ownership, adequate fiscal space and managerial autonomy. Proper Management of health care systems including health care facilities is of great value to individuals, communities and countries all over the world.

Management of health personnel and other resources is thus a very vital component in every organization, including hospitals, because it is through management that objectives are settled, strategies of accomplishing them in the optimally are put in place, and resources needed are mobilized (Saleemi, 2011; Cole, 2004). Proper management entails putting in place appropriate strategies and approaches that ensure resources are well allocated and utilized without wastage or misallocation (MSH, 2006). Suitable management practices have made major contributions in improving hospitals and delivery of quality health care in many fields of human activity. Effective management ensures that services that uphold, improve, and reinstate health are given to persons and populations in both urban and rural areas, in light of growing disparities in privilege. Poor hospital management has serious consequences on service delivery and health outcome within the catchment areas of hospital (Rosner, 1989).

Rosner (1989), highlights three basic objectives of hospital management. These include; one, managers are charged with the duty for the smooth running of daily affairs of the hospital in the most operative and proficient way so as to provide stability and continuity of health service provision. Two, managers are responsible for ensuring healthcare services are given to the patients timely and in the most convenient manner. And three, managers are the pacesetters, and culture builders as they initiate and maintain social order and sobriety in hospitals. According to Njenga (2014), the fundamental goals of top management team's efforts is to create competitive gains and ensure solid organizational performance, through making vital organizational decisions and setting strategic directions.

Generally, the management and operations of health sector are guided by the policies and guidelines developed by the international body, i.e. the World Health Organization (WHO, 2001). WHO policies and guidelines mostly are public health issues and or focus on case management issues which are passed to various governments to implement. The governments adopt and implement these policies and guidelines through their Ministries of Health. These ministries have a responsibility of providing healthcare services in their countries through health care systems and organizations - hospitals, health centers, and dispensaries (RoK-MoH, 2014). Through the ministries, each country has put up institutional governance structures in place to ensure appropriate administration of various health care delivery organizations (RoK-MoH, 2014). Such facilities - public hospitals, health centers and dispensaries - are - manned by publicly appointed medical and paramedical staff

Swanson, Atun, Best, Betigeri, Campos, Chunharas, Collins, Currie, Jan, McCoy, Omaswa, Sanders, Sundararaman, & Van Damme, (2015), states that managers of health service in low-income countries include heads of subnational health services, programme managers and hospital and health facility managers. Health systems are composed of all the

institutions, associations, resources and personnel who work basically to promote health (WHO, 2000). Hospitals are the main units in a health system which provides an array of preventive, promotive, rehabilitative and curative health services (Majusi & Kirigia, 2016). In a hospital set-up, the management functions acts as an enabler for doctors, nurses, other para-medical and non-medical teams to perform their roles as easily, efficiently, effectively and as humanely as possible, as they take care of their patients (Parand, Dopson, Renz, 2014). They do this through organizing the resources available - human resources to perform their duties and controlling human activities and other resources in the best way possible towards providing the best quality healthcare feasible (Parand et al., 2014; MSH, 2006).

Besides the government, the non - government sector also augments the delivery of healthcare services by government through faith-based organizations, NGOs and privately-owned hospitals and clinics. Out of the 7795 health facilities in Kenya, 881, 306 and 2652 are owned and operated by faith-based organizations, non-governmental organizations (NGOs), and privately-owned hospitals and clinics, respectively (RoK-MoH, 2014). The governance structure in the private health sector organizations is varied and is dependent upon the ownership type. Public health and case management are well documented and adhered to by all health care organizations both private and public.

Despite the massive improvement in medical amenities over past decades, sub-Saharan Africa still lags behind in this experience due to a host of management inefficiencies, which has led to the slow pace in reducing vulnerability to diseases, in narrowing healthcare inequalities and in poverty reduction. Poverty increases poor-health and poor-health in turn increases poverty (Kaseje, 2006). This vicious circle can be broken by effective management of health facilities - About 20% to 40% of health resources are wasted through various forms of inefficiencies and wastage (WHO, 2014.) Some of the inefficiencies emanate from the cutting down of public expenditure by the African government under

Structural Adjustment Program fronted by an International Monetary Fund and the World Bank. Health sector generally and hospitals, in particular, were hard hit by structural adjustment programs as they fall under social amenities (Kaseje, 2006; Nziga, Mbaabu, & English, 2013).

Management inefficiencies in the health service sector in regions south of the Sahara desert has led to the high healthcare inequality in the sub-region. For example, despite South Africa gaining independence in 1994 and enacting a constitution that compels the state to the realization of the right to health and good health policies, the country suffers from large health inequalities. These inequalities emanate from a combination of factors, such as gender and racial discrimination, migrant labor without service entitlement income inequalities and family life destruction by the previous apartheid regime (Coovadia, Jewkes, Barron, Sanders, & McIntyre, 2009). In Kenya management inefficiencies are attributed to large health inequities between the poor and the rich as well as to substantial disparities in health service delivery in government hospitals (Takashima, Wada, Tra & Smith, 2017). These inequalities still exist despite the lion's share of budget allocation to health systems going to the hospitals in developing countries (Barasa, Molyneux, English, & Cleary, 2017; Carter, Drogan, & Lyton 2011). Specifically, in Kenya over 50% health care budget goes to public hospitals (Barasa et al., 2017; Peacock, Chan, Mangolini & Johansen (2001). Moreover, despite the critical nature of hospital and health sector management, not much attention was given to health sector management by donors, international funding agencies and African governments (Dovlo, 2016). In ensuring efficiency and effectiveness in health programs, little mention was made of management, the emphasis being put on employing fiscal and economic measures (Dovlo, 2016) to improve health outcomes.

Globally, the managerial practices in health care fall under several broad categories including operations management, goal and target setting management, talent management,

quality improvement, monitoring and financial oversight (Mafini & Dlodlo, 2014). Bloom, Sadun & Reenen (2014), studied the effects of various dimensions of management practices on healthcare outcomes in hospitals settings of Western countries. The authors identified four dimensions of management practices which are of beneficial to proper performance of the hospitals including: operations, target setting, performance monitoring and incentives oriented management styles.

In the US hospitals, management practices have been shown to affect performance of employees and the quality of patient care. According to Van den Broek (2014), healthcare organizations of Western countries are under pressure in delivering good quality of care to the clients, and management is a key factor in doing this. Such organizations are confronted with challenges of rendering quality of care and hence are under pressure to find ways of achieving higher client contentment. The challenges encountered in such endeavors include poor operations and dysfunctional human resource practices as well as poor performance of employees (Bloom et al., 2014). However, the author showed that poor operational management and dysfunctional human resource practices such as inadequate training, poor teamwork, and weak incentives can be the root causes of inefficient performance of employees and the hospital. Bloom et al. attempted to examine the interaction between different hospital management practices in healthcare, giving inadequate attention on how these practices affect staff performance and how employee performance in turn influence healthcare outcomes (McConnell, Lindrooth, Wholey, Maddox, & Bloomet al., 2014).

However, several researchers (McConnell et al., 2013; & Bloom et al., 2014), argue that the connection between hospital management practices, health professionals' performance and patient outcomes remains elusive. Such elusiveness is the result of confounding factors including behavioral operations (which affects the interaction of human behaviors and

operational processes), human resource management, characteristics of hospitals (public or private, general or specialized hospitals), unmeasured attributes of employees (attitude and behaviors) and patient characteristics.

In Africa, proper management practices are supposed to translate into better quality service delivery, efficiency and effectiveness in an organizational setting. In Uganda, the connection between management practices and performance of public hospitals was found to be inadequate (Kakooza, Tusiime, Odoch & Bagire, 2015).

There is limited research on management practices that can sustain efficiency and care effectiveness in African hospitals and other health care organizations (Bagire & Namada, 2015). Kakooza et al. (2015), indicated that there was lack of impact of evidence regarding the effect of management on hospital performance. The academic community had to critically evaluate existing management theories and practices to discover those factors and practices that could strengthen and sustain effective organizational practices in various African contexts. In Uganda Kakooza et al. (2015), found that the application of quality management practices should concentrate on upgrading the quality of employees. In Nigeria, Boxall (2012), established that interpersonal quality among the medical personnel in the healthcare system, is affected by a variety of factors, particularly, the interaction of medical personnel with patients.

Bloom et al. (2014), state that management practices in hospitals are very poor compared to that in other institutions. It is even worse in public than in private hospitals. The Kakooza et al. (2015) study was informed by various organizational management theories among them system theory and the top echelons theory. The systems theory presumes that firms are constructed using many parts that must be coordinated to attain functionality. When an

organization is plagued by poor performance, it implies that there are managerial gaps in top level management.

The health sector contributes 2.5% of the GDP in Kenya and private healthcare facilities control 43% of the health sector in the country. According to the National Health Sector Strategy (NHSSP) 2005-2010, weak management system is cited as one of the main factors that contributes to the decline in health status of Kenyans. In order to achieve a higher hospital performance through the process of management, it is crucial to escalate the empowerment feeling among medical staff, and to involve communities in processes of health facilities management. Private healthcare services in Kenya contributes 2.9% of the 4.7% of health expenditure. The sector contributes 22% of all health services (2009/2010 Kenya National Health Accounts). There has been concern from the public and various stakeholders for the government to strengthen and revitalize management of the health sector in the country, especially by upgrading the quality of medical personnel hired in hospitals (Jones, 2016).

It is therefore very essential that in the quest for improved healthcare delivery, enough attention be given to the management of healthcare services in hospitals. The behavior and actions exhibited by management are reflected in the firm's efficiency levels (Njenga, 2014). An organization’s performance is a measure of how well the organization tries to accomplish its set objectives as cascaded from goals, and entails recurring activities, such as setting the organizational goals, putting mechanism in place for monitoring the progress towards the goals, and adjusting them whenever necessary (Heavin, 2017). A firm’s managerial performance is a strategic approach to in ensuring sustenance of effective enterprises through the continuous improvements in the competencies of the workers (Armstrong & Laschinger, 2006). Performance of public hospitals in Kenya may not be up

to date due to lack of appropriate skills among health workers. The available literature does not contain any standards by WHO or the Kenya government guidelines on how hospitals ought to be managed. However, WHO (2005), stated that six competencies are required in all levels of a health care system, namely: leadership, communication, resource management, results - based management, problem-solving skills, and customer focused service delivery. However, these competencies are too broad and have not been packaged in a palatable manner by hospital managers. Thus it is not clear how they can be used to achieve the desired results. This study aimed at establishing how well the managerial functions and operations (tasks and activities carried out by managers in the process of stewarding an enterprise) should be executed to attain the set goals and objectives desired at the meso-levels of the health systems, where the hospitals are situated.

1.2 Statement of the Research Problem

Proper management of hospitals entails performing certain functions comprising planning, defining roles, organizing, ensuring accountability, creating production processes and incentives, and hiring and motivating staff. Proper management of health facilities is needed to ensure high performance of hospitals in healthcare delivery (Dovlo, 2016).

The successive governments of Kenya have implemented various health policies post - independence including: free healthcare; structural adjustment program; user-fees imposition and abolition, healthcare delivery protocol, and the devolution of healthcare functions to county levels, all aimed at improving health outcomes (RoK-MoH, 2014; Republic of Kenya - Kenya National Bureau of Statistics, 2015; and WHO, 2013). These policies led to expansion of public healthcare infrastructure, yet the state of the country's health system and service delivery remains below expectation. As a result of poor working conditions, low remuneration and low satisfaction of patients with services, health workers,

especially doctors, have exited the public health systems to work outside in the private sector or outside the country. In some cases the medical staff in public hospitals, work full time in the private sector (RoK-MoH, 2014; Blanpain, 1994; & Kuremu, 2006). This situation leads to overworking of qualified health personnel in the public hospitals.

According to Takashima et al. (2017), there are still large health inequities between the poor and the rich as well as substantial inefficiencies in health service delivery in government hospitals. Furthermore, there exist high geographical inequalities in health care access, inadequate human resources, lack of qualified health workers, poor staff attitude, low morale, weak supervision of routine activities in public hospitals (RoK-MoH, 2014). All of these health service delivery problems indicate the need for better management practices in the public health sector.

According to the Booth (2019), Sub-Saharan Africa has the lowest ratio of management staff to workforce worldwide, in terms of health services, with 17% of its total healthcare workers being employed as managers in comparison to 43% in America and 33% globally. The managerial skill deficit has long, adverse and complex consequences on healthcare service delivery, with poor management being blamed as causing an annual loss of 5 billion Kenyan shillings to the Kenyan health (Booth, 2019).

The interest in increasing efficiency and ensuring value for money in health service provision is increasingly taking center stage in health service delivery debates, and decision makers are more and more being interested in understanding the factors that determine the best possible health outcomes given the limited resources. Those factors include the role played by the managers of health facilities and by various management practices. This study sought to determine association between management practices and performance of public hospitals in Kenya.

Given that proficient and effective public hospitals and healthcare centers ensure healthy and productive human capital which in turn propels economic growth and development, it is imperative that the question as to whether management matters in healthcare performance be properly and thoroughly addressed (Rosner, 1989).

Many empirical studies conducted mostly outside Kenya have looked at the source of this situation, and have found poor performance in healthcare delivery in the public sector hospitals to be caused by frequent drug shortage, lack of funds, and poor motivation among staff, (Oyaya & Rifkin, 2003; Blas & Limbambala, 2001; & Kirigia, Emrouznejad, Vaz, Bastiene, & Padayachy, 2008). The few studies done in Kenya on effect of management on performance of hospitals have been conducted using very few samples.

Given the economic and geographical heterogeneity in the country, it would be more efficient to use representative sampling reflecting all these differences. Also, a good number of researches have only focused on technical efficiency and infrastructural efficiency issues in sub-Saharan countries ignoring other aspects of performance such as service quality and patients' satisfaction with services. (Kirigia, Sambo & Lambo, 2000; Kioko, 2013; & Zere et. al., 2006). Looking at efficiency alone without examining quality and welfare issue is not enough to solve dismal performance of public hospitals. This study sought to identify management practices in use in public hospitals and how they affect service quantity, and quality, efficiency in resource use and allocation, hospital outputs and key health outcomes.

The thesis advances the literature by applying a multidimensional approach to performance measurement by considering the role of multiple management dimensions in improving service quality, quantity, and in raising the level of patients' satisfaction with the way public hospitals operate. The thesis breaks new ground by identifying the dimensions of management processes that can be implemented to increase technical efficiency in the

production of different types of hospital outputs. Another novel aspect of the thesis is its focus on impact of a single management index on various hospital outputs and on subjective wellbeing of patients as indicated by the patients' satisfaction with the services available in public hospitals.

1.3 Objectives of the Study

1.3.1 General Objective

The main aim of this study was to determine the association between management practices and performance of public hospitals in central Kenya.

1.3.2 Specific Objectives

i. To identify management practices used in public hospitals in central Kenya.

ii. To determine the effect of management practices on the quantity of health care services provided in public hospitals.

iii. To determine the association between management practices and the quality of healthcare services.

iv. To investigate the association between management practices and efficiency.

v. To determine the association between management practices and health outcomes.

1.4 Research Questions

The following questions were addressed by the study:

i. What management practices are commonly utilized in public hospitals in central Kenya?

ii. What is the relationship between management practices and healthcare quantity?

iii. What is the relationship between management practices and service quality?

iv. What is the relationship between management practices and technical efficiency?

v. What is the relationship between management practices and health outcomes?

1.5 Hypotheses

As already noted, the study sought to document the management practices in public hospitals in Kenya and to estimate their effects on hospitals performance. The study tested the following null hypotheses:

H01. Hospital management practices have no association with hospital performance.

H02. Hospital management practices have no association with quantity of healthcare.

H03. Hospital management practices have no association with service quality.

H04. Hospital management practices have no association with hospital efficiency.

H05. Hospital management practices have no association with health outcomes.

Although the above hypotheses were strongly rejected by survey data from central Kenya, there is need to revisit them using data from other parts of the country. Consideration also needs to be given to testing the hypotheses using experimental or longitudinal data which were outside the scope of the present study due to limitations of time and resources.

1.6 Justification of the Study

This study contributes to existing literature on hospital performance by documenting and analyzing the relationships between hospital management, service delivery and health outcomes at the hospital level. Although the available literature on the performance of hospitals in Kenya underscores the value of management in healthcare service delivery, it is silent on the relationship between management, efficiency, and health outcomes. The study generates evidence that can be utilized to improve the performance of public hospitals,

the decision making units (DMUs) which take the bulk of the resources allocated to the health sector services in Kenya, and elsewhere in Africa.

In general, there is no agreed method of monitoring and evaluating hospital management practices and hospital performance. Zhu, Guo, Dou, Zhao, Qiao, & Wu (2018), proposes that each country or region should develop tools that are relevant to and fit into cultural background, economic status and environments. This study developed management practices measuring tools, which may be adopted by various institutions to guide the monitoring and evaluation of the management process. In addition, the study demonstrates empirically the relationship between management practices, and hospital performance, and hospital efficiency. The study identifies the management practices that work and to enhance health, and recommends health policy changes that would improve service delivery in hospitals and other health facilities. By so doing, this thesis provides additional information which might be useful to the government in guiding highly consequential decisions, such as the privatization of the management of public hospitals, and adoption of private sector management styles in an effort to improve service delivery in public health facilities.

The study further enriches the literature on performance of the public hospital sector, showing how management tools may help in its revitalization in Kenya and other African countries.

1.7 Significance of the Study

The findings from this study are significant in several ways. Hospital managers who take management as a career may utilize the findings in putting in place strategies to promote and motivate use of new approaches to quality healthcare service delivery. The findings may be valuable to the Ministry of Health officials, such as Cabinet Secretary, Permanent Secretary, Director of Medical services and other senior decision makers in the design and

implementation of new guidelines on hospital management. The community that seeks health care services at the hospitals stands to benefit from the findings of this research because it shows the measures that can be implemented to reduce waiting time in various hospital departments. The findings of the study might help health facility managers to properly plan and budget for provision of health care services that meet patients' expectations. The challenges experienced during provision of healthcare services can be overcome by using the management tools documented in this study.

1.8 Limitations and Delimitations of the Study

1.8.1 Limitations

The researcher encountered problems such as uncooperative personalities in hospitals who were not willing to provide adequate and accurate information. In a few occasions the researcher did not get complete acceptance and support from all hospital staff and from the general public. Some of the respondents were not able to understand the questions asked, and as a result much time was involved in translating and assisting the respondents to fill the questionnaires.

1.8.2 Delimitations

The resource and time constrains dictated that the study focus only on hospitals, a small sub-sample of all health facilities in the country, an aspect that restricts the extent to which its findings can be generalized. This study concentrated on management practices needed for the day to day running of the hospital which were action-oriented, rather to long-term oriented management practices, such as human resource management planning and procurement of durable hospital equipment, just to mention a few. The study was confined to 25 hospitals in 5 counties: Kiambu, Kirinyaga, Murang'a, Nyeri and Nyandarua in central Kenya, which differs considerably from some other Kenyan counties, especially those in

Northern and coastal regions. The sample selection bias, which was necessarily dictated by resource constraints, should be borne in mind when interpreting and using the findings presented in this study.

1.9 Organization of the Study

The remaining chapters are arranged as follows: Chapter two reviews the related literature, focusing on pertinent conceptual frameworks, while examining the management skills needed for effective service delivery. The chapter looks briefly at management theories and the role of management in health service delivery in a developing country context. Chapter three deals with the study methodology focusing on role of health inputs in service delivery, as well as the relationships between management processes, health outputs, health outcomes, and hospital efficiency. Chapter four presents and discusses the study findings. Chapter five summarizes the study, highlighting its major conclusions and policy implications. Data collection instruments and issues of ethical approval, interview consents, and additional study findings are presented in annexes, following the reference list.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter reviews studies on management practices and some management related theories on which this thesis is anchored, including the empirical literature on the relationship between management practices indices and hospital performance. It then summarizes gaps in knowledge in the empirical studies reviewed as well as in the conceptual frameworks that are the basis for management practices whose effects on hospital performance are analyzed.

2.2 Review of Relevant Theoriesand Empirical Models

2.2.1 Theoretical Models

There have been attempts by various researchers to develop theoretical studies explaining the role of management in improving productivity and efficiency while reducing costs of production. This section highlights some of these theories and how they have been applied in the health care facility management.

The conceptual part of this study is informed by an input – process – outcome model first presented by McGrath (1964). This approach to management describes the basic operations and interactions between various inputs, organizational processes and performance of a decision making units (DMU) such as the traditional firm, and recently a health facility. The model provides ideas for studying hospital performance, especially due to the recognition of the important role of team-work in production processes. Hospitals are made up of patterns of organized relations where different elements of the system are related to each other in a specific way. In this study inputs into the management process play the roles of

independent variables in a statistical model and the main such variables include the human resource, infrastructure, medical supplies and finances.

Theoretical models offer managers various analytical tools of steering their firms efficiently towards meeting the organizational objectives (Olum, 2004). The theory of the firm, the evidence-based theory, systems theory, health care management theory, classical organizational theory as well as others theories which explain the rationale behind management practices that are in common usage are reviewed, starting with the theory of the firm.

i) The Theory of the Firm

This is the basic economic proposition which explains firm behavior and out of which many of the economic models are derived or extended. It was proposed by Alfred Marshall (1890) and given its present form by Coase (1937). The central idea of the theory is that, similar to the consumer or the household, the firm behaves rationally at the margin in undertaking production activities. The firm does this by choosing the inputs mix that maximizes total output or total profit. Though public hospitals in this study might not necessarily be profit motivated, it is fair to assume that like firms they seek the least costly way of providing health services to the communities they serve. Though many managerial economists argue that the theory of the firm is an inadequate in guiding managerial decisions, it is necessary that public hospital management be conducted taking into account the fact that hospital inputs such as drugs, medical equipment and personnel are in limited supplies (see e.g., Loasby, 2005). Public hospitals ought not only to be efficient in providing services to citizens but should also ensure that services are of good quality and are equitably distributed to patients. Although unlike the situation of profit-making firms, equity in

service provision is an important managerial function of hospital management, this issue has not been considered here.

ii) Classical Organizational Theory

Classical Organizational Theory stresses management duties such as how to organize, forecast and plan; and how to command, control and coordinate production processes (Chankova, Muchiri & Kombe, 2010). The theory considers the organization as if it were a machine and takes employees as if they were parts of the management machine that must be efficient if the organization is to achieve its objectives. The organizational theory has six key pillars, including: division of labor, coordination, departmentalization, structure, span of control and functional process, all of which exist in hospitals in one form or another.

iii) Health Care Management Theory

The application of this theory is widespread in healthcare institutions (Palmieri & Peterson, 2009). There are essential tasks that organizations, hospitals included, that must be accomplished by management for proper performance of hospitals. In applying the health care management theory, it is necessary to determine the organization's priorities. The list of priorities should be followed by a plan of how the priorities will be realized. From the information on priorities and potential beneficiaries of the services associated with them, health care managers can control which goals to set and how to implement them. Development of operational procedures and guidelines are important in this regard.

iv) Scientific Management Theory

This theory was developed by Taylor (1911) during the industrial revolution. He supported systematic staff training on the best practices after which they are allocated duties accordingly. This theory is appropriate for addressing today’s management challenges in

hospitals. Hospitals workforce is composed of various professionals who are trained in certain areas and specifically employed to do specific jobs (Mullins, 2010). Taylor believed in and supported systematic staff training on best management practices. Training and developing workers so that they can perfect performance in specific jobs leads to specialization at the workplace and to efficiency. Taylor believed in the division of labor between management and workers with the former performing science-based jobs and latter performing manual jobs. Scientific management examines in detail the workflows in an organization with the principal objective of increasing labor productivity (Mullins, 2010). Hospital managers should acquire knowledge of scientific management because it of proper functioning of organizations and business enterprises today. Some scientific practices of today's hospital management include analysis, standardization of best work procedures, monitoring of performance, standardization of work ethics, and knowledge transfer among workers.

v) Systems Theory

The origin of systems theory in management can be traced to biological and engineering sciences. The theory focuses on the understanding of how social interactions influence performance of organizations, especially when surroundings of an organization are an intervening factor (Amagoh, 2008). The general systems theory was first formulated by Ludgwig Von Bertanlantty in 1940. The theory is about how social systems function and how they integrate with a broad variety of other factors to influence an organization's performance (Gillies, 1982). A system is made up of parts whose interactions and interdependence enables it to meet its objectives by producing the desired outcomes (Mwai, 2018; Amagoh, 2008). By definition a system has several parts that work closely together to produce intended effects. The role played by an element of a system influences the entire system (Sullivan & Arthur, 2006).

Amagoh (2008) states that a system is a set of components designed to work together towards well defined goals. Amagoh elaborates that if one element of the system is altered or removed the nature of the system can be changed into a new one. All production systems are composed of three components namely, process, outputs and outcomes. An important feature of every system is that components provide feed-forward and feedback connections between and among them. These connectivity mechanisms help in running the system smoothly. In a hospital set up, each operational unit is connecting to other units through a management system with a well-defined communication lines among managers of the units. For example, the clinical input for laboratory tests or radiology examinations forms has a communication node with the units that receive patients into the hospital. The systems theory helps the manager to view the organization broadly as a whole, including a view of the interrelations of the various parts within the organization.

Another salient aspect of a system is that it consists of elements whose inter-relationships and interdependence work together for the common good of system at large (Donabedain, 2012). There are both closed and open systems, with closed systems revealing the internal workings of an organization and open systems showing how it interacts with its surroundings (Gillies, 1982). In contrast, open systems approach examines the repeated cycles of input and output processing and how they are influenced by the environment. An effective organizational structure enables working relationships between and among various components of an organization, improving the working efficiency within organizations unit (Johnson, et al., 2008).

The systems theory's most significant concept is the categorization referred to as bounding hierarchical approach. Kenneth Boulding suggests that systems can be categorized as a hierarchy into nine spheres, which include geography and anatomy of systems which provides description of the parts; dynamics, which show how parts of the system move and

relate to each other within its environment; self-regulating part where a system is self-controlled; open part, where a system is evolving; among others (Sullivan& Arthur, 2006).

The systems theory criticisms include the inability to specify with precision the meaning of a system and the vagueness over what ought to be included in the system theory (Polston-Murdoch, 2013; & Donabedain, 2012). It also does not state what to do when a conflict arises between the organizational internal environment and outer structure of the organization. The application of the system theory is not constrained by organization's boundaries, especially when organizations have many communication networks and their activities have a hybrid schedules of interactions with other organizations. Open systems theory is criticized for failing to provide choices that ensure forecasting of performance and stability of organizations (Sullivan & Arthur, 2006). An effective organizational structure facilitates relationship among various elements in the organization and infuses working efficiency within the organizational parts. Customer satisfaction is one of the outcomes of organizational effectiveness (Richard, Devinny, Yip, & Johnson, 2009). Although system theory is informative of the internal and external processes it fails to show how management is conducted within an organization.

vi) Chaos Theory

Chaos theory is relevant in understanding a haphazard and non-systemic events similar to today's global pandemics that render management practices chaotic within organizations (Palmieri & Peterson, 2009). The proponents of chaos theory, as an aid to management recognize that events that influence organizational performance are usually uncontrolled. For many decades, managers have acted on rational basis of systematized and controlled organizational events. Chaos theorists suggests that as systems get more complex day by day naturally, they become highly unpredictable; and therefore, a lot of energy is needed to

sustain them. As they utilize more energy, systems attempt to acquire extra structure to attain and sustain internal stability. The process goes on till the system divides itself, unites with other complex systems or disintegrates and ceases to exist in a previous form (Palmieri & Peterson, 2009). To avert such situations, an effective manager must have a strategy to forestall the worst scenario from happening. Since 2013 when devolution took effect, hospitals have deteriorated in management quality and in meeting steady commodity supplies due to nepotism and corruption, making their management more chaotic than before the devolution.

vii) Reinforcement Theory

The Reinforcement Theory emphasizes on maintaining a good work environment through both positive and negative feedbacks. Positive reinforcement happens when a specific behavior is followed by the desired consequence. Punishment is therefore defined as the introduction of an undesirable consequence to eliminate a specific behavior (Drummond, 2009). The theory is appropriate for predicting factors that affect quality and quantity of work output. However, it does not provide insights into employee satisfaction. In hospitals some staff do extremely good work of life-saving and need to be commended or even rewarded; on the other hand some staff commit professional negligence action leading to loss of life, a conduct that needs severe punishment.

viii) Utilization management theory

Utilization Management (UM) theory reviews a patients' information using a defined standard and/or expert view to determine when and whether treatment is needed, with an intent to control overuse of services. (De Dreu & Weingart, 2003). De Dreu & Weingart (2003) agree that utilization theory emphasizes on need, suitability and proficiency in which proactive actions improve the upkeep of patients as provided by health care regulations.

Wickizer & Lessler (2002) describe utilization theory as service utilization management which has become most popular and is widely used for hospital cost containment. The American Hospital Association (AHA) describes utilization management as planning, organization, direction and controlling of healthcare inputs in a cost-effective way without compromising on the quality of care in achieving organizational objectives.

Utilization theory is being used in Europe and the USA for pre-admission, admission, and for continued hospital stay decisions; for case management, and for decisions related to hospital discharges when patients have challenges regarding hospital bills. The UM is used for patients' reviews at various stages to assess whether each of the treatment stages is necessary or not and to decide if the patients are getting the correct treatment and quality of care. Utilization theory is also being encouraged by the insurance agencies to try and reduce healthcare cost. This is particularly so since private hospitals in Kenya take the lion's share of national hospital insurance fund (NHIF). This theory is very vital in the management of the public hospitals in Kenya as the country prepares for expanded implementation of the universal health coverage pillar of the government's reforms in the health sector.

ix) Top Echelons Theory

Top (upper) Echelons theory states that organizations are mirror images of their top managers (Finkelstein, Hambrick, & Cannella, 2009). This means that the organization's management and leadership have an intense influence on success or failure of an organization. The topmost managers and leaders are in prime positions of making and influencing policies and their implementation. It is assumed that they are supposed to know what ought to be done in order for a firm to achieve success and to avoid pitfalls. They know the strong and weak areas and are able to identify threats and address the same as well as

identify opportunities and seize them. They take the successes or failure of the organizations as personal responsibility and do all they can to avoid failure.

The hospital managers as in any other service organization are called to lead from the front by being good stewards by leading and showing the way. They ought to exhibit characteristics and traits that enable them not only to discharge their managerial functions and duties effectively and efficiently but also in a manner that their junior staff want to emulate and follow. This will make their work easier as they will have minimal frictions in the workplace. If every top hospital manager has such an altitude, the hospitals will be well managed from top to the service delivery points with good outcomes as the population would receive the needed services.

Kenya, like and most developing countries requires very strong and committed managers to improve, sustain and deliver quality health care. The hospitals need managers with a good track record in performance, have integrity, and with good management skills. Managers without training in management should be trained on management practices that work. The top managers should know where the hospital stands and where they want to take it. They should understand the weak areas, strong areas and take the necessary actions. They should accept that success or failure of hospitals as their personal responsibility and should do all that is possible to avoid failure.

x) Team Building Theory

Team building theory emphasizes excellence, best practices and constant improvement in performance. The theory relies heavily on team spirit and team work. This entails consensus building and good relations between and among individuals at every level of decision making and work plan implementation. This is the most appropriate theory in public hospitals today. All hospitals and all hospitals managers are struggling to achieve quality,

best practices, and higher labor productivity. Hospitals, being multi-professional organizations need teamwork and consensus building to achieve their goals, mandate, and targets (Mullins, 2010).

xi) Attribution Theory

Attribution Theory as used in health service management evaluates the reasons for breakthroughs and downfalls of healthcare systems or a hospitals (Palmieri & Peterson, 2009). The theory highlights what makes a hospital fail or succeed. On the same vein, Palmieri & Peterson (2009), suggests that a safe environment for patients is of crucial importance to a hospital's success. This theory presupposes that error in health care can probably happen and by learning to appreciate these errors as random human shortcomings, caregivers can create an appropriate environment for patients' recovery rather than concentrating on their shortcomings (Donabedain, 2012). A good manager will keep his or her ears on the ground within and outside the hospital to monitor what goes on and act timely to prevent what can bring the hospital down and to promote what makes hospitals succeed. The manager and his team should decide which mistakes need warning and which need punishment. Using the theory with considering the work environment or the circumstances of the workforce can bring the hospital down.

xii) Behavioral School Theory

Behavioral school theory was derived from workplace experiments in the United States of America. Mayo observed behaviors of workers at workplace in response to various environmental conditions (Kirkbride, 2006). The experiment proved four things: one, work fulfillment and performance is dependent more on work conditions, attitudes, communication and positive reinforcement. Two, expression of gratitude and reassurance as opposed to intimidation from supervisors and managers positively affects peer groups

influence; thus the need to informal group interactions at the work place. Three, the experiment rejected Taylorism and its focus on staff selfish-interests but supported the theory's monetary rewards incentive. Lastly, it denounced the popular hypothesis that the society is full of unorganized human beings behaving in a way aimed at securing self-preservation and self-interests (Bennis, 1989).

This theory is very applicable to today's hospital settings because one of the leading causes of health workers' complaints is poor work environment. This problem is commonly brought out during workers' strikes. The theory recommended greater staff participation, improvements in trust and honesty in work environment and attention to teamwork in the work place.

xiii) Path-goal theory

This theory was propounded by Evans (1970) and points out four leadership styles in connection with rewards and sanctions. The leadership styles may be labeled participative, supportive, directive and goal oriented (Polston-Murdoch, 2013). A directive leader is the one who provides clear instructions on the expected organizational codes of conduct and processes (Polston-Murdoch, 2013). The style is adversely linked to subordinate's satisfaction for performing predictable, defined task. However, when the directive style is adopted, the behavior of the leader influences how the subordinates respond to it (Polston-Murdoch, 2013).

Unlike the directive style, supportive leadership focuses on working together, with emphasis on learning and development. Leaders utilizing supportive style are more friendly, approachable and empathetic to subordinates' wellbeing (Yukl, 2017). The participative leadership style enjoins input from staff for inclusion during decision-making and in the implementation of organizations' activities and processes (Kirkbride, 2006). Additionally,

the style is appropriate for improving staff morale and promotes non-repetitive ambiguous duties. Lastly, the achievement-oriented style is where leaders focus on setting high-performance goals and progressively increase the performance standards once the goals are met or are close to being achieved (Kirkbride, 2006). The leaders express capabilities of the staff and seek such qualities when recruiting (Yukl, 2017). The style is appropriate for managing subordinate staff pursuing very challenging assignments which cannot be repeated and which require complex procedures to perform, such as surgery. A variant of this leadership style in hospitals can help bring much needed improvements in healthcare delivery.

xiv) Theory X and Y

The X and Y states that there is some factor X that contributes to a manager's adverse perspective on behavior of workers (Mcgregor, 1960). Employees are seen as lazy, loathing effort, and therefore require a blend of financial incentives and a threat that they can lose their jobs to make them work hard. "Theory Y", is contrary to "Theory X"; it states that individuals want to satisfy themselves by looking for self-esteem, personal-development and personal-fulfillment at work (Richard, Devinny, Yip, & Johnson, 2009). The fundamental assumptions in "Theory Y" are that work is a natural act and that the normal human being cannot naturally distaste work. Whether work is a source of pleasure (to be desired) or a punishment (to be avoided) is contingent on nature of the work and how it is managed. Theory X seems to be more applicable than theory Y. If people were as theory Y says, supervisors and managers would not be having work to do. Still, there is need to test both theories in a Kenya environment as each has some aspect that reasonably describes human behavior.

xv) Evidence-Based Theory

There are two main broad categories of evidenced-based theories of management: the organization-centric approach and the leadership-centric approach. The organization-centric approach was pioneered by Ichniowski, Shaw & Prennushi (1997). They undertook a thorough investigation of 17 firms, on productivity effects of innovative management practices such as teams, incentive pay, flexible job assignments, training and employment security. The researchers attained considerably higher levels of labor productivity using these incentives than with the traditional approaches, such as strict work rules, hourly pay with close supervision and narrow job definitions (Ichniowski et al., 1997). The authors concluded that systems of innovativeness practices in the management of human resources raise workers' efficiency which in turn improve firm performance in situations when alterations in individual employment aspects have insignificant or no impact (Ichniowski et al., 1997). This implies that incorporating innovative management practices such as the ones listed above in hospital and healthcare center management would ensure better performance and would help prevent the public health sector workers from engaging in part-time employment in private hospitals. The leadership-centric approach focuses on the role of the individual managers; it postulates that some firms such as hospitals perform better than others because they are led by better managers or management teams (Johnson et al., 2008).

Walshe & Rundall (2001) concluded that healthcare managers have not been fast enough to use the theory to pass judgment on their own performance even though they are quick to employ it to pass judgment on caregivers' performance. The theory requires all health care workers to take decisions based on evidence. On decision-making Walshe & Rundall (2001), state that managers ought to apply similar standards as those they apply on caregivers, thereby, bringing the level of equity to decisions made by managers in healthcare. However, the real-world application of this theory by managers is limited by

many considerations, such as the time constraint in obtaining the necessary evidence on managerial activities. This theory is applicable in general management decision-making as well as in clinical areas, such as in making a clinical diagnosis, in lab-based investigation of cause of illness, and in treatment and discharge decisions.

2.3 Hospital Performance Evaluation Models

Hospital performance evaluation is one of the major management elements that influence hospitals' quality and quantity of healthcare delivery. Hospital management and leadership are entrusted with the responsibility of making decisions to ensure that their hospitals provide on a basis for quality, accessible and affordable health care services. This can only be achieved if they employ quality improvement monitoring systems to track compliance, with management standards to determine how well progress towards productivity improvement is adhered to, as a key feature promoting a culture of continuous improvement and accountability. This is possible if the management embraces the results-based management (RBM), performance contracting and performance appraisal system introduced by the Kenyan government in 2003 (Republic of Kenya, 2003).

In addition, they can employ rapid results initiative (RRI) for some project and programs. Embracing information technology for data, information, communication and knowledge management is not an option if they have got to succeed in monitoring and measuring hospital performance. Performance must be defined in the context of stated goals exhibiting the values of diverse stakeholders such as patients, professionals' insurers and regulators. Some countries such as Ireland, Great Britain, Denmark, and Germany have created a performance assessment and improvement framework (Centre for Economic Performance, London School of Economics and political science, 2016).

Solon Woo, Quimbo, Shimkhada, Florentino, & Peabody (2009), and World Health Organization (2000), says that in a third world country setting, measuring health sector performance cannot only be hard but also expensive and controversial, mainly because of scarcity and reliability concerns of available data. There is also concern that the collection of data is not done sequentially or steadily, thereby bringing about little information on trends. This is no different from the Kenya case and therefore the need to have structures, methods, and tools for the same is of vital importance to measuring, monitoring and evaluating hospital performance.

World Health Organization (2003) and Braithwaite, Hibbert, Blakely, Plumb, Hannaford, Long, & Marks (2017), state that measurement of hospital performance is at the center of the concept of hospital quality improvement. Measuring hospital performance enables one to describe what hospitals actually do. The main ways of assessing hospital performance are statistical indicators, regulatory inspection, third-party assessment and public satisfaction surveys. They concentrate on service (quality) improvement, waiting time, outcome, patient satisfaction, research, resource management, efficiency, patient and staff safety, access to health, life expectancy at birth and infant mortality among others. Gallaher, Kim, Lofters, Murphy, Campo, Quiñonez, Schaefer-McDaniel, & Shankardass (2009), states that the death rate within 30 days of hospital admission for myocardial infarction is utilized as a measure of quality care. The WHO (2000), states that following measures are used to gauge health performance per country globally: life expectancy at birth overall years, deaths per 1000 live births, infant mortality, and Gross Domestic Product (GDP).

Caballer-Tarazona, Moya-Clemente, Vivas-Consuelo, & Barrachina-Martínez (2010), state that instituting specific and well-thought-out researched criteria to assess hospitals' activities is crucial since there is a large growing chunk of public resources devoted to health matters.

Hence, it is imperatively important to come up with a system to assess health care performance so as to learn and improve potential inefficiencies.

World Health Organization (2000), recognizes three overall aims of a health care system: ensuring healthy population, responsive citizen-centered health services and fair payment structures. The hospital is the key to arriving at these goals. Clearly, the organizational arrangement and delivery of healthcare services influence the overall performance of the health system. This calls for measurement of health care systems generally and more specifically hospitals because of their centrality in the provision of preventive, promotive and curative health services to the society they serve (Kuremu, 2006).

Good performance is a distinctive feature for institutions that can withstand change dynamics that occur due to competition emanating from the discovery and adoption of new technologies. Good performance is necessary for all organizations and cannot just be said to be performed when it cannot be measured, monitored and evaluated against standards. These compounds the reasons for all organizations, hospitals included ensuring they plan and establish standards or benchmarks which are used to gauge performances.

Veillard, Champagne, Klazinga, Kazandjian, Arah, & Guisset (2005), in their study developed six features for evaluating hospital performance: production efficiency, responsive governance, clinical effectiveness, patient focus safety, and staff orientation. From their study they were able to: define the concepts and recognize the most important aspects of hospital performance; devised the framework for assessing the performance of hospitals (known as PATH) to improve evidence based management and quality improvement via performance evaluation; choosing of central and purpose made set of performance highlighters with elaborate operational definitions; recognition of tradeoffs

between indicators; detailing of descriptive sheets per indicator to reinforce hospitals in translating the outcomes; etc. (Baba & HakemZadeh, 2012).

According to WHO (2000), global evaluation for health system performance measurement in 192 member states indicates that framework for assessing and increasing performance of Healthcare systems must concentrate on four key areas; service provision, financing, resource creation, and oversight.

The WHO (2000), report highlights four different types of hospital performance measurements; Inspections**:** areas of focus include hygiene, fire, medical devices, radiation, medicine, blood transfusion, infection control; consumer Surveys**:** focus on patient empowerment, health education, complaint mechanisms, continuity of care, comfort, and result; third-party assessment**:** usually organized by nations or regions, ISO standards, peer review, and accreditation is also in this category; statistical indicators**:** statistical indicators are used to gauge performance management and quality improvement.

2.4 Hospital Performance and the Work Environment

The work setting entails the social interactions at the workplace, interactions with peers, junior staff and their superiors. It is the context in which managers do their work. This environment is dual in nature, that is, external and internal work environment (Cole, 2004). They state that the essence of management lies in the fact that managers are endowed with the obligation of taking all necessary actions that enable the individual and the group/ team contribute their best to the group/team objectives. This they do by creating an enabling environment for effective individual and group/team endeavors to obtain results. The aggregate of these results constitutes the performance of the organization. A manager must know and observe the laws, policies, rules, and regulations which relate directly or indirectly to health, such as Public Health Act, Pharmacy and Poison's Board regulations, procurement

and financial regulations, et cetera, as part of external forces that may affect the performance of the manager Likewise, managers ought to understand the internal ways of doing things so as to enable him/her contribute positively by improving the internal processes, communications, and interactions. Following are studies which show the link between the practice of managing and controlling the hospital work environment and the quality and quantity of healthcare delivery

Drummond (2009), states that a conducive working environment is paramount to the discharge of high quality, effective and efficient service delivery as it indirectly motivates health workers and determines their performance. Un-conducive working environment includes among other things, absence of recognition and appreciation for good work, the poor relationship among colleagues, poor communication, heavy workload, stress with working with HIV patients and the absence of a link between wages and work performance.

Kundu (2015), observes that managers have the responsibility of eliminating performance problems, creating and maintaining conditions that motivate employees, providing opportunities for staff development, and reinforcing effective behavior. These pre-conditions are to be met for increased patient satisfaction level and grievance handling.

Provision and consumption of hospital services used at the same place in a time sensitive manner helped hospitals to deal with unexpected or impromptu cases. There are few ways which may be embraced by hospitals to reduce unexpected external influence including scheduling of operations, demands forecasting, revenue cycle maximization (Mclaughlin & Hays, 2008). Applying the manufacturing driven operational principles in achieving improved healthcare delivery service, though greatly desired in hospital setup, the task is not easy.

2.5 Evolution of Hospitals: An Overview

Hospitals as institutions for taking care of the ill people emerged at different times in different places in the world exhibiting social and religious circumstances. Hospitals are organizations for regular healthcare usually within a specific period. They are vital part of social organizations which provide population with complete medical care both preventive and curative and also as a center for research and training of health workers (Joshi & Mamta, 2006).

The hospital is committed to not only to inpatient treatment but also ambulatory and domiciliary use. A hospital is a multipart organization and an institution with a team of qualified human capital and sophisticated but specialized scientific equipment used in providing both curative and preventive healthcare services. They are coordinated together for a common goal of reinstating and sustaining good health to patients who visit the hospital (Ballabh, 2009).

Hospitals began in the period before 1000 B.C and in the middle age period, hospital served other purposes, such as home for the poor and refuge for travelers. The name originated from the Latin term “hospes” which is the root or the source word of the English words, such as hostel, hospice, hotel, guest and hospitality (Horden, 2005).

Horden (2005), states that the first record of hospitals was in the 5^{th} and 6^{th} Centuries AD in the Byzantine Empire. Further, Horden (2005), reported that hospitals began later in monasteries in Western Europe. He continues to say that most health care provision was offered through extended families and local communities. Horden (2005), states that the industrial revolution came with monumental changes in the social arena that influenced health and healthcare. Cities sprang up in various parts of the world making people live in clouded areas providing favorable circumstances for transmission of infectious diseases,

unsafe industries, and increased injuries. Mortality rate increased while social support systems crumbled due to increased population mobility. Horden also states that it took a mixture of philanthropy and self-interest amongst the wealthy to stimulate public health measures and building of new hospitals.

2.6. Health Service Delivery and Hospitals in Kenya: A Short History

According to Koinange (1996), the modern medicine came to Kenya initially through the Imperial British East Africa Company (IBEA Co.), later through missionaries and lastly through Government at independence in 1963. Development of health services was highly linked with the building of Kenya Uganda railway by British colonialists, missionary activities and the world wars. The first doctors came to Kenya courtesy of IBEA Co., some of who were later absorbed by the government when the protectorate stopped being ruled by the IBEA Co and taken over by the colonial government in 1920.

Koinange (1996), states that about 20,000 laborers from India were shipped to start the building of the Kenya Uganda railway in 1898. The railway reached Nairobi in 1899 and Kisumu in 1901. In 1908 Nairobi was made the headquarters of both the government and railways. The staff recruited to build the railway system played a vital part in the early development of modern health services in Kenya. The railway transportation brought new people, a new way of life but it also came with new diseases and efficient means of transmitting some of them. Kenya was declared a British protectorate in 1895 in order to administer the Protectorate, the British proposed the following eight departments: financial, judicial, road and transport, medical, public works, customs and shipping, posts and telegraph, and military. Health was among the first department to establish. Before the coming of the colonialists, health services were offered by the traditional medicine men in the community.

According to Koinange (1996), as the railway reached Nairobi, records show that there were very many rats, fleas and other vermin on top of a smallpox outbreak. At the same time, the medical personnel were few and widely spread which included four medical doctors stationed at Mombasa, Machakos, Kikuyu, and Kismayu. Dr. McDonald was the first Chief Medical Officer stationed at Mombasa. By the dawn of the 20th century, there were a handful of medical and paramedical staffs all who were foreigners. The staff establishment grew gradually over the coming years. The health services in those days were exclusively for expatriate civil servants, colonialists and European settlers. Major diseases of the time were the plague, malaria, smallpox and sleeping sickness.

The church contribution to the introduction of western medicine in Kenya in the early 20th Century was pioneered by Dr. Ludwig Krapf, a German sent by Church Missionary Society who set up a mission at Rabai. Later in1908, an eight-bed hospital was established and the first Kenyan medical auxiliary trainees recruited. The following year (1909), the colonial government established a hospital at Fort Hall (Murang'a). By then, the government had also started various stations which were run by medical assistants and apothecaries (Koinange, 1996).

Slightly before the First World War in 1913, the British colonial government through the London School of Tropical Medicine sent Professor William J. Simpson to visit East Africa to assess and report on the sanitary conditions of the country. He recommended that there should be a clear distinction between curative and preventive services, the appointment of a Chief Sanitarian and a bigger budget for sanitation. He further recommended the improvement of hospitals and also indicated that to control plague in urban areas, residential areas should be separated by an open belt of 300 yards or more. This is the reason why there are green belts between Muthaiga, Parklands, and Pumwani. Racial segregation appears to have been carried out on the basis of improving public health as it was thought

that as long as Africans, Asians, and Europeans lived together plague would not be controlled (Koinange, 1996).

According to (Koinange, 1996), a meeting of Provincial Commissioners in 1919 admitted the need to extend the medical facilities to the native (rural) and recommended the building of dispensaries and training of African natives to man these dispensaries. This was supported by the Director of Medical Services, Dr. J. L. Gilks who advised that "A government hospital is a tangible sign of government activity which the native understands". The first close association between the government and church missions regarding health matters occurred in 1922 when the Kenya Medical Department requested Dr. Arthur at Kikuyu to start medical training for Africans. By then, 60 medical assistants had already been trained in Uganda between 1920 and 1922.

As far as church medical services were concerned the Missionaries from Scotland championed more than any other missionaries the medical work in Kenya. They were the only missionaries that out rightly wanted to have the Africans educated. Their mission status was characterized by the installation of a school, hospital and church buildings. The Scotland missionaries owned hospitals were handed over to Presbyterian Church of East Africa in 1956. All the three; Kikuyu, TumuTumu, and Chogoria are known as P.C.E.A. hospitals (Githii, 2008).

According to Githii (2008), the Second World War impacted on health development capacity to handle war emergencies. The many African soldiers who took part in the war brought with them many health problems from wherever they had been. He argues that despite that health services before independence was developed on racial lines, reasonable growth was achieved with the Director of Medical Services Dr. A. R. Paterson showing the

need for research and advocating for expanded social services, and improvement in housing and health care for the local people.

RoK-MoH (2014), Master Facility List indicates that at independence in 1963 the department's name was changed to the Ministry of Health and Housing, with Dr. J. C. Likimani becoming the first African Director of Medical Services. Since then the health sector has gradually grown with over 6,000 institutions of health, the majority of which are government owned while others are faith-based organizations and private sector owned. Before acceptance of hospitals and modern-day medicine, the majority of Kenya African nationals relied heavily on traditional medicine, a practice which still exists in some parts of the country to date though not openly.

Before independence, Kenya had a centralized form of government and health service delivery was through fee for service. Upon Kenya gaining independence from Britain in 1963, the country continued with a centralized form of governance until the enactment of the constitution in the year 2010 and its implementation in 2013. After independence, health services and education were provided freely through a policy to fight diseases, poverty, and illiteracy. This system had a good referral system (along the hierarchical chain) from home to dispensary to the health center to District Hospital to Provincial and finally to National Hospital.

The free medical services went on till 1989 when World Bank advised introduction of user fees in the hospitals for less than a year and then stopped and began again in 1991 and hospital boards were established to oversee the hospitals. The user fees intention was to improve the infrastructure of hospitals but with the reduction of the health budget, it was used for buying drugs and employing casual workers in hospitals after the subordinate workers were laid off following implementation of structural adjustment measures.

In 1976 after Alma Ata declaration of primary health care many health centers particularly rural health demonstration units were put up. The training course for nurses changed from Kenya registered nurse and Kenya registered midwives to Kenya Registered Community Health Nurse (KRCHN). These were trained to manage rural health services with an emphasis on primary health care. Many hospitals were also built by communities through Harambees (cooperative) efforts. By 2004 there were many dispensaries, health centers, and hospitals and one district could have more than are district hospital and health centers. Since independence Kenya adopted a centralized form of government where administrative power was concentrated in the country's capital, Nairobi. The centralization of power at the capital resulted in imbalanced development, especially in the countryside.

Close to a decade now, Kenya has made a dedication towards decentralizing the management of the health system in the country, through increasing the powers of county governments over the distribution of resources, provision of service at the district hospitals and the subsequent lower levels of the system in order to ensure maximum community participation in health management in line with Alma Ata declaration. From the steady reforms listed in the earlier two Health Sector Strategic Plans, that District Health Management Boards and the District Health Management Teams (DHMTs) are now obliged take charge of facility level procedures within district hospitals in counties.

According to Republic of Kenya (2014), Kenya has a hierarchical healthcare system structure which starts with the primary and community healthcare units, and then progresses to high levels of healthcare units where difficult cases are referred. Primary healthcare units comprise community units, dispensaries and health centers. Currently, the structure has six levels as follows:

Level 1 - referred to as a community unit with 5000 people; each family is assumed to have 5 members so that twenty households are expected to be under one community resource person and one community unit to have 50 community resource persons. The fifty community resource persons are expected to be under one health extension officer attached to the nearest dispensary. At this level, there is a diversity of preventive and promotive health care activities taking place.

Level 2- referred to as dispensary, with one dispensary serving three community units (15,000 people). The dispensary offer outpatients only and patients who require admissions must be referred to a health centre. Preventive and promotive services are also provided at the dispensaries.

Level 3 - referred to as health centre, serving 30,000 people or the number served by two dispensaries. Health centers have outpatient services as well as 24 hours inpatient services, including observation and treatment beds and a few beds to maternity beds.

Level 4- District or sub-district hospitals serve about 100,000 people or the number covered by 20 community units or three health centers. District hospitals have medical, surgical, pediatrics and maternity wards and have at least one specialist in each department, with one or two medical officers who manage in-patients and clinical officers who serve the outpatient clients.

Level 5 - (Provincial Hospital) which serves 1,000,000 people or 10 times the number served by level 4 hospitals. These are regional referral hospitals with several medical specialists. They treat most of the referred cases except a few who have special problems.

Level 6 - (National Hospitals): there are five national hospitals namely; Kenyatta National Hospital (KNH), Kenyatta University Teaching, Referral and Research Hospital

(KUTRRH), Moi Teaching and Referral Hospital (MTRH), Mathare Mental Hospital, and National Spinal Hospital.

Following the successive revision of the Kenyan Constitution in 2010 and its implementation in 2013, there has been a shift of roles and responsibilities from national to county level as a way to enhance health coverage (RoK-MoH, 2014). The level 5 hospitals which were earmarked for transformation into national hospitals have now been taken up by the various county governments. As of 2014, there were 7795 health facilities in Kenya with 48%, 38% and 14% owned and operated by the public sector, private commercial sector, and non-commercial private sector respectively. Most of these hospitals, clinics and health centers are located in the urban areas leading to a high geographical disparity in access to healthcare (RoK-MoH, 2014).

As compared to the WHO requirement of 23 doctors, midwives and nurses per 10,000 people, Kenya has on average 1 doctor, 12 midwives and nurses per 10000 persons, with shortfalls below these levels being found in the public sector and in rural areas. Also, about 30 to 40% of bed capacity in Kenyan hospitals is provided by the government and faith-based organizations (RoK-MoH, 2014). Dispensaries are normally the system's immediate point of contact with patients; however, there are some areas where hospitals and health centers act as the first point of contact. Currently, the health service delivery is run based on the new Kenya Essential Package for Health (KEPH) plan.

Although Kenya’s health system has gone through massive improvement, there still exist some challenges. There is a high patients to doctors’ ratio, the health sector lacks qualified doctors, especially in the public sector and in the rural areas, a situation contributing to high geographical disparities in health care access (RoK-MoH, 2014). Over 50% of the Kenyan healthcare facilities have old infrastructure making many of them unable to meet the current

acceptable standards in terms of infrastructure and equipment (RoK-MoH, 2014). Also, the devolution of management to the county level has made it possible for budget cuts and hospitals administrators now run the government hospitals in a business-oriented manner, a situation which has resulted into many health care challenges (RoK-MoH, 2014). Currently, the government is now looking forward to privatizing the management of public facilities to help solve these challenges.

The country expected that by devolving the management of the health facilities most of health care challenges, problems, and inefficiencies could be identified easily and addressed. Little change however has happened. The question remains as to whether the situation is really a management problem, given the fact that the devolution reform is not yielding tangible results. The empirical findings of thesis (see the results sections) show that implementation of effective management practices in government hospitals is an important ingredient to the solution of service delivery facing the Kenyan health system.

2.7 Empirical Review

2.7.1 Overview of Hospital Management.

According to World Health Organization (2016), hospitals are healthcare institutions manned by medical, paramedical and other professional staff, having facilities for inpatient services, which deliver medical, nursing and related services. Hospitals services vary from acute to convalescent to terminal care employing both diagnostic and therapeutic services, treat severe and chronic conditions stemming from ailments, injuries and genetic disorders (WHO, 2016).

Organizations world over are established to serve the needs of the society. Resources are used and structures are built in the creation of organizations. The most salient feature in every organization is management - the source of command and control center. Cole (2004)

indicated that management is the nerve center for command and control of daily running of the hospital affairs. Hospital managers ensure that governance and coordination structures at the hospital level were functional. They also felt that it was means of engaging with the other health-related performers in their region. To achieve this, managers of various institutions or organizations work at different levels depending on the size and operations (Saleemi, 2011). These levels can be defined as a line of demarcation between various positions and increases when the size of the institution or organization, and the workforce increase and vice versa (Saleemi, 2011). These levels control a chain of command, the extent of authority and the status appreciated by the managers. The levels can be classified into three broad categories as illustrated by various reports: lower level, middle level and top level (Saleemi, 2011).

A top-level manager serve as a leader in the organization, and therefore portray the qualities of both a manager and a leader. The top manager determines how other levels operate and therefore plays a very important part in the organization. Practice of management, therefore, puts into consideration aspects that facilitate the other levels managers and workers to perform their duties for the success of the organization (Cole, 2004). Some of the management practices that top-level managers use or require include:

One, work plan preparation, this entails documenting the organizational/ department goals, objectives and activities to be executed in an organization in order to attain its mission (Saleemi, 2011). Planning involves identification of where the organization is in providing services and coming up with what is to be done to achieve its desired goals within a stipulated period. The activities could be many and requiring time, a lot of resources both human efforts and financial resources and therefore prioritization is important to ensure that activities are completed on a priority basis. The process ought to involve the management at all levels and all stakeholders to ensure proper implementation of a plan. Each worker is

assigned a set of activities to accomplish and as such regular monitoring is important for the attainment of the goals as per the plan. The individual work reports are evaluated against the work plan on a regular basis.

Two, supervision, Saleemi (2011), Armstrong (2009) and Government of New Zealand (2005), Health Practitioners Competence Assurance Act, states that supervision is an organized formal relationship framework which a practitioner reflects critically on the workers below him/her, and receives feedback and guidance from their seniors. The supervisor bridges the gap between the management and the workers, communicates to workers the goals, policies, plan, decisions, and strategies. The supervisor as a representative of management receives grievances, complaints, and suggestions from the workers. The supervision forms a springboard platform for directing workers on how to carry out activities and one of its functions is to clear any doubts on routine matters that workers face on a day to day basis.

Other roles of supervision include ensuring instructions are given to workers, activities are done in the prescribed and controlled manner, resources are used in the most profitable way possible, discipline is maintained, and there are good communication and feedback between management and workers (Government of New Zealand, 2005).

Three, delegation, Cole (2004) and Sagimo (2002), states that delegation with follow up entails the transfer of authority and responsibility by senior to a junior person to carry out specific duty the practice enables a manager to focus on more critical issues of the organization. This helps to boost confidence, morale, and productivity among employees, and may also promote a spirit of teamwork. In the process of follow up, the manager is able to interact with the worker and in case the worker is facing difficulties, the manager can offer advice or address some of the problems.

Four, motivating, inspiring and empowering others, according to Saleemi (2011) and Sagimo (2002), empowerment entails expanding the ability of workers or individuals to make informed selections and change them into actions that promote the execution of the organizational mandate. Empowerment gives workers a sense of confidence, commitment, and appreciation that contributes to the realization of the organization's goals. Motivated workers initiate goals and stay focused on them thus increasing the likelihood of them being achieved. Empowerment makes workers try to achieve more than has been assigned to them, and may make them feel energetic and thus work harder (Cole, 2004).

Five, establishing a good working relationship through consultation and consensus building. Feedback is requisite at all levels of management of any organization; a manager requires feedback from various levels of the organization that is under their authority. It is of great significance for a manager to make sure there exists a cordial working relationship with workers at different levels of an organization. Such a relationship affects the implementation of planned activities and the effective supervision of workers by section heads. Establishment of such a relationship requires consultation and agreement across different departments.

Lastly, the residence of managers in the hospital, according to Nezenega, Gacho, & Tafere (2013), having senior hospital managers residing on hospital grounds is a widespread practice globally as it enables hospitals 24 hour-support with the resultant prompt decisions on patient care. This greatly improves the quality of healthcare delivery in hospitals.

2.7.2 Management Practices

Management dates far back to the period when man became civilized and started to organize themselves into communities, to find collective ways of providing themselves with food, clothes, shelter, wealth and security. Some of the ways include working in groups to grow

crops, do batter trade, to wage wars, to form common beliefs and practice in form of religion, and to explore and conquer other territories. The ultimate aim was to ensure that their communities prospered and survived for a long time. However, since the time of civilization, management has developed out of the experience, evolved out of practical complexities and its techniques has been refined from the crude and rudimentary forms to present day management techniques and principles, which is applicable in many spheres of human organizations (Cole, 2004).

To undertake proper management of any formal organization such as hospitals, it requires a set of well-planned behaviors and actions that managers must exhibit as they execute their managerial activities or responsibilities, known as Management Practices. The phrase was coined from the two terms management and practices. Management denoting getting things done through the effort of other people (Saleemi, 2011; and Cole, 2004) while practices refer to the actions the manager take to make sure that resources available are employed suitably in meeting the organization's objectives. According to Hornby & Turnbull (2015), to manage is to run or to be in charge of; while practice means to actually use of a plan or technique contrary to the application of theories connected to it. Olum (2004), defines management practices as an art, tacit knowledge and skill required to perform one’s duty as a manager.

The modern management styles used in many organizations today is credited to the works of Elton Mayo, Fredrick Taylor, Max Weber and Henri Fayol among others who postulated various theories on management (Cole, 2004). Example, Taylor(‘s) work titled "Scientific Management set clearly and precisely work targets, remunerate employees for tasks and goals attained and also providing feedback regularly (Cole, 2004). Fayol is credited for promulgating the fourteen management principles which include authority and responsibility, division of labor, subordination of interest, payment of personnel, initiative,

decentralization or centralization, job security, equity, etc. Fayol further stated that management functions are; planning, organizing, commanding, coordinating and controlling (Sagimo, 2002; and Cole, 2004).

Though there are some general management practices common to every organization such as work plan preparation, work plan implementation, empowerment of others, consultation, and consensus building, good communication, delegation, supervision, motivation and inspiration, residing of senior managers, good relations with other members and use of inspection tool. Most of these practices are specifically adaptable to the type and function of the organization (World Health Organization, 2007). Specifically, to hospitals and other healthcare centers, the world health organization requires that management or managers, one, ensure an adequate number of managers, appropriate competencies, ensure there is working critical support system and ensure an enabling working environment (World Health Organization, 2007).

There are as well tools developed by Bloom, Sadun, & Reenen (2007), which is used for measuring practices employed in management. It is an assessment tool based on interviews and employs likert scale from worst practice score of 1 to best practice score of 5. The tool comes with 18 basic management practices questions. A high score meant best practice and when employed would improve productivity. The final score was the mean score of the 18 questions. The tool broadly assesses management practices in three areas. First, it helps to monitor whether managers monitors their organizations and utilize the results for continuous improvement. Second, it assesses whether managers set right targets and track right outcomes. Third, whether firms encourage and reward staffs anchored on their performance and tries to retain their most competent employees.

Management practices however, differ across countries, using the management practices measuring tool, Bloom & Reenen (2010), conducted a comparative study of various manufacturing organization from several countries and found that there were diversities in management practices across countries as well as organizations. In their findings the difference in performance in firms in Britain and the United States depended on management with those in the United States and international firms performing better than those of Britain and blamed this on poor management. On different countries comparison, he found contrary results indicating that in US and Canada management used more incentives than monitoring while Japan, Sweden and German management used more of monitoring and target setting than incentives. On probing why management practices widely differs across firms and nations, they found that this was due to a number of reasons: market imperfections, family business control of firms, legal restrictions and communicational breakdown allowing bad management practices to persist.

Assessing hospital management practices low resource constraints settings is a critical component of ensuring that organizations do not only have in place mechanisms and structures for production of products and services but also the mechanism functions to its best ability. In many developing countries hospital management practices are an understudied despite their but potential as fundamental contributor to the availability of health care (Bloom et al., 2008). The need for assessing management practices ultimately to employ them in the productivity and hence improve outcomes in health care settings in order to bridge any efficiency and quality gaps in hospital performance. Bloom states that quality improvement in healthcare, many scholars point out that healthcare institutions ought to borrow a leaf from successful manufacturing and technology sectors. However, scanty information is available on how these practices are disseminated in hospitals and whether they relate to improved quality in delivery of healthcare service. Carter, Drogan & Layton

(2011), felt that given the wide differences in management practices across hospitals, dissemination of these practices may be beneficial in attaining high quality outcomes. High quality management practice is just as important in public services and can even lead to reduced death rates in NHS hospitals. Hospitals with better management practices are known to produce better clinical outcomes, such as lower mortality rates from myocardial infarction, as well as higher levels of patient satisfaction and better financial performance (Carter, Drogan & Layton (2011). Managers who combine clinical and managerial skills are known to produce better performance as compared with those who do not possess clinical knowledge. Competition among hospitals could be a pre-cursor for improving the quality of hospital management practices. Hospitals with higher numbers of clinically trained managers attain higher management practices scores across all countries (Carter, Drogan & Layton (2011).

Bloom et al. (2008), stated that hospital boards that paid greater emphasis to clinical quality had management that better monitored quality performance. Similarly, hospital boards that employed clinical quality metrics more effectively had higher performance by hospital management staff on target setting and operations. Good hospital management practices aid to increase the understanding of the dynamics among boards, front-line management, and hence quality of health care that provide new targets for improving health care delivery. The authors opined that hospitals committed to be of high quality generally had significantly higher performance on management practices than low-quality counterparts. Hospital management available literature majorly relied on qualitative data or theory-based approaches and evaluated them by structure and function. Most of these studies focused on whether better management improves the efficiency and financial performance of hospitals and not on clinical outcomes. Hospitals with high performance across a varied number of

process and outcomes-based health care quality metrics were linked with better management practices.

2.7.3 Management Practices and Quantity of Health Care Services

Hospitals are strategically located in many countries. They are usually established in densely populated areas to serve the community. The volume or quantity of patients a hospital receives in a given period of time is usually related to reputation of the hospital. The reputation of a hospital is generally influenced by customer satisfaction which is as a result quality of healthcare services provided by hospital or healthcare facility. The issue of volume in hospitals is a critical on to managers as well as policy makers due to its link to economies of scale and efficiency. According to the free dictionary online hospital volume refers to "the number of cases of specific conditions treated at an inpatient facility. Morbidity and mortality are typically lowest in treatment centers where professional staff has the greatest clinical experience.

Literature available seems deficient in examining the nexus between management practices and volume; however, this relation may be assessed through effects of quality improvement in healthcare services. Management is thought to the way business is conducted. When well applied management can operations at the hospital for better. This implies that all types of inputs resources can be put to the most prudent use. This prudent utility of input resources in the production and provision of healthcare services cause not only in quality improvement but also in satisfaction and hence the good publicity of the hospital. This in turn causes more and more patients to seek services in the said hospital. Conversely, the opposite is may hold true. If there is poor management, even with the best of health specialists and cutting-edge technology it volume may not be ensured as people will want to seek services where quality is not only guaranteed but also assured.

Treadwell, Perez, Stubbs, McAllister, Stern, & Buzi, (2015), view was that hospital volumes are regularly utilized as a structural metric for evaluating quality of care. This points to the casual relationship between quality of services offered and volume of patient attended. Lega, Prenestini & Spurgeon (2013), highlights that many studies have shown that patients who receive surgery at higher-volume hospitals have a higher chance to have better results. The Institute of Medicine pointed out in its synthesis of 77% of peer-reviewed journals reported that there was significant inverse relationship between hospital volume and mortality. Though there seems to be a statistical correlation between quantity and quality of care, this relationship in an individual hospital's volume, whether high or low, is a not a good proxy for results.

Donabedain (2012), looked at volume-outcome relationship and posited that where high volume of surgeries were conducted it resulted into better outcomes due to what they termed as practice makes perfect. Also, they go on to argue that volume could be higher in hospitals with better outcomes because patients seek care at facilities with better reputations in anticipation for better performance. It is possible that for elective procedures providers who are well known might receive more referrals or self-referrals from patients themselves. On the same Donabedain (2012) add that high-volume providers are most likely to institute better processes of care, such as well-designed care plans, streamlined procedures, and higher adherence to evidence-based guidelines that improve clinical outcomes.

2.7.4 Hospital Management Practices and the Quality of Health Care Services.

Quality of service is the degree of excellence in which an organization meets customers' needs and requirements, and exceeds their expectations. Presumably, hospitals invest in best practices to execute their mandate, through increased efficiency, higher revenue and profits, and/or improvements in the quality care. These goals are not mutually exclusive. Increased

quality can directly or indirectly attract more patients and increase revenue, more so if quality is easy for patients to observed (McConnell et al., 2013). Quality measurement in health care services is commonly determined by hospital mortality, readmission rates and length of stay (LOS). The composite result had comparable or better reliability in ranking hospitals than individual outcomes. The proposed composite measure brings together three outcomes in an ordinal approach for a more comprehensive and reliable view of hospital performance than its component indicators.

Health care delivery system faces challenges including improving quality services, providing increased access, and costs reduction. While all three elements are important, there is increasing evidence that the perceived quality of health care services has a relatively greater influence on patient behaviors (satisfaction, referrals, choice, and usage) compared to access and cost. The expansion of PHCs has been a crucial component of many developing countries' strategies to expand access to quality care to their populations, especially in rural areas. However, despite the expansion of PHCs, the quality of health care delivery in developing countries remains low (McConnell et al., 2013).

In many countries the quality of health care services given to patients fails to meet or exceed customers' expectations and standard performance indicators. This attribute to causative factors such as management practices, poor ability and motivation of employee. However, poorly managed healthcare increase in inputs do not translate into improvement in quality (Mickan, 2005). This is because the injected resources will also be used poorly indicating the need for proper management for turning input resources into products and services that meet and or exceed the customer expectations.

Mickan (2005), pointed out that in scenarios where external competition does not create avenues for incorporation of effective managerial practices, supervision is crucial for

achieving persistent improvements. Therefore, their finding is in tandem with the current study which found supervision as the only management practice that affect directly the efficiency. It also reduces under one-year mortality rate and increased overall satisfaction with OPD services.

The skilled health workers led by physicians have been managing the hospitals worldwide with good outcomes (Mickan, 2005). The common practices of management include policy making, planning, organization, implementation, team building, monitoring and evaluation (Management Science for Health, 2006). Good management practices take center stage in any firm or organization that intends to continuously operate in response to customer's anticipations.

Lega et al., (2013), revealed positive association between clinical and economic performance. The study also found out that health care systems and institutions performance were associated with good management practices hence quality service delivery to the patients. Likewise, in Uganda Kakooza et al. (2015), revealed that Ugandan public hospitals are in pathetic conditions and with service delivery at the lowest ebb making it clear that there were conspicuous flaws in management practices. The research look at the effect of management decision making, framework, processes and information sharing and the style of management on hospital performance. The study singled out proper management to be precursor of improved performance of Ugandan hospitals. It also showed that management was crucial to the proper delivery of quality health care services.

More recently Dovlo (2016), states that management is a vital feature of health system strengthening which is often not given much prominence. To enable management capacity building there is a need to consider other aspects such as the manager's work environment, the numbers, support systems, and distribution. Able leadership is one aspect that can't fail to catch the attention as it is a vital portion of management capacity building in resource

constrained situations since such situations require leadership skills so as to obtain managerial accomplishment.

Dorros (2006), management is a social specialized subject area that relates to people's behavior and human institutions. He revealed that firm's management is mostly determined by structures, cultural values, procedures and policies that is adopted and applied to the setting in which it seeks to attain its outcomes. Public health sector management ought to give prominence to its contribution to effective and efficient use of hospital resources to attain quality output. Moreover, health sector results are particularly assessed and measured in terms of the health of the population (Kuremu, 2006). Thus, management and health facility managers must, therefore, be externally focused while all other internal managerial processes and structures are meant to fulfill this purpose.

Some studies have also shown that management autonomy is also keen on ensuring better performance of public hospitals. With the optimum level autonomy required from the mother ministry and government, hospital managers are able to look for avenues to scale up services and or be more creative and innovative which will, in turn, bring about improved motivation and competition among different hospitals, thereby improving quality and acquisition to healthcare services (Bloom et al., 2008).

In Kenya using a similar framework as Barasa et al. (2017), assessing the county level autonomy under the devolution system revealed that the devolution has led to a significant reduction in hospital autonomy which has led to destabilized hospital administration and leadership, reduced community involvement in hospital matters, sub-standard quality of services, low motivation among hospital staff, non-alignment of priorities both by the county and hospitals, staff insubordination and poor quality of care. However, quality of medical services depends on the physician’s personal attributes and patient perception to the

healthcare setting and the broader environment. Supportive leadership, education and training, proper planning, and effective resources and processes management improve the medical services quality. The extent to which differences in management leads to differences in firm performance is a noticeable query which is of much interest in social science. To investigate this, Bloom, Eifert, Mahajan, McKenzie, & Roberts (2011), did a controlled study in a management field experiment on big Indian textile companies. It was done through the provision of free consultation on recent management practices to a set of study companies randomly chosen whereby they compared the performance outcomes with those of control firms. The findings were that, employing these management practices led to raising normal output by 11% through increased quality and efficiency thereby resulting in inventory reduction and annual profitability of about 230,000 US Dollars. Informational constraints were an important factor as they hindered performance improvement. The authors continue to say that delegation (that is, increased decentralization of decision-making through an improved flow of information which enables delegation of decisions by top-level managers to middle managers) and employment of information technology (IT) for extensive data collection impacted on better and quality management practices. These practices increased computers use and brought about data collection and analysis employed in present management. Results suggest that lack of adoption of these practices were due to informational barriers.

The practice and method of measuring hospital performance are also keen in ensuring proper performance which leads to quality services provision. Studies such as (Nikjoo, Beyrami, & Jannati, 2013), have shown that performance assessment and measurement help to attain organizational objectives and informs the organization about the current situation and quality of performance. It enables organizations in summarizing their direction, present position and the rate at which their progressing towards specific objectives (Ott, 1978).

Management Science for Health (2006), highlights indicators of organizational management capacity under the following six sub-categories planning, human resources management, management information, quality assurance, logistics management and monitoring and evaluation system. Veillard et al. (2005), grouped management indicators to include safety, responsive governance, clinical effectiveness, staff orientation, patient centeredness and efficiency. While, Chang, Lin, & Northcott (2002), was looking at UK's National Health Service performance Assessment Framework project classified indicators into six, effective delivery of appropriate quality health care, dimensions health improvement, patient/care experience of the NHS health outcomes of NHS health care, fair access and efficiency. Kaplan and Norton, (2004), employed scorecard to assess healthcare services to measure organizational performance categorized management indicators into four aspects: internal processes and learning, financial performance, growth and customer satisfaction due to quality services. Kaplan & Norton (2004) also states that healthcare indicators in Japan are grouped into five categories: effectiveness, satisfaction, time/efficiency, safety/quality, and health status.

The practice of appointing leaders in hospitals have as well been shown to be significant in hospital performance. Wake-Dyster (2001), and Mickan (2005), state that despite that healthcare managers do not have direct contact with patients, their capability to manage with efficiency impacts directly on quality services patients receive. Due to this direct connection between healthcare management and patient experience, individuals who are appointed to leadership positions to head healthcare facilities have long experience in the healthcare matters.

According to World Health Organization (2001), management and leadership abilities require to be attained using various methods such as coaching, learning by practice and mentoring. Old-style classroom-based learning is insufficient in provision of the necessary

skills. Some learning activities suit more the management teams while others are appropriate for individuals. Management education is imparted mostly through formal training which is composed basically of classroom training usually provided by universities or institutes of management. Management knowledge imparting methods being predominantly lectures or case study approach. The teaching approaches are normally made to pass information and knowledge efficiently in many ways and frequently presume a model of the right or expected managerial behavior which abide the managers and health professional to provide quality services (Kuremu, 2006).

Palmieri & Peterson (2009), opinion was that quality health care services may be affected by health staff burnout, lack of motivation by the hospital management, poor working environment and job dissatisfaction. Most of nurses in every country lack enough confidence that patients could care for themselves after discharge. Better hospital work environment was related with significantly low nurse burnout and job dissatisfaction and with better quality-of-care results. Therefore, poor hospital work environments, lack of motivation and appreciation are common and were related with negative outcomes for nurses and quality of care. Bettering work environments holds promise for nurse retention and improved quality of patient-care. The patient choice of hospital for treatment is influenced by distance, quality of services and waiting times. In public, private not-for-profit (PNFP) and private for-profit (PFP) hospitals may have different behaviour and performance in different indicators such as health outcomes, cost-efficiency and quality (Lega et al., 2013). Despite the limited budget in most hospitals, the policy of control over operational costs succeeded in maintaining the quality of healthcare services. While reducing the expenses for medicines, consumables and laboratory investigations, some quality criteria for healthcare services were observed to be improved hence high-quality service delivery. Clinical outcomes, financial outcomes, consumer loyalty, and community

reputation are unquestioningly the primary focus in healthcare. The hospitals cannot address clinical outcomes in isolation or the quality and safety efforts that shape them.

According to Oyaya & Rifkin (2003), proper utilization of the health facilities, change of clients' negative perceptions and utmost use of human capital will lead to high quality of service deliverance to the clients. Oyaya & Rifkin (2003), stated that poor quality of services in the public health care facilities led to greater use of private health providers. Thus, expanding access or holding the line on costs is not enough if one's confidence in the quality of health care services must be maintained. Perceptions of poor quality of health care may, in fact, dissuade patients from using the available services because health concerns are among the most salient of human concerns. Oyaya & Rifkin (2003), also states that at the root of the performance gap, there are many challenges affecting the quality of service delivery to the patients including: critical staff being absent, essential supplies being unavailable, inadequate facilities, and poor quality of staffing. Problems of supervision and accountability exacerbated the problems.

World Health Organization (2001) and Brook, Pedler, & Burgoyne (2012), hold the opinion that Action Learning (AL) is a more recent approach to management training. They describe it as emerging from formal training sessions with real problem-solving. It's also referred to as action training, research and skills development. In the words of Brook, Pedler, & Burgoyne "Action Learning is an approach in developing of people in an organizations which makes use real-life responsibilities as the medium for learning. It is dependent on the premise that learning and action move together and without learning there can be no prudent action," (Brook et al., 2012)

Hope (2001), describes New Public Management (NPM) as a management tradition that exhibits prominence of the citizen or customer focus, at the same time being accountable

for quality outcomes. NPM is a group of broad like managerial policies, which influenced reform agenda of public administration in most OECD nations since late1970s. It documents most of managerial, institutional and structural changes which occurs in public sectors of these countries and a number of approaches in management as well as methods taken from the private sector (Drucker, 1995). Hope (2001), continues to argue that, NPM has made available a future of smaller organizations designed for institutions providing quick service delivery that was kept small by market forces and that ought to be customer receptive and results inclined for them to continue. These institutions ought to design management pyramid with fewer layers and delegate operational power to forefront managers. With a cut in the number of employees, many services would be contracted other than assuming that in-house provision is best.

Pollitt, Van Thiel, & Homburg (2007), holds opinion that what needs and must be done includes: cutting costs on direct public sector and increase labor discipline in order to increase utilization of resource; adopt and employ private sector style management practices that bring about less rigidity in making decision; encourage competition via term contracts and tendering in the public sector because opposition is crucial to reduce costs and improve standards and quality health care services; public sector decentralized to make units more manageable and encourage competition among the divisions; change focus from inputs to outputs by putting emphasis on outcomes as opposed to procedure. Establishing the stated measures of standards and performance since accountability depends on stated objectives and efficiency on goals and managers who will carry out professional management since accountability require proper delineation of duties (Pollitt et. al., 2007).

According to Pollitt et al., (2007) and Mwita (2000), the salient points of NPM can be categorized or classified into two broad categories: those that go into managerial progress and institutional reorganization and those that focus on markets as well as competition. NPM

movement is founded on efficiency and utility for the economic market as a model for administrative and political relationship. Additionally, institutional parts of NPM emanate from new institutional economics movement, which is based on in transactional cost, public choice and principal-agent problem. These brought about reform themes of public sector which are founded on ideas of market behavior in ensuring efficiency (Kuremu, 2006).

Mwita (2000), reported that improved efficiency is over-arching objective of public sector reforms in developing countries. However, state's method of promoting and undertaking collective action efficiently is an excessive burden, there must be reorganization through reducing and a refocusing of the state's activities geared towards improving macroeconomic indicators stability and creating incentives for better performance hence high quality health care services. Besides, to raise efficiency there is a need for increased competition both in the private sector and the public sector.

According to Robalino, Picazo, & Voetberg (2001), decentralization is a key element in the altering the function of the public sector and introduction of the New Public Administration (NPA) concept. Robalino, Picazo, & Voetberg (2001) and Robinson (2015), viewed decentralization in the context of NPM as a way for governments to provide and deliver top-notch quality health care services valuable to citizens; reduce central administrative controls hence increase managerial autonomy; rewarding efforts at both the individual unit and organizational level; make it possible for managers to get human capital and technological capital resources to match and meet targeted performance of high quality; develop willingness among public servants to competition and tolerance about which role is to be discharged by them and not the private sector; enabling citizens to engage in developmental planning and decision making; improving economic and management efficiency and promoting good governance.

According to Dorros (2006), the health sector reform movement that began in the late 1980s and early 1990s was the catalyst to the development and national health reform programmes. These programmes have drawn attention to the need to improve efficiency, access, and quality of care as a means to attain better health outcomes (Drucker, 1995). This exhibits a paradigm shift in organization and management of the health system from one which is centralized, hierarchically structured and supply-oriented institution and where management is bureaucratic to a state of decentralization, is shared and management is driven by the need to acquire information and knowledge while being accountable for results. In practice, however, the reform process has been slow and the results difficult to assess.

In conclusion, the hospital management and policymakers need to make more attention to motivate staff, train medics and other staff on patient soft skills to deal with patients, creating a good working environment, effective listening, good communication, and polite and courteous. Without any additional costs, showing truthful interest in patients would greatly reap benefits. In terms of tangible dimension, an improvement of physical facilities, equipment and appearance of doctors and other staff should be given priority. It is important to note that a stronger modern managerial perspective ought to be introduced in the hospitals to assist delivering quality services and patient satisfaction.

2.7.5 Management Practices and Hospital Efficiency

According to Peacock et al. (2001), efficiency is one feature of looking at the performance of the whole health services. Efficiency is an element of productivity which denotes the comparison between optimal and actual amounts of inputs and products. According to World Health Organization (1998), performance in the health sector is how well a country seeks to attain efficiency as it respond to the health needs of its citizens and prevent financial losses emanating from poor health.

Types of Efficiency

i) Technical Efficiency

According to Peacock et al. (2001), technical efficiency is the physical relationship between resources (capital and labor) and health outcome. Technical efficiency is attained when the extreme possible enhancement in outcome is achieved from a given amount of inputs. In achieving a set of health outcomes, technical efficiency is attained by applying cost effective procedures with minimum inputs. Thus, it measures how prudent capital, labor and machinery as inputs are used to yield outputs in comparison to the potential optimal output in a given DMU sample. This implies a technically efficient firm, employs the best practice, uses the same expertise as all other DMU's in the sample and produces the given quantity and quality of output without wastage of inputs.

Efficiency in a hospital set-up is whereby the minimum available resources are meant to provide health services to largest volume and best quality possible. Peacock et al. (2001), state that in efficiency measurement makes a comparison between the resources consumed in delivering the services against the achievements of health outcomes. They continue to say that efficiency in health care is seen in the degree to which health programs achieves health enhancements in actual settings.

ii) Allocative Efficiency

Allocative efficiency denotes the economic state in which production shows customer preferences in specific virtuous service which is provided up to the point in which the last unit offers marginal benefits to clients that is equal to marginal price of production (Lovell, 2006). Allocative Efficiency measures the minimum cost of production with the correct selection of input for a specific output and input costs, assuming that the organization in

question is completely technically efficient. This is attained by choosing sets of health programs which are technically efficient to produce highest health improvements possible for the population. Allocative efficiency is expressed as percentage score with 100% score showing that the organization is reviewing its input in the proportions which yields the minimum cost possible (WHO, 2016).

iii) Cost Efficiency

Cost efficiencies the degree to which the program has attained or is assumed to attain it's outcomes at reduced cost compared to options (Kumar & Shah, 2013). The deficiencies in cost-effectiveness happen if the program is not the least cost alternative or approach to attaining the same or similar outputs and outcomes. An entity can be said to be cost efficient if only it is both allocative and technically efficient and it is computed as a product of two scores. Therefore, a 100% score in cost efficiency implies 100% allocative and technical efficiency.

Methods of measuring hospital efficiency

Two methods have been the most popular in measuring hospital efficiency. These include; DEA (Data Envelopment Analysis) and SFA (Stochastic Frontier Analysis).

Data Envelopment Analysis (DEA).

Charnes, Cooper & Rhodes (1978) define data envelopment analysis as a non-parametric technique mostly utilized frontier method on studies in Health Care Organization where multiple input yield multiple outputs. It is a scientific linear programming technique which provides sizable flexibility on the specification of input and output relationship in a firm's production process. It's employed to calculate efficiency in Government service, a non-profit organization, and the private sector. Units of analysis are also known as decision

making units (DMU) and they depict organizations such as hospitals or sub-units within an organizations such as hospital wards.

Stochastic Frontier Analysis (SFA)

This is a parametric technique that was established separately by Aigner, Lovell, & Schmidt (1977). Data envelopment analysis and Stochastic Frontier Analysis measure efficiency by comparing optimal performance and real performance. On one hand, data envelopment analysis computes the relative efficiency on the basis of observed best practices, on the other hand, Stochastic Frontier Analysis measures efficiency based on projected or theoretical best practice frontier hence data envelopment analysis. Studies have always been decision making units that is 100% efficient.

SFA was established out of concerns or identified weaknesses that data envelopment analysis all departures from best practice frontier are taken to signify inefficiency. Fried, Lovell & Schmidt (2008), suggested that the choice of technique ought to be based on the objective of analysis and accessibility of the data required. They also reported the concurrence of outcomes from Stochastic Frontier Analysis and Data envelopment analysis that increases with the use of high-quality data. Most of SFA studies focus on cost inefficiency. The capacity of data envelopment analysis to find access other models alongside simple efficiency scores provides it an edge over additional measures. According to Fried, Lovell & Schmidt (2008), DEA helps in answering managers' questions which include; how to select the appropriate role model as possible benchmarks on a performance improvement program? What facilities are most efficient? If all operations were optimal, how many extra service output could be produced and by how much could it minimize the resource used, and in what areas? What are the salient features of efficient operating facilities, and how can they guide in choosing a location for expansion? What is the optimum scale for the operations and how much would it save if all the facilities were of optimum

size? How should accountability be done for in the context of different external influences when assessing the performance of individual operating facilities?

DEA strength includes; handling various inputs and output. This does not require a notion of the functional form relating to input or output. DEA employs a direct comparison of decision making units against a combination of peer decision making units. Inputs and outputs that can have different units such as the number of beds, health staff, patients treated and expenses on medical supplies. DEA estimates relative efficiency of a decision making unit thought to congregates very slowly to absolute efficiency. It articulates how sound one is doing as compared to peers but not associated with a theoretical maximum.

Efficiency notions are based on the objective of production anticipated and range of activities analyzed. In diverse researches on health care efficiency, the objective of production has been taken to be services provision and achieving outcomes. Activities that are compared vary from other care procedures across countries. The core of measuring efficiency is on the production frontier concept, which relates inputs to either outputs while taken into account the influence of external factors on production efficiency. The production frontier shows the technical and behavioral features of the production method.

Hospital efficiency estimation is a subject that has been studied by many health economists and scholars worldwide. Most of the efficiency analysis studies have employed a two stage procedure. The DEA efficiency scores estimation in the first stage using the usual outputs and inputs method. The second stage, the scores are then regressed against some environmental related regressors which are assumed to affect efficiency (Coelli, 1996; Chilingerian & Sherman, 2004; & Ray, 2004).

Caballer-Tarazona et al. (2010) studied the operative efficiency of hospital performance in Spain. The study involved hospital service units that had a waiting list higher than average

in 22 hospitals in Valencia. General surgery, ophthalmology and traumatology orthopedic surgery units were included from each hospital in the study sample. The output variables were admissions, consultations and surgical interventions while input variables used were a number of doctors and beds. The study results showed that general surgery had 8 and 14 while ophthalmology had 9 and 13 efficient and inefficient units respectively. Finally, traumatology- orthopedic surgery had 6 efficient units and 16 inefficient units. The study results showed that if a hospital is run one service efficiently, it does not imply the other services are run efficiently. The authors advise studying the efficiency of each unit independently as opposed to studying overall hospital efficiency. While we agree with Caballer-Tarazona et al. in developing countries like Kenya there is a need to improve the general hospital efficiency before narrowing down to specific service units.

Goudarzi, Pourreza, Shokoohi, Askari, Mahdavi, & Moghri (2014), studied the technical efficiency of 12 teaching hospitals allied to Tehran University of Medical Sciences between the years 1999 to 2011 using Stochastic Frontier Analysis (SFA). The input variables used were doctors, nurses and other personnel and active beds while output variable were the number of inpatient admissions of outpatients visits. The results showed that technical efficiency scores ranged from 22% to 81% with an average of 59%. The finding also shows that input variables of doctors, other personnel and outpatient and admissions as outputs affected production positively and significantly. The outcome of this study exhibits striking wastage of resource in the hospitals during the review period.

In their study, Prezerakos, Maniadakis, Kaitelidou, Kotsopoulos, & Yantopoulos (2007) used DEA to estimate the changes in efficiency and productivity of a sample hospitals in Greece between 1998 and 2005. This study transcended in two periods: before and after reforms brought about by the enactment of Act No. 2889 of the year 2001 aimed at cost reduction and hospital efficiency improvements. The input variables were a number of

doctors, nurses, other personnel, beds and operational expenses while the output variable were laboratory examinations, outpatient visits, and inpatient admissions. The results showed that reforms brought about efficiency improvements when only quantities were taken into consideration. In the period between 1998 and 2002, the results show regressed efficiency flowed by improved efficiency thereafter up 2005. The results, however, show that when running costs are taken into account the hospitals exhibit significant regress meaning the higher cost of production over time. The results also indicated that it was difficult for individual hospitals to significantly improve anymore their efficiency by changing their scale of production and their efficiency in running their beds and labor inputs. However, hospital management can reduce costs concentrating on handling better their operating expenses which as the analysis indicates can be halved, on the basis of the performance of best practice units.

Osei, d'Almeida, George, Kirigia, Mensah, & Kainyu (2005), study on technical efficiency of Ghanaian district hospitals and health centers in the public sector. The inputs variables were human resources (doctors, dentists, and non-clinical staff) and beds while inpatient discharges, maternal and child health care visits and deliveries were employed as output variables. The study used data from a sample of 17 health centers and 17 hospitals for the year 2000. Results showed that on one hand 14 of the health centers had TE score of 100%, while on the other hand, only 9 of the hospitals had a technical efficiency score of 100%. The study excluded drugs though it is an important input in the provision of health services due to lack of data. This study showed that small health facilities, in this case, health centers were more technically efficient when compared with large health facilities, which were district hospitals (Centre for Economic performance London School of Economics, 2016).

A similar study to the conducted-on level I, level II and level III hospitals in South Africa by Zere (2000) using data for the year's sampled hospitals for 1992/93-1997/98. The input

variables employed were a number of beds and total recurrent expenditure while output variables employed were outpatient visits and inpatient days. The overall efficiency score for the levels I, II and III were 0.74, 0.68 and 0.70 respectively, implying they were all operating below the best frontier, that is, less than 100%. This study also exhibits a close similarity to the study of Osei et al. (2005) in that lower level health facilities seem to be slightly more efficient than larger facilities in both cases.

On scale and technical efficiency, Tlotlego, Nonvignon, Sambo, Zere & Kirigia (2010) using a sample of 23 hospitals from a zone in Benin from year 2003 to year 2007 showed that on average 15 of the hospitals were inefficient in in each of the years from 2003 to 2007 and were required to either augment their output or decrease their input to be technically efficient. The results also indicated technical efficiency scores based on average variable return to scale (VRS) were between 63% and 88% respectively for the period under review. This study also pointed out the possibility of providing extra patient care for both outpatient preventive and curative, and inpatient care without additional inputs (Kirigia & Zere, 2013).The extra patient care would be provided through the adoption of health promoting activities and reduction of user fees to reduce barriers to promote underutilized health services.

According to a study done by Bwana (2015) on technical efficiency of hospitals which are owned by faith-based organization in Tanzania between the years 2009 and 2012, the average technical efficiency was 59.79% in 2009, 60.01% in 2010, 57.49% in 2011 and 55.08% in 2012. The results indicated technical efficiency did not improve over the years under review. The results further indicated that most hospitals exhibited an increasing return to scale implying that they required allocation of more resources in order for them to operate at the most efficient frontier.

Mujasi & Kirigia (2016) conducted a longitudinal study using five-year pane; secondary data for the financial years 2009/10to 2013/14 in Uganda's 13 referral hospitals to measure productivity and efficiency changes. The results revealed that there was increased productivity which was due to progress in technology application and not improvement in efficiency. The study findings intimated that efficiency changes in the five years span were insignificant and hospitals which were inefficient require an increase both outpatient visits and deliveries by 19% and 6 % respectively. The study found that there was an opportunity for improving hospital productivity through hospital efficiency improvements.

Korir & Kioko (2009), used secondary data for two financial years 1994/95 and 1995/96 to estimate efficiency in public hospitals in Kenya. Hospital managers provided primary data first-hand information from their perspective about the healthcare delivery inefficiencies in their respective hospitals. The study estimated a non-linear short run variable cost function, the explanatory variables were outpatient visits, average wage, admissions and beds. Outcome showed a mean level of inefficiency to be 30%, hospitals exhibit IRS implying they need to increase both inputs and outputs proportionately to operate at the best efficiency frontier, existence of economies of scale implying that government hospitals are using more inputs than necessary leading to waste of resources, and inelastic relationship between recurrent costs and the capacity hospitals and output. Inefficiency in the study was associated with factors such as inadequate staffing, a poor production technology, underequipped laboratories and non-functioning theatres, transportation complications, shortage of or mal-distribution of drugs and medical supplies and poor servicing and/or frequent breakdown of machines and equipment.

A study was done by Kirigia, Emrouznejad, Sambo, Munguti, & Liambila (2004), on the efficiency of the Kenyan public health centers. Employed human resources, number of beds and non-wage expenditures were used as inputs and common tropical disease most prevalent

in outpatient visits, family planning and antenatal visits, immunization and other outpatient visits as outputs. This study found out that out of the sample health centers used 44% were inefficient implying that in order to be efficient they either needed to decrease inputs used or produce more outputs.

Kinyanjui, Gachanja, & Muchai (2015), in a similar study employed a number of doctors and nurses, beds and cots and a total of other works as inputs variables while annual outpatient visits and total inpatient admissions as the output variable. In an efficiency study of health centers and dispensaries operated by Nairobi City Council for the year 2006 and 2007 using input variables, the number of nurses, clinical officers, and support staff and output variables, the number of curative outpatients, the number of children visiting the clinic and the number of expectant mothers seen. The study found out that average technical efficiency was 75.9%. The outcomes further showed that 60% of the health facilities had sufficient while the rest needed a reduction in input resources for them to operate at most efficient frontier (Kinyanjui et al., 2015).

2.7.6 Management Practices and Hospital-level Health Outcomes

Bloom et al. (2014), declared that management practices had strong association with better clinical and financial outcomes of hospitals. The authors stated that better management practices had also strong correlation with better employee performance which is measured by both non-financial and financial outcomes including quality of health care. Management practices identified in the study are closely linked to patient outcomes. This is in tandem with the findings who reported effect of management practices in health service organization in developed countries and hospital in particular. Bloom et al. (2014), stated that the management practices is associated with the outcome including; total outpatient, total inpatient, overall satisfaction in outpatient, overall satisfaction in inpatient, total number of

flesh still births, total under one-year mortality, total maternal mortality and total live births. Kaplan & Norton (2004), suggest that modern management techniques (e.g. Kaizen, Balanced Scorecard) which were rooted in the manufacturing industry of developed countries can be adopted to hospital settings to improve quality of management practices which leads to better performances hence good hospital outcome (Graban, 2012).

Following from the contingency theory, it is evident that the size of the hospital can also influence management performance and in turn affect the quantity of outcome and outputs or healthcare service delivery. A study conducted in 1996 by the University of York reviewed 200 studies to assess the effects of the size of hospitals against the outcomes. The study confirmed in their conclusion what most people believe that larger quantities resulted in better results (outcome). Often, authors overestimate the size of the relationship because of the failure of taking into account case mix. Secondly, if there exists a causal relationship, then the trend of causation cannot be shown. In other words, does "practice makes perfect" or are better outcomes in large hospitals because of skewed referral? Thirdly, betterment in quality care could be realized through more hospital specialization, instead of enlarging hospital size. Prior studies conducted looked at both the hospital and the doctor volume which showed a connection between results and hospital volume but not between results and doctor volume, implying joint expertise by doctors' team is superior to that of the individual (Posnett, 1999).

Bloom et al. (2008), used the management measuring tool to interview a sample of clinicians and managers in cardiology and orthopedics specialties, in 161 interviews across 100 English Acute hospital trusts. In addition, 21 private hospitals were examined employing similar technique. Out of the entire acute care providers of in the United Kingdom 61% of them were covered.

The findings were both methodological and substantive. Methodologically they exhibited that their management practice scores delivered useful information and associated with measures of hospital performance such as decreased mortality rates from acute myocardial infarction (heart attack) general surgery, waiting lists, staff turnover and host of other performance measures.

Substantively, they uncovered a number of striking results. This is basically as a result of differences arising from different styles employed by different managers in people management which includes recruitment, use of people soft skills, compensation, individual development and career growth, reward, and sanction. Targets were also a challenge in National Health Service (NHS) due to arbitrary nature of imposition by central government. Second, the average scores of management for private hospitals were higher than public hospitals. This was attributed to people management. Third, from the study findings managers who had clinical backgrounds, were found to have a higher average score than their counterparts who did not have the same. This implies that lack of similar information base between managers and powerful interests of senior doctors is a major aspect that lowers performance.

Finally, from the study findings, it was somehow evident that competition was connected to improved hospital performance. It also indicates that when compared with the private manufacturing industry, competitive forces are not robustly employed in healthcare. This prevents the departure or takeover of dismally performing hospitals. The private hospitals were better managed than public hospitals. Amongst publicly owned hospitals, the autonomous ones had relatively higher management scores than those not so autonomous. The findings also gave some evidence that competition was linked to better hospital performance.

The AMI and overall emergency surgery were used as the two were to a great extent the ordinary causes for admissions that lead to death. Clinical outcomes used in this study were the 28 days death rate for emergency admissions for AMI and non-elective surgery because death rates from these ones were the ones used by United Kingdom regulator for quality. The two are used as clinical indicators of hospital performance. The size of waiting list for all the operations was employed also as a performance indicator (Drucker, 1995). Measures of service quality used in this study were infection rate, readmission risks, waiting time and measure of patient satisfaction in addition to job satisfaction of staff. On the other hand, the efficiency utility of resources was measured and analyzed per medical employee, bed occupancy rate and average stay period of patient in hospital.

A culture of good management is essential to ensuring the performance of firms, organizations, and countries. This is in line with what Bloom et al. (2007), concluded that despite where US-based multinationals are located, they perform better than their non- US counterparts. Therefore, management practices and culture of firms and organizations, hospitals included, need to adopt and adapt best practices available globally to enable them to maintain the tempo of competitiveness by providing unequivocal products and services both locally and internationally.

As concerns the hospital size, the larger the size (human resource, equipment, and infrastructure) the more likely patients will flock due to perceived capacity to handle cases as well as quality (Kuremu, 2006). However, this is highly dependent on good management of all resources. This is because the bigger the hospital the more cumbersome it is to manage. On the contrary, small hospitals have got minimal infrastructure, human resources, and equipment hence, easy to manage as compared to the large hospitals. On the other hand, large hospitals are good for improving the quality of health service whereas small hospitals aid in making health care service more available and accessible.

Sowden, Aletras, Place, Rice, Alison, Grilli, Ferguson, Posnett, & Sheldon (1997), state that there are two competing objectives that dictate the way hospital services are arranged and organized in a particular context namely, centralization versus decentralization of hospital services. The pre-hospital services centralization puts forth two arguments. Firstly, hospitals and medical staff undertaking high quantities of work obtain better results; secondly, big hospitals attain economies of scale. On the other hand, pro-hospital services dispersion counter by arguing that dispersing hospitals services improves access by the population and minimizes inequalities.

A major aspect of making the development of modern general hospitals was to put under the same roof different specialties. The argument for developing big hospitals can be viewed from different viewpoints such as strengthening the connections related specialties and multidisciplinary teams, to ensure appropriate utilization of costly machines or strengthen training part played by the hospital (Sowden et al., 1997). The small hospitals equipped with well skilled human resource and relevant equipment for the size are able to handle cases at a very early stage, diagnose and treat and therefore avert complications that lead to a referral to large hospitals and in some cases loss of life. These small hospitals can be centers of preventive and promotive health services to the communities in catchment areas. If small hospitals are built and distributed well throughout the country they would reduce the burden of diseases and of complication that leads to referral to large hospitals. They will also bring about access and equity in health service delivery.

Sowden et al. (1997), looked at the size of hospitals in detail and concluded that economies of scale are made use of relatively low levels of about 200 beds. However, diseconomies of scale become salient at levels of about 650 beds, with the assumption that the hospital was operating at maximum efficiency. The optimal size range is from 200 – 400 beds. Tsai, Thomas, Jha, Gawande, Huckman, Bloom & Sadum (2015) in their study of hospital board

on management practices found out that hospitals with high management performance had higher board performance. It also found out that effective board practices were linked to a particular form of management practices. The study also found out that hospitals boards with high management practices had better management processes relating to target setting, operations, monitoring and medical staff as compared to poor quality hospitals.

Mafini & Dlodlo (2014), found out the possibility of evaluating hospital management practices in resource constrained settings on an effective management practices are a precursor of the provision of higher-quality care in hospitals. Also evident from this study was that superior performance by management staff was associated with higher-rated hospital boards. The research also established that hospitals whose boards paid superior attention to clinical quality put in place management which checks it. Evident from the study showed that hospitals with board that used more efficiently quality metrics in the clinics did relatively better in terms goal setting, operation and achievement.

2.7.7 Summary of Literature

High-quality care in any hospital is a fundamental component of a high-performance health system. If health service delivery is not properly managed, then adding more resources and skills may not change into better quality health care services. Therefore, sustained supervision is important for achieving consistent improvements in frameworks. A satisfactory level of hospital performance is the maintenance of a state of functioning corresponding to societal, patient, and professional needs and norms. High hospital performance is founded on professional competences in application of present knowledge, available technologies and resources, efficiency in the use of resources, minimal risk to the patient, satisfaction of the patient, and optimal contribution to health outcomes. Within the health care environment, high hospital performance should also address the responsiveness

to community needs and demands. High hospital performance should be assessed in relation to the availability of hospital services to all patients irrespective of physical, cultural, social, demographic and economic barriers. However, little is known about how to increase managerial capital to generate persistent improvements in hospital performance. No scholarly work was found on hospital management that helps improve and sustain hospital output and outcome consistently.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the research methodology employed in the study. This includes the research conceptual framework (the theoretical tool used to guide both the estimations of output and outcome models and interpretations of empirical results), the research design, study area, target population, sample size, sampling procedure, data collection method, operationalization of variables, the empirical models, tests of validity and reliability of data, and data analysis procedures.

3.2 Conceptual Frameworks and Models

Health performance measured in terms of various health outcomes—reduced sickness, deaths, increase in health facility deliveries, number of inpatient care and outpatient care represents the outcomes of investing health inputs and allowing interaction between the inputs and management practices. Put differently, health outcomes are a function of health systems resulting in turn from health inputs, management effort, and collaboration of health and non-health entities. Most important core inputs that are needed for health care delivery are medical, paramedical, other professionals, funding, infrastructure and equipment, medical supplies, clinical guidelines, operational policies and a health information management system. Feng & Valero (2020), highlighted the complementarity between management practices and human capital. They documented that, at times it may be necessary to combine the two together in order to advance and raise firm's efficiency. In this study this was exhibited through the interactions between inputs and outputs as well as

the intended impacts as presented in the framework shown below, which is constructed following reviews of theoretical and empirical literature.

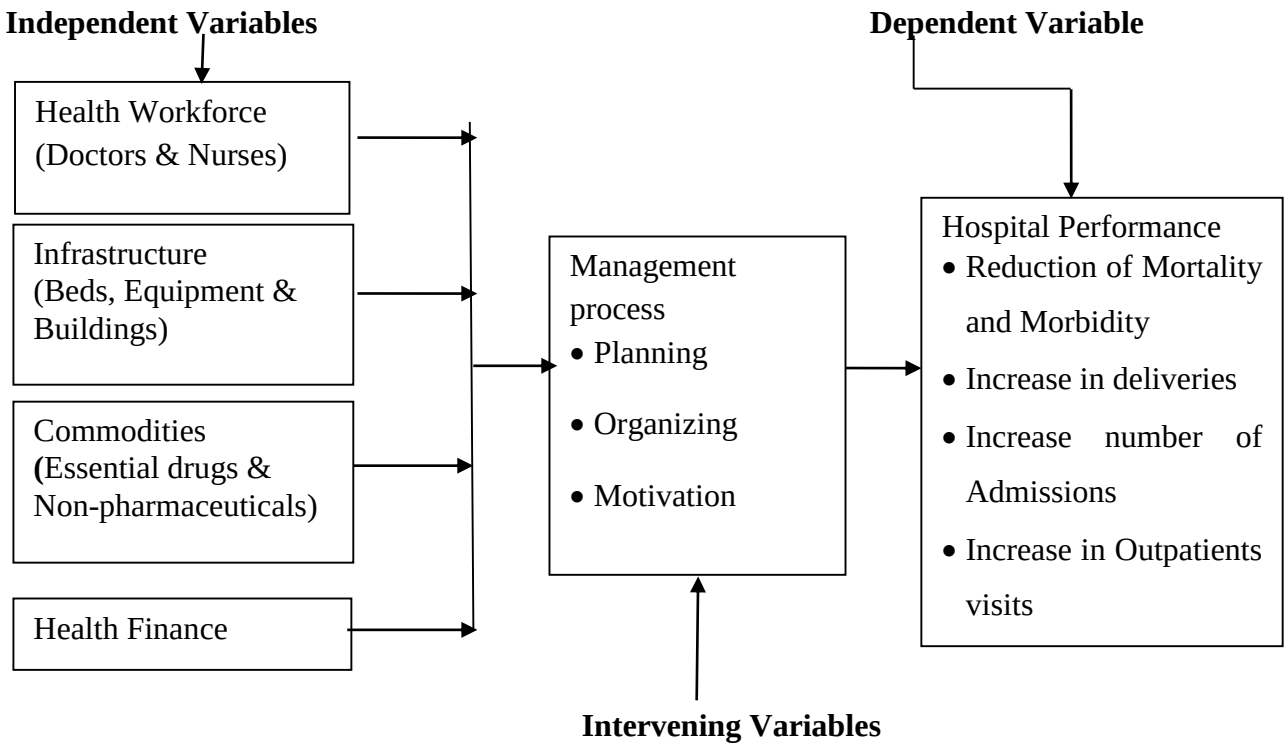

Figure 3.1: Conceptual Model

Source: Author.

The middle column in Figure 3.1, shows that management is an intervening variable because it is the channel through which the independent variables in the right-hand side column affect the outcome variables in the right-hand side column. If the management variables are not taken into account when estimating the impacts of infrastructure, commodities, personnel and finance on hospital performance the estimated parameters would be biased. The effects of management on hospital performance would also be biased if the variables in the left-hand side column are not included as controls in the estimating equation.

The conceptual framework is founded on the premise that the management processes associated with the health inputs give the desired health outputs. A further assumption is that health outputs are linked to better health results of individuals and families and finally

to societal level impacts such as economic growth and development. The hospital performance directly or indirectly impacts on social and economic position of the community within catchment area the hospital serves. For example, a one-hour reduction in waiting time for one thousand patients at a level five outpatient facility means a thousand hours are available for active social or economic production. Reduction of maternal mortality, under-five mortality, similarly improve the productivity of the population. Therefore, good hospital performance requires management process that utilizes the available inputs to produce desired outputs, outcomes and impacts in an effective and efficient way. To achieve this, the management needs structures with clear levels of management to monitor progress of the processes and inputs that the organizations remain on track towards the desired goals.

i) Independent Variables (Health Inputs)

The health inputs in the framework include health finance, health workforce, commodities, and infrastructure (beds, buildings, and equipment) which have been described in section 4.1.1. Managers through good management processes need to use the investments effectively in order to produce desired health outputs—increasing access to and quality of services. The health inputs indicators related to access and quality of services are enumerated in Table 3.1. Therefore, the framework summarized the whole health service delivery. It indicates the relationship between health inputs, management process, health outputs, outcomes and impacts.

Table 3.1: Types of Health Inputs

Type	Potential indicators	Potential data sources
Infrastructure	Total sum of beds	Inventory records
Health workforce	Total doctors	Staff returns
	Total Nurses	Staff returns
Finance management	Percentage of Cost sharing banked.	Hospital expenditure reports
	Expenditure versus budget	
Commodities management	The proportion of the amount of cost sharing allocated to commodities	Hospital expenditure reports
	Number of days without tracer drugs	Pharmacy and drugs records
Leadership and governance	Number of HSF meeting held	Minutes of the meetings
	Number of hospital management committee meetings	Minutes of the meetings

Source: Author.

The hospital inputs were similar in various hospitals and had similar factors such as health seeking behavior, cultural values, economic and political factors. The measurement of output, outcome and impact were also similar. The only factor which was supposed to influence the results in this study was the management process. The region is inhabited by one community the Kikuyus. In addition, agriculture and livestock farming is the main social-economic occupation.

ii) Intervening Variables (Management Processes)

Table 3.2: Management Process Indicators

Management Function	Potential Indicators	Potential Data Sources
Planning	Availability of annual work plans	Work plan
Organizing	Number of HMT meetings held	Minutes of the meetings
Leading	Number of supervisory visits done	Supervisory reports
Monitoring and Evaluation	Number of quarterly review meetings held	Minutes of the meeting Review reports
Annual Evaluation	Annual review of the AOP done	Review report

Source: Author.

The intervening variable in this study was management processes. Management ensures the availability of resources and their right mix. It is management's work to turn input resources into desired outcomes. It does this through combining in the right proportions the various input resources and manipulating them to produce the desired outputs and outcomes. In this study the inputs were health workforce, infrastructure, and commodities management and finance while dependent variable was performance. For the available input to be converted to outputs and outcomes the essential role played by manager (intervening variable) is critical in ensuring that the desired outputs and outcomes are obtained in the most efficient manner.

iii) Hospital Performance Indicators

The health outputs in this framework relate to access and quality of services are indicated by such indicators as total number of outpatient attendance, total number of inpatients

attendance, waiting time at outpatient department, waiting time for caesarian section, total live births, fresh still births and overall patients' satisfaction with both outpatient and inpatients services among others. The health output relates to coverage of health services while the impact relates to mortality, morbidity and the client satisfaction. See table 3.3 below:

Table 3.3: Hospital Performance Indicators

Potential outputs, outcomes or impacts	Potential indicators	Potential data sources
Outputs	The total number of the in-patients	Inpatient registers
	Total number of the out-patients	Outpatient registers
	Proportion of surgical cases operated	Inpatient registers
	Total number of hospital discharges	Disease index card
	Hospital average length of stay	Facility daily bed return
	Waiting time at OPD.	Patients record
	Waiting time for caesarian section.	Inpatient register
	Average emergency waiting time	Special survey report
	Hospital turnaround time	Special survey report
	Occupied bed days	Disease Index card
	Bed occupancy	Facility daily bed return
		Patient case record
		Inpatient register
Outcomes	Percentage of skilled deliveries conducted in the hospital.	Maternity registers
	Total live births.	
	Percentage of fresh still births	Perinatal mortality Audit
		Maternity registers
Impacts	The hospital based infant mortality rate	Inpatient registers
		Maternity register

Potential outputs, outcomes or impacts	Potential indicators	Potential data sources
	The hospital based under five mortality rate	In patient registers
		Disease Index card
		Maternity registers
	Hospital based maternal mortality rate	Maternity registers
	Hospital based Malaria case fatality	Inpatient registers
		Disease Index card
	Client satisfaction with hospital services	Exit surveys in hospitals

Source: Author.

The study assumed that measurement of outputs, outcomes and impacts were similar and the only factor which was supposed to influence the results in this study was the management process. Based on these, we developed the various data collection tools and implemented them in the study sites.

iv Score Card for Measuring Management Practice Scores

The score tool was borrowed from Bloom et al. (2007) management measuring tool with some modification. The modification was to make the tool applicable to the general management practices by top managers in several hospitals included in this study. The breakdown was to award more marks to areas which were to contribute more to success of the organization. The management style and supervision frequency points to manager's personal attributes. Northouse (2018), indicated that manager's characteristics (demographic) contributed to the resolution that they made and hence actions taken by the administrations they lead. He was of the opinion that this happens since demographic characteristics are associated with the many intellectual foundations, morals and discernments which influences the decision making of supervisors (Couper & Hugo, 2005). In the section of supervision, the highest score was 20% and use of checklist 10% giving a

total of 30%. The researcher did the scoring. In hospital set-up just like private sector, the top manager or CEO (chief executive officer) the commitment and personal attributes matter a lot. Using the above tool, three managers in each hospital were scored during the interview and average score was taken to be the hospital score.

The subgrades were determined according to the weight each area was felt to carry as well as its importance. The management style targeted the manager personal attributes which is very important and supported by Top Echelons theory (Finkelstein, Hambrick, & Cannella, 2009), state that institutions are an echo of their top managers. This had 4 sub-sections which included teamwork which is achieved through consultation and consensus building and good relationship with others. This area was a portioned 10 marks, this was followed by delegation with 10 marks, empowerment 10 marks and good (effective) communication 10 marks. Team work was graded by how frequent consultative meetings were held.

Table 3.4: Score Card for Various Management Practices for Each Manager

S/No.	Management Practice			Score
1.	**Management style**		Consultation & consensus building	5
			Good relationship with others	5
			Delegation with follow up	10
			Empowering	10
			Motivating and inspiring others	5
			Good communication	5
Sub-Total				**40**
2.	**Supervision**	*Frequency*	Daily	20
			Weekly	15
			Monthly	10
		Supervision Tool/checklist		10
Sub-Total				**30**
3.	**Work plan**			**10**
	Existence and *indications for implementation plan*			**10**
4.	**Resides in the Hospital**			**10**
	Grand Total			**100**

Source: Modified from Bloom et al. (2007).

The second section was supervision. The high frequency of supervision gives better results. Therefore, daily supervision was allocated 20 marks, weekly, 15 marks and monthly 10 marks. The effectiveness was assessed using the supervision report and use supervision

check list. The supervision checklist use was given 10 marks. The use of supervision checklist showed the uniformity of the supervision and removed subjective-ness of supervision. Team work was graded by how frequent consultative meetings were held.

Managers who practice team work through consultation and consensus achieve better results because everybody feels part of the team and recognized. Senior managers' residence in hospitals was one of management practices in this study. One historical fact is that hospitals in Kenya were started by missionaries. The first eight beds hospital was opened at Kikuyu in 1908 and started training health workers. The hospitals also built houses for the managers and the workers. Even today mission hospitals still house their hospitals managers and most of their workers within the hospitals as well as trainees who contribute to labor force. When Kenya government started to building hospitals, they also followed the missionaries and built houses for managers within the hospitals. When managers are housed in hospitals their supervisions duties are made easier and also workers have easier time in consulting the managers in the time of problems. The housing managers in hospital come as a blessing in case of disaster as they are able to make quick decision and mobilize workers to save lives. There are health workers who are not committed and either report late or abscond their duties after reporting in hospitals where managers are not within particularly at nights, weekends and public holidays.

3.3 Study Design

This study adopted a descriptive survey design that described uniqueness of a population being studied. It was used to gather information on the performance of public hospitals in Kenya and the essential roles of management among 5 counties. It entails observing and describing the behavior of a subject without influencing it. The descriptive research design was used since it sought to get information which described presented phenomena by

probing people about their values, perception, attitude, and behavior. Questionnaires and interview schedules were used to gather data. The study also used a mixed research design with both quantitative and qualitative data being collect. This gives better results than when only quantitative or qualitative data is collected. The analysis of both data sets gave more information and the qualitative information supported quantitative results.

3.4 The Study Area

The study was conducted in 25 hospitals located in 5 counties in Central Kenya. This region is comprised of the following counties: Kiambu, Kirinyaga, Muranga, Nyeri, and Nyandarua. Central Kenya was chosen because the research was not funded. The researcher used his savings to pay the university fee and carry out the research. It was, therefore, less expensive to carry out the study in central Kenya and also it is where the majority of the population is located. The public hospitals in this area have a total bed capacity of 3018 and 3918 staff. In the five counties all factors other than management are similar, i.e., environment, social-economic, political and cultural believes. Most of the people residing in the area are Christians although there are a few christians who do not believe in going to the hospital. However, the number was small to affect the study result. This aspect of the region was introduced in the design to helps isolate management as the key variable accounting for differences in performance across the hospitals in the areas. Although the management structures of the public hospitals in Kenya are the same, the performance of various hospitals is different and this can only be attributed to the different styles of management.

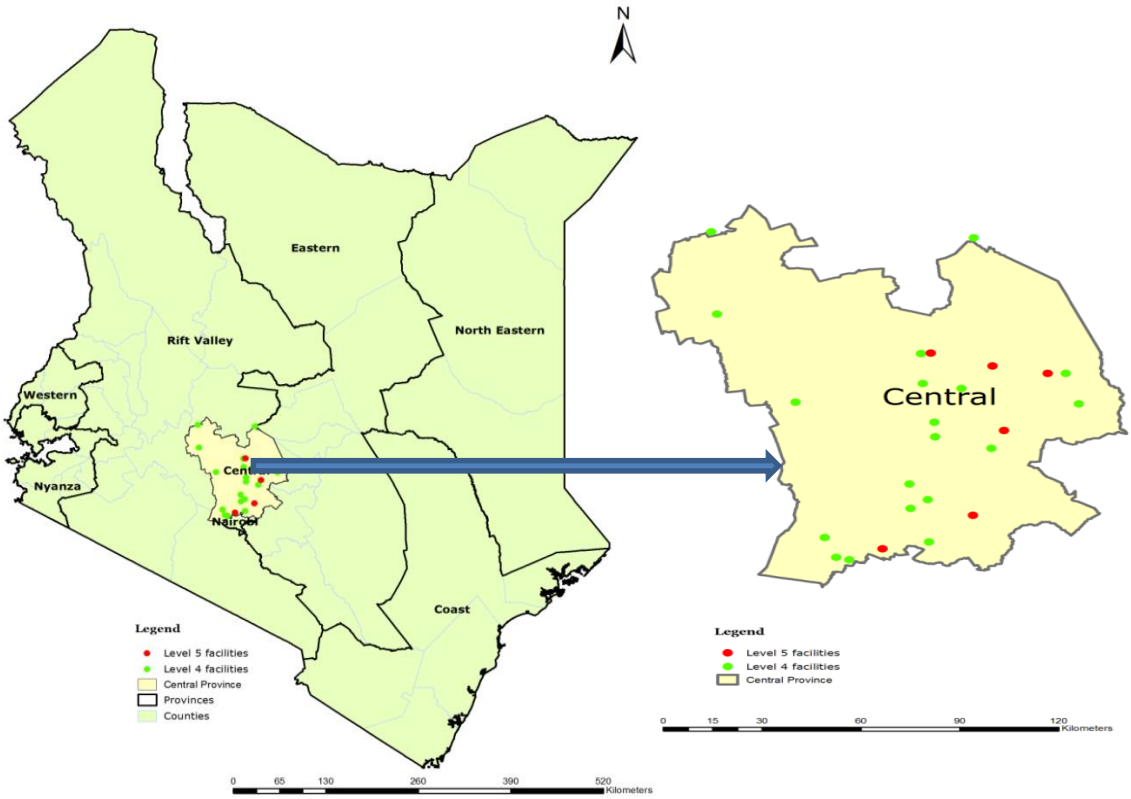

Figure 3.2: Study area is Central Kenya

The diagram above shows the map of Kenya and the location of the central Kenya.

3.5 Target Populations

The target population of the study consisted of 4,383,743 people from the 5 counties in central Kenya. This target population was from the 2009 census record. Among them, 1,979,760 were outpatient's visits in the hospital, 162,581 inpatients, 75 top hospital managers, 75 supervisors and 120 community representatives.

3.6 Sampling Technique

The study adopted systematic random sampling technique to get sample population of the inpatients, outpatients, and community representatives. Sample size of inpatients, outpatients and community representatives was systematic and relevant in that, every patient, and each member of community had an equal chance of inclusion and so selection bias was minimized. The study also used purposive sampling technique to get sample population from the hospital managers and supervisors. This entailed census method for the hospital managers and supervisors working in those hospitals.

3.6.1 Sampling Method: Hospitals

The study areas had a total of twenty-five hospitals (level 5 and level 4 hospitals). Level 5 hospitals were six (6) and level 4 were nineteen (19). According to Health Act No 21 of 2017 page 479, Level 5 hospitals functions include; delivery of specific services, training of medical personnel who work at the primary care level (paramedical staff), work as an internship center for staff, up to medical officers, act as a research center, that offers research facilities for concerns of county status and the in-charge who is a certified medical practitioner who have acquired master's degree in health related areas. All level 5 hospitals had bed capacity of 200 and above, with the largest having 383 beds.

Level 4 hospitals functions include; clinical assistance and supervision of units at the lower ranks, inpatient services, provide comprehensive emergency obstetric care, dental health

services, operation on inpatient basis, health learning, delivery of specific laboratory tests and radiology services. In addition, they provide logistical support to low level facilities in the catchment area and repackaging of information movement from facilities to catchment area. Level 4 hospitals had bed capacity of between 7 and 199. Since the population of hospitals in the study area was small, the census sampling method was used where the entire population of hospitals in central region was included in the study.

3.6.2 Sampling Method: Patients

The study employed systematic random sampling method in selection of patients for filling of the questionnaires. This enabled each patient in the study population had an equal opportunity of being selected. In this regard, a multi-stage random sampling method was used. In the first stage of the selection process, patient subjects were sub-divided into groups based on the levels of care. As such there were two patient's cluster; i.e. one for patients from level 5 hospitals and the other from level 4 hospitals. Each hospital work load for inpatients and outpatients for 2011/2012 financial year were used to find the number of patients to distribute questionnaires to from each hospital for inpatients and for outpatients. From each of the groups the number of patients was proportionately selected. Thus probability proportionate to size was used to obtain the number of patients for the different levels of hospitals. At every facility the patients were given the questionnaires to fill in. This procedure is illustrated in the following flow diagram (Figure 3.2).

3.6.3. Hospital Managers

The Kenyan public hospitals have doctor in charge who is the medical superintendent and assisted by nursing manager and a chief health administrator. These are the top hospital managers who are led by hospital superintendent and are given responsibilities of day today running of the hospitals. The sample size for the hospital managers was 75 and included the

three managers from each hospital. They included medical superintendents, nursing officers in charge and hospital administrative officers. The data was collected from the hospital managers, supervisors, and focus group through face to face interviews. The interview allowed the researcher to gather in-depth information pertaining the study objectives and also gave the respondents a room to express their opinion. These are considered to be the core management team in a hospital.

3.6.4 Supervisors

Three supervisors from each hospital were selected as key informants. Supervisors in the hospitals can be equated to middle level managers who work closely with the top level hospital management. They are usually in charge of key departments e.g. outpatient; maternity, paediatrics, pharmacy to mention a few. Due to the fact that they work closely with the top level management and are abreast with the daily running and occurrences in the hospitals, they were better placed to be key informants. These were very important and sensitive departments in hospitals. Pharmacy dispenses medicine to all patients in the hospital. Maternity is the busiest and most sensitive department and Paediatrics is the second busiest. Data was collected from the supervisors by the use of face to face interview with structured open-ended questions to help in gathering qualitative data.

3.6.5 Community Representatives

Focus group discussions were organized to obtain information from community representatives about their views regarding performance of hospitals. The data was collected by use of interview schedules where every focus group answered a number of structured questions. The researcher used the community health workers randomly selected respondents who formed focus groups. The study managed to have 12 focus groups discussions of 6-10 members. These were 6 groups of males and 6 groups of females,

conducted separately. The gender separation was done to prevent inhibition of either by the other from speaking freely.

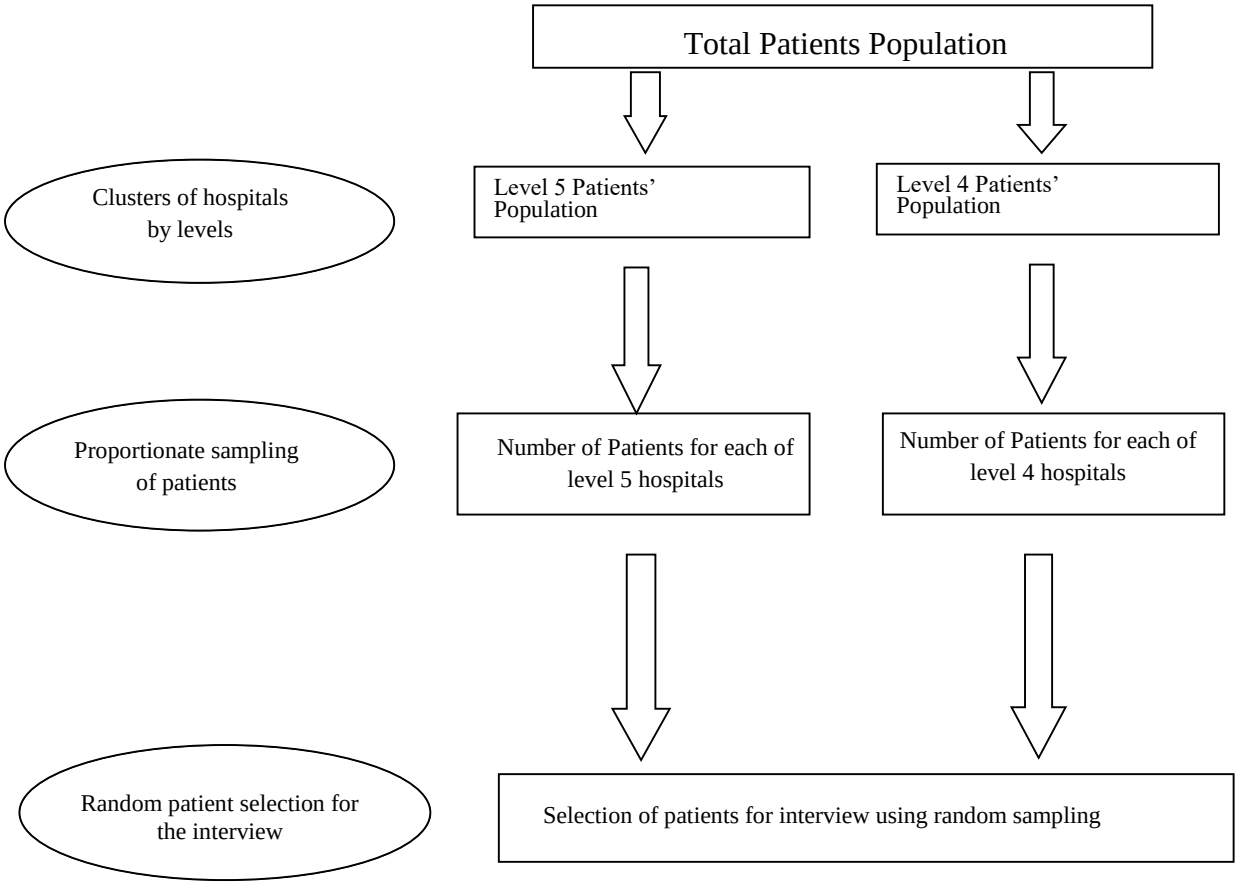

Figure 3.3: Illustration of the Sampling Procedure

Source: Author.

3.7 Sample Size Calculation

The sample size of the study included the top three hospital managers in every hospital i.e., medical superintendent, nursing officer in charge and health administrator in charge, three supervisors from each hospital, 368 inpatients, 380 outpatients and 120 focus group discussions. The sample sizes for both outpatients and in-patients were calculated using Fisher's formula (Fisher et al., 1991), Mugenda & Mugenda (2003). The sample size was governed by estimated occurrence of outcomes of concern, preferred level of statistical

confidence and acceptable margin of statistical error. The formula used to determine the sample sizes were as follows:

$$\boldsymbol{N = \frac{Z^2 \times p(1-p)}{\partial^2}}$$

Where $\boldsymbol{N}$ is the required sample size, $\boldsymbol{Z}$ represents the confidence level of 95% (Z= 1.96), $\boldsymbol{p}$ represents the estimated occurrence of sub-sample of interest (e.g., numbers of, outpatients, inpatients, hospitals, facility managers and $\boldsymbol{\partial}$ the margin of error, usually taken as 5% (this is the probability of stating that something is true when it is in fact false).

3.7.1The Sample Size for the Inpatients

The target number of the inpatient population for the selected facilities was 162,581 and half the patients were expected to be admitted or the half of the total beds were expected to be occupied at any particular day. That consideration brought the number of the patient population to 81,290 (that is *p* times the target population). The researcher assumed that about 10% might not answer the questions. This reduced the estimated prevalence of subsample of interest to 40%. Generally, denoting a sample size as n, this gave the following size when applied to a specific case:

$$\boldsymbol{n \geq \frac{1.96^2 \times 0.4 \times 0.6}{0.05^2} = 368}$$

The number of patients interviewed per hospital was done using probability proportionate to size. Since level 5 hospitals are expected to have at least 200 beds; the sample size of patients for level 5 hospitals was calculated as follows:

$$\boldsymbol{n = \frac{Total\ number\ of\ inpatients\ for\ all\ level\ 5\ hospitals\ x\ sample\ size}{Total\ number\ of\ all\ inpatients\ (2011/2012fy)}}$$

$$\boldsymbol{n = \frac{106,637\ x\ 368}{162581} = 242}$$

The sample size from each level 5 hospital was calculated proportionately to workload since the hospitals had different workload.

$$\frac{\textbf{\textit{Total inpatients per hospital (workload) x sample size (242)}}}{\textbf{\textit{Total number of inpatients in all level 5}}}$$

Table 3.5: Inpatient Sample Size from each Level 5 Hospital

S/no	Facility name	No. of admissions	Sample size
i.	PGH Nyeri	19682	45
ii.	Karatina Hospital	9984	23
iii.	Kiambu Hospital	19039	43
iv.	Thika Hospital	14105	32
v.	Murang'a Hospital	10291	23
vi.	Kerugoya Hospital	33536	76
	TOTAL	**106,637**	**242**

Source: Author.

The sample size for level 4 was arrived at by subtracting the level 5 sample size from the total sample size which is 126 inpatients. The total of 126 inpatients from the 19 level 4 facilities was shared among each of the hospitals proportionately. Table 3.6 below indicates the calculated sample size for each facility as per the formula below;

$$\frac{\textbf{\textit{Average inpatients} - \textit{(per hospital) x sample size (126)}}}{\textbf{\textit{Total number of admissions in all level 4 hospitals}}}$$

Table 3.6 Inpatients Sample Size from each of the Level 4 Hospitals

S/No	Facility Name	No. of Admissions	Sample Size
a)	Mt. Kenya Hospital	542	5
b)	Othaya Hospital	2242	5
c)	Mukurweini Hospital	2409	5
d)	Nyahururu Hospital	8863	20
e)	Ol'Kalou Hospital	6489	15
f)	Engineer Hospital	190	5
g)	Tigon Hospital	3605	8
h)	Nyathuna Hospital	86	5
i)	Kihara Hospital	1420	5
j)	Ruiru Hospital	2489	5
k)	Kirwara Hospital	976	5
l)	Gatundu Hospital	7491	17
m)	Igegania Hospital	725	5
n)	Maragua Hospital	2676	6
o)	Muriranjas Hospital	2374	5
p)	Kangema Hospital	1018	5
q)	Kimbimbi Hospital	3153	7
r)	Kianyaga Hospital	733	5
s)	Nanyuki Hospital	8463	19
		55944	**158**

Source: Author.

It is noted that all facilities allocated inpatient sample size of less than 5 were adjusted to ensure that at least 5 patients were interviewed in each facility. This was in order to avoid low degrees of freedom for comparison purposes. Hence the adjusted in-patient sample size for the level four hospitals increased from 127 to 158 (that is 158+242) giving a total of 400 inpatients who were interviewed.

3.7.2 Outpatients Sample Size

The total number of outpatient visits in the hospitals in the central region was 1,979,760 out of an estimated catchment population of 4,383,743. Thus the number of visits as a proportion of the catchment population was 0.45. Therefore the minimum sample size for the outpatients was determined as follows:

$$\boldsymbol{n \geq \frac{1.96^2 \times 0.45 \times 0.55}{0.05^2} = 380}$$

The number of out-patients interviewed per hospital was done proportionately using the proportion of outpatient attendance of each hospital as follows:

$$\frac{\boldsymbol{Number\ of\ outpatient\ attendance\ per\ hospital\ \ x\ Total\ Sample\ size}}{\boldsymbol{Total\ number\ of\ outpatient\ attendance\ for\ all\ hospitals\ (2011/2012Ffy)}}$$

All facilities allocated outpatient sample size of less than 5 were adjusted to ensure that at least 5 people were selected in all facilities. This was in order to avoid low degrees of freedom for comparison purposes. Therefore, the adjusted sample size increased from 380 to 390. The total number of out-patients selected from each of the twenty-five hospitals is as shown in Annex 11on page 224. A total of 400 outpatients were interviewed during data collection.

3.8 Fieldwork Processes and Data Collection Tools

The ethical and research approvals were obtained from Kenyatta National Hospital Ethical Committee on submitting the request through director UNITID after the research proposal was passed. The data was collected using six data capturing tools: tools for managers, key informant (supervisors), and focus group discussion was interview schedule; tools for inpatients and outpatients was questionnaire. Qualitative data capturing tools were administered to the three managers selected from every hospital in 25 hospitals such that 75 managers were covered. The researcher visited one hospital at a time and conducted the interviews with the help of three research assistants who were taken through on the details on the data collection tools by the researcher within a period of two weeks. These research assistants also explained to the respondents about the data collection tools. The tools are in annex number 1 to 7 (pages 203 to 217). All managers, key informants, and focus group signed the consent form before the interview began. Confidentiality was maintained throughout the data collection.

3.8.1 Quantitative Data

The quantitative data was collected using the questionnaires. The questionnaires were distributed to the discharged patients who filled them and returned to either to the researcher or research assistant. The questionnaires were randomly administered to outpatients after drug collection from the pharmacy and inpatients who had been discharged. The researcher would toss a coin to determine which ward to visit whereby the result of a head meant moving to maternity and tail to the pediatric ward. A sample size of four hundred inpatients respondents participated from all the twenty-five hospitals. For the out-patients, researcher went to pharmacy department and waited for the patients who were exiting after getting prescribed medicines and drugs filled the questionnaires. This was done until the sample size for each particular hospital was attained. The exclusion criteria were the patients not

discharged or the patients who could not use the first language. The maternity and pediatrics wards were chosen because the healthy indicators of maternal, neonatal, under one year and under five years' mortality rates are still very high in Kenya. The annual hospital data for the financial year 2011/2012 was got from hospital records by Health Information Record staff in the team.

3.8.2 Qualitative Data

The qualitative data was collected through focus discussion among key informants who were the supervisors and community representatives. The key informants included; maternity in-charge, pharmacy in-charge, and out-patient in-charge. These were chosen due to the key roles played by the departments in service delivery and contribution to hospital's performance. An aggregate of seventy-five key informants were interviewed. In total, twelve focus group discussions were held, two from each of the level 5 hospitals, one for males and one for females. Each focus group had ten members from the community. To achieve this, we went to hospital early, arranged with management for a quiet room in which the interview was conducted. To form the focus group discussions we randomly picked members of the public (relatives) coming to visit their patients in the wards in the hospital.

3.9 Data Processing

All filled-in questionnaires were serialized and we entered data was into the computer using research electronic data capture (Red Cap) device. The research electronic data capture software avoids duplication of entries and the serialized questionnaire can be entered only once. The procedure used to transfer the field data into the computer for processing and analysis protects against coding errors that are common in manual data entry procedures. The collected data was keyed in for analyzed.

3.9.1 Data Entry and Processing

The data collected from hospital records, patients, and community representatives was classified as either qualitative or quantitative to capture a hospital environment, including management aspects, hospital services, the inputs used to provide the services, determinants of service utilization, and quality and health outcomes of service users, among others. The qualitative data was collected from hospital managers, supervisors and community members through the interview schedules and focus group discussions that we analyzed thematically. To ensure data quality, all the filled questionnaires were serialized. The data was entered using research electronic data capture (RED CAP) because it is friendly and also avoids double entries. The collected data was coded, analyzed and given a meaning. Three research assistants assisted the researcher to key in the data. We ensured the quality of data by ensuring accuracy in data entry and avoiding double entry.

3.10 Pilot Study

The pilot study—to test the data collection instrument—was carried out in three hospitals in Nairobi County: Mbagathi hospital, Mama Lucy hospital and Kiambu hospital. A total of 60 participants were interviewed in the three hospitals. These hospitals were chosen due to similarity in service delivery and level of category with the other target hospitals for data collection. They are public hospitals, mainly supported by the government and equipped with infrastructure and human capital offering similar health services. The pilot study enabled us to restructure, modify and eliminate any ambiguity for items in the questionnaire; it tested logistics and assembled information prior to a larger study. In addition, we identified gaps and limitations of data collection tools and addressed before data collection.

3.10.1 Data Validity

According to Mugenda & Mugenda (2003), validity is the degree to which outcomes obtained from the analysis of the data actually represents the phenomenon being studied to assess the degree to which a research study measures what it intends to measure. The study adopted content validity of the questionnaires to indicate whether the tested items represent the content that the text is designed to measure. The researcher piloted the questionnaires to ensure the items used in the questionnaires are consistent and valid.

3.10.2 Data Reliability

Moskal & Leydens (2004), defines reliability as the extent to which a test consistently measures whatever it is measuring. Measuring the reliability of instruments occurs as test-retest method which is the simplest method for testing reliability and entails testing the same subjects after two years, establishing that there is a correlation between the results. The researcher used a triangulation technique approach to increase the reliability of the data collected and hence gives the same results.

3.11 Data Analysis: DEA, Regression, and Qualitative Methods

For hospital inputs, the data collected was analyzed as per the research objectives which included effects of hospital management practices on quantity of hospital services, quality of services, efficiency of hospital and outputs and health outcomes associated with hospital services. The data was processed into tables of descriptive statistics hospital efficiency scores were computed using the DEA software, while the OLS and Tobit regressions were used to analyze determinants of variations in efficiency levels across hospitals. Qualitative data analysis was done thematically. Briefly, data analysis was done at three levels using a variety of methods and steps including:

i Exploratory data analysis.

This comprised computations of frequency distributions of all variables. At this level, the validity of the values in each variable was presented in terms of means and the minimum and maximum allowable values.

ii. Measurement and Analysis of Hospital Efficiency

Technical efficiency of a hospital was measured using the Data Envelopment Analysis (DEA) method using an input-oriented model. It is a linear programming technique intended to measure the relative efficiencies of a sample of decision-making units (DMUs) like hospitals. DEA measures the efficiency of DMU comparative to the peer groups' efficiency with a hypothetical production frontier which represents optimum efficiency. Hospitals as DMUs are units of management that have some level of authority and/or capacity to affect the efficiency levels. The variables used as hospitals inputs were total beds, doctors and nurses for each hospital while variables used as outputs were total outpatients visits and total inpatients admissions for 2011/2012 financial year.

The stochastic frontier analysis method was used where the DEA identified hospitals that used low input mix to provide their outputs. Each hospital was allocated an efficiency score by collating its output/input or ratio with those of its efficiency peers which formed the frontiers of the production space. The score depended on how far the hospital lay from the frontier. The further away from the frontier, the less technically efficient the unit was. In assigning scores, the efficient units that lay on the frontier were assigned a score 1 (or 100%), while inefficient units were given scores ranging from 0 to 1 (or 0–100%). The management processes for the hospitals in the frontier line was compared with those of the inefficient hospitals in the production space.

The DEA offers a good way of looking at multiple inputs and outputs and linking the two sets of variables to measure hospital efficiency. The technique was used in the first line analysis to establish performance (efficiency) of various hospitals in central Kenya. The researcher preferred DEA (Data Envelopment Analysis) to SFA (Stochastic Frontier Analysis) because DEA mathematical linear programing technique has a benefit of handling multiple inputs and multiple outputs in efficiency measurement. SFA is a parametric technique and analyses many inputs to one output. Its reference efficient point is predetermined and can be artificial. The DEA efficiency estimation can graphically be demonstrated as shown below (Coelli, 1996). The presentation follows the language and notation originally used by Coelli.

iii Input Oriented Measures

Farrell illustrated his ideas by involving companies, two inputs (X1 and X2) to provide an output (Y), and assumed returns to scale to be constant with a focus on reducing inputs (input oriented).

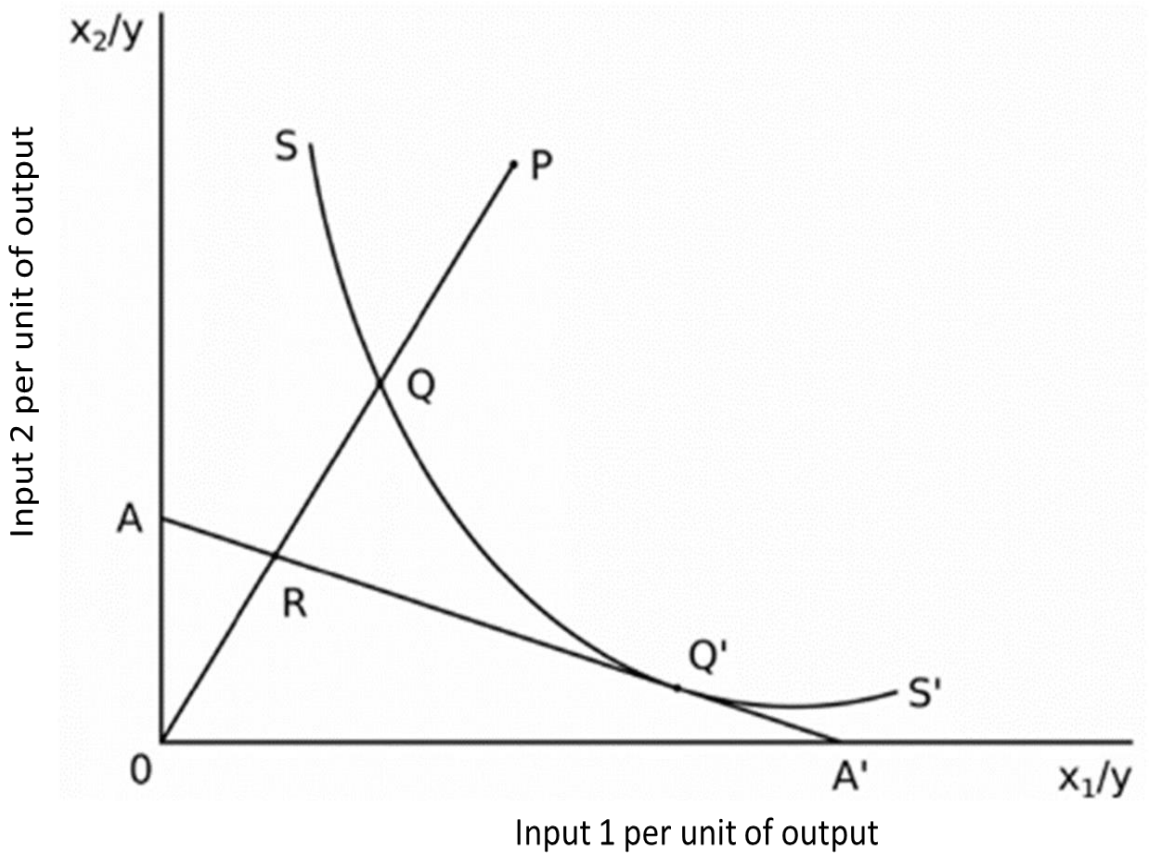

Figure 3.4: Technical and Allocative Efficiencies

Source: Coelli, 1996.

In Figure 3.4, an isoquant unit of an efficient entity is represented by$\boldsymbol{SS'}$. This allows the measurement of TE. If an entity utilizes amounts of inputs $\boldsymbol{P}$ to provide a unit of output, its technical inefficiency is given by the distance $\boldsymbol{QP}$, which measures the amount by which all inputs can be decreased proportionally without reducing outputs. This is conveyed in percentage form the ratio ***QP/OP***, denoting the percentage by which all inputs may be reduced. Technical efficiency (TE) is thus expressed as follows:

$$\boldsymbol{TE_1 = OQ/OP} \qquad (3.5.2.1)$$

OQ / OP can also be obtained by *1 – (QP/OP).* It takes a value between zero and one, thus providing a pointer as to the degree of technical inefficiency in an institution. A value of

one indicates that the institution is totally technically efficient. For instance, point $\boldsymbol{Q}$ is technically efficient since it lies on the efficient isoquant.

The input-price ratio denoted by line $\boldsymbol{AA'}$ in Figure 3.4, is also known as allocative efficiency and can be computed. Allocative efficiency (AE) of an institution operating at $\boldsymbol{P}$ is:

$$\boldsymbol{AE_1 = OR / OQ} \tag{3.5.2.2}$$

The distance $\boldsymbol{RQ}$ signifies the cut in production cost which could happen if the output level was at the allocative and technically efficient point $\boldsymbol{Q'}$ instead of at *Q* which is only technically efficient. Economic efficiency ($\boldsymbol{EE}$) is the ratio:

$$\boldsymbol{EE_1 = OR / OP} \tag{3.5.2.3}$$

Where the distance $\boldsymbol{RP}$ can also be interpreted in terms reduction in cost. The product of the two efficiency measures gives the overall economic efficiency

$$\boldsymbol{TE_1 * AE_1 = (OQ/OP) * (OR/OQ) = (OR/OP) = EE_1} \tag{3.5.2.4}$$

NB: the values of each of three measures ranges from 0 to 1.

Using the formula above and the DEA software, technical and scale efficiency for 25 hospitals were calculated. Maintaining the assumption of constant returns to scale, the output maximization problem in the model is shown below:

i. Model 1

$$\boldsymbol{Max\, E_j = \sum U_r Y_{rj}} \tag{3.5.2.5}$$

Subject to

$$\boldsymbol{\sum V_i X_{ij} = 1} \tag{3.5.2.6}$$

$$\boldsymbol{\sum U_r Y_{rj} - \sum V_{ij} X_{ij} \leq 0} \qquad \boldsymbol{(where\ i = input\ 1 \ldots m\ and\ j = DMU\ 1 \ldots n)} \tag{3.5.2.7}$$

ii. Model 2

$$\boldsymbol{Max\ E_j} = \sum U_r \boldsymbol{Y_{rj}} + \boldsymbol{W_j} \quad (3.5.2.8)$$

Subject to:

$$\sum \boldsymbol{V_i X_{ij}} = \boldsymbol{1} \quad (3.5.2.9)$$

$$\sum \boldsymbol{U_r Y_{rj}} - \sum \boldsymbol{V_i X_{ij}} + \boldsymbol{Wj} \leq \boldsymbol{0}\ (\boldsymbol{where\ i = 1 \ldots m\ and\ j = 1 \ldots n}) \quad (3.5.2.10)$$

Where $\boldsymbol{E_j}$th efficiency is score of for hospital $\boldsymbol{j}$, $\boldsymbol{Y_{rp}}$is the actual amount of output r produced by hospital $\boldsymbol{j}$, $\boldsymbol{X_{ij}}$ is the actual amount of input$\boldsymbol{i}$ used by hospital $\boldsymbol{j}$, $\boldsymbol{U_r}$is the weight to output $\boldsymbol{r}$ and $\boldsymbol{V_i}$ is the weight of input $\boldsymbol{i}$. Also, $\boldsymbol{s}$ is the number of outputs, $\boldsymbol{m}$ is the number of inputs and $\boldsymbol{n}$ is the number of hospitals. Moreover, $\boldsymbol{V_i}$ and $\boldsymbol{U_r}$ are assumed to be strictly positive.

With the same constant returns to scale notations as shown in the model (1) above, one can derive scale efficiency. The additional W component corresponds to an intercept which is unconstraint sign (Bjurek & Hjalmarsson, 1995). In order to determine whether it is a constant or variable return to scale, the following is used; if $\boldsymbol{W_j} > 0$, then there is increasing return to scale, if $\boldsymbol{W_j} = \boldsymbol{0}$, then there is a constant return to scale and if $\boldsymbol{W_j} < 0$, then there is decreasing return to scale

The DEA model applied by Kirigia et al. (2000) were employed to determine the efficiency among health centers and dispensaries in Kenya. It is assumed that under the restriction, each of the health facility efficiency is determined by regressing against its individual criteria. The efficiency of a target unit $\boldsymbol{E_j}$ is obtained as a solution to the maximization problem and thus the algebraic model in Model (2) can be written as;

$$\boldsymbol{Max\ E}_j = \frac{\sum \boldsymbol{m_{ri} Y_{ri}}}{\sum \boldsymbol{n_{ij} X_{ij}}} \quad (3.5.2.11)$$

Subject to

$\frac{\sum m_{ri} Y_{ri}}{\sum n_{ij} X_{ij}} \leq 0$ but cannot exceed 1; $(m_r, n_j \geq 0)$ (3.5.2.12)

Where E_j is the efficiency of hospital j to be estimated m_r and n_j are the inputs and outputs variables to be estimated in the model, Y_i are the outputs of the ith unit, X_i is the inputs of the ith unit, r indicates the t different outputs and j shows the q different inputs

Mwari (2013) observes that the DEA problem of the model (2) is a fractional linear program where the objective function is maximized while the subjective function is minimized. Therefore, it can be converted into linear form and linear programming is applied. This is done by maximizing the numerator with the denominator set to be a constant and applying the Charnes et al. (1978) transformation we obtain;

$$Max\ E_j = \sum M_{r1} MY_{r1} \quad (3.5.2.13)$$

Subject to

$\sum M_{r1} Y_{r1} - \sum n_{j1} X_{j1} \leq 0$ (Where $n_{ji} X_{ji} = 1$, and $m_r, n_j \geq E$) (3.5.2.14)

Where E_j is the efficiency of hospital p to be estimated m_r and n_j are the inputs and outputs variables to be estimated in the model, Y_i are the outputs of the ith unit, X_i are the inputs of the ith unit, r indicates the t different outputs and j indicates the q different inputs.

3.11.1 Ordinary Least Squares Regression Analysis

This analysis used ordinary least squares (OLS) in estimating the impact of management practices on hospital performance indicators. In this study, each hospital performance indicator variable was regressed against one management practice variable to avoid co-linearity. The hospital performance (dependent variables) used in this study were log outpatients visits, log inpatients admissions, log total live births, log fresh still births, log emergency waiting time for caesarean section, log emergency waiting time at outpatient department, log efficiency score, overall satisfaction with outpatient services and overall satisfaction inpatients service. On the other hand, the management practices (independent

variable dummies) used included; indicators presence of work plan, work plan implementation, empowerment of staff, effective communication, delegation, daily supervision, motivation and inspiration and hospital residence of managers.

3.11.2 Tobit Regression Analysis

Tobit regression analysis is employed when the dependent variable is incompletely observed or when the dependent variable is observed but in a selective sample which is not a representative of a population.

3.11.3 Truncation and Censoring

The leading causes of incompletely observed data are the truncation and censoring. Truncation occurs when particular observation on both the dependent variable and regressors are lost or (limited). Truncation also arises when the sample data is got from a subset of a higher population. Censoring happens once data on the dependent variable is omitted or limited but not data on regressors. It is an anomaly in the sample. If there was no censoring, then the data could be a representative sample from the population of interest. Truncation entails a loss of more information than censoring, as truncated data is missing from the sample. If the truncation is from below, then the average of the truncated variable is more than the mean of the original one; i.e., the mean is pulled upwards. Similarly if truncation is from above, then the mean of the truncated variable is smaller than the mean of the original one.

In this section, regression involved CRS, VRS and SCALE efficiency scores as dependent variables. In the estimation of the efficiencies through DEA, the scores were between 0-1 (0-100%). Some of the information was hidden in zeros in these dependent variables hence best method to use to analyze determinants of CRS, VRS and SCALE efficiency scores, i.e, to regress hospital performance indicators against these determinants (managers'

characteristics and environmental factors) was the Tobit method. The managers' variables were dummy variables and their choices were zero or 1.

3.11.4 The Qualitative Data Analysis

Qualitative data were analysed thematically. During data collection, the interviewer asked and recorded open-ended questions and their answers from four thematic areas. These included: 1) Is the hospital serving the community well? 2) What major problems does the hospital face? 3) In your own view, how would you describe the hospital in terms of drugs and other supplies, food, the staff attitude, hospital cleanliness and safety and, 4) what can be done to improve the hospital services? Qualitative information was used for a descriptive analysis of the link between hospital management, health service delivery, and health outcomes. The information from focus group discussions (FGDs) and key informant interviews were used to argument results from the quantitative analysis.

3.12 Data types

The quantitative data was presented in form of tables, charts and percentages as per study objectives. The qualitative data was analyzed using content processing approaches. Qualitative data was used to supplement the quantitative data.

CHAPTER FOUR

FINDINGS AND DISCUSSIONS

4.1 Introduction

This chapter presents the findings of the study and their discussion along the study objectives. The first objective intended to find out the management practices used by the seventy-five hospital managers in 25 public hospitals in central Kenya. The second section presents the findings of the second objectives of the study which sought to find out the effect of management practices on the quantity of healthcare services provided in public hospitals. The third section consists of the findings of the third objective which sought to find out the effect of management practices on quality of service in the public hospitals. The fourth section consists of the findings of the fourth objective which sought to determine the effect of the management practices on hospital efficiency. The firth section contains the findings of the firth objective which intended to determine the effect of management practices on hospital outputs and outcomes. The sixth section contains qualitative results of the study. The seventh section contains summary of management practices and hospital performance indicators. The eighth section comprises the discussion of study findings by each objective.

4.2 Management Practices Used in Public Hospitals

Characteristics of Hospital Managers

Table 4.1 presents the summary statistics of hospital managers' socio-demographic characteristics for the financial year 2011/2012. Hospital managers' background information was collected on sex, age, marital status, profession, residence (whether residing within the hospital compound or outside hospital compound) and distance to the hospital where the manager works. Categorical variables such as sex (male or female), marital status (married, single, widowed or separated), manager's profession (medical officer, nursing officer, hospital administrator or other cadres) and whether resides within the hospital compound or outside was presented as proportions while continuous variables (i.e. age of the managers, distance to the hospital for managers who stay outside the hospital compound and number of years of service) were presented using average and standard deviation as the measure of central tendency and variation respectively.

Three managers from each hospital were interviewed separately and each given a score. The average score of the three managers was taken as the hospital score state of management as shown in figure 4.1 (see page 114). Each manager was asked the management practices they use in their hospitals and the end result was as shown in table 4.2 (see page 115).

Table 4.1: Summary Statistics for Hospital Managers (2011/2012FY)

Variables	N	%
Gender:		
Female	34.0	45.30
Male	41.0	54.70
Marital status:		
Married	60.0	81.10
Single	12.0	16.20
Widowed/separated	2.0	2.70
Professional category:		
Medical Doctor	25.0	33.30
Nursing Officer	25.0	33.30
Hospital Administrator	24.0	32.00
Others	n/a	1.30
Resides within the hospital?		
No	53.0	70.70
Yes	22.0	29.30
Age of managers	Mean = 42.09; SD= 8.62	
Distance from residence to the hospital	Mean = 7.53; SD = 10.66	
Years of service	Mean = 17.33; SD = 9.75	

Source: Author.

From table 4.1 above, male managers were the majority at 55 percent. This was an indication that most hospitals had adopted one-third rule of either sex by incorporating females in hospital management and administration. The average age of managers was at 42.09 years with a standard deviation of 8.62. Eighty-one percent of managers were married, while 16 percent single. Widowed or separated managers accounted for three percent of the total managers. On average, 71 percent of managers stayed 7.53 and SD 10.66 kilometers away from the hospital compound. Also, most managers had worked for about 17.33 and SD 9.75

years in the health profession before promotions to the management position. Twenty-nine percent of hospital managers stayed within the hospital compound.

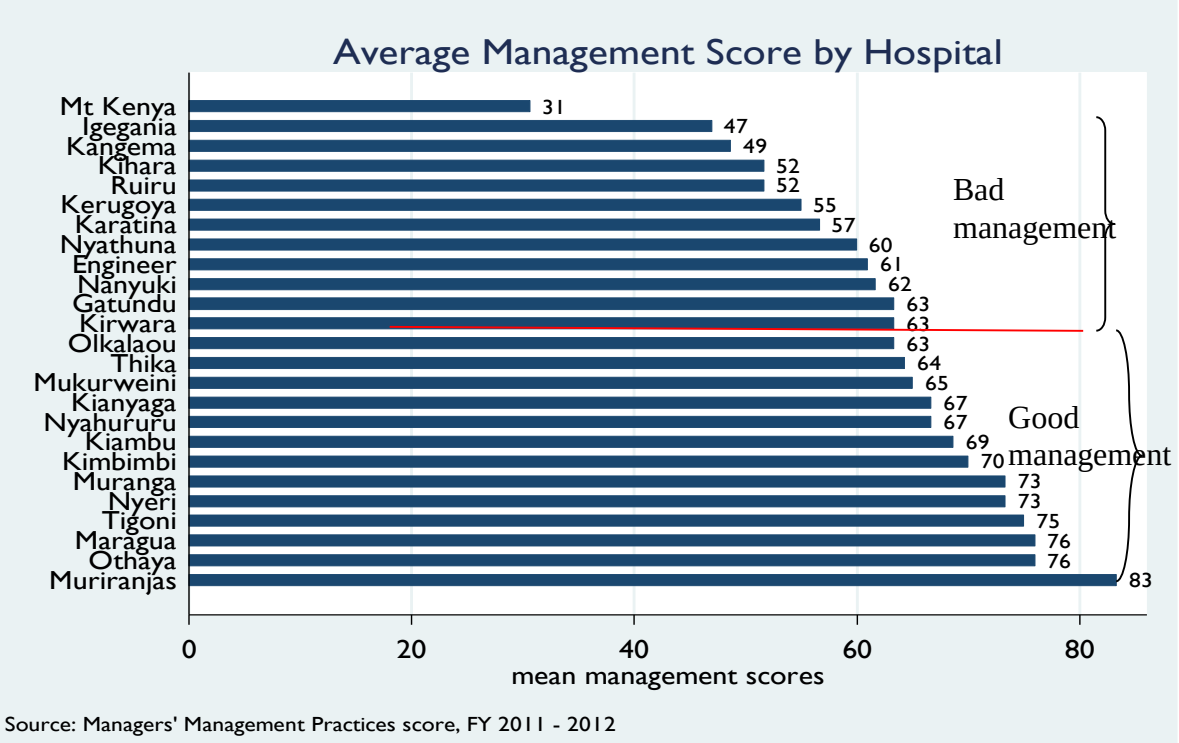

Figure 4.1: Management Scores across Hospitals

Source: Author.

Figure 4.1 shows management scores across hospitals for each hospital. Muriranjas had the highest management score followed by Othaya, Maragua, Tigoni, and Nyeri while the Ruiru, Kihara, Kangema, Igegania and Mt. Kenya had the lowest score. The hospitals were divided into two broad categories: good for hospitals with average management score of above 60 and bad for hospitals with a management score of 60 and below. As indicated in Figure 4.1, the cut-off line (red-line) separated bad (eight) from good (17) hospitals. According to Management Sciences for Health (2006), good management is making sure that comprehensive strategies and methods are put in place and the resources are efficiently utilized without loss or misallocation. The purpose of measuring the management scores

was to find out whether the management status correlated with hospital efficiency scores in table 4.3. Out of 17 well-managed hospitals, 10 (59%) had an efficiency score of 100%, while 7(41%) had an efficiency score of between 73.2 to 87.7. The average efficiency score was 65.3%.

Table 4.2 Hospital Management Practices in the Order of Practice Frequency

	Number	Percentage (%)
1. Regular Supervision	74.0	98.67
2. Good Communication of Information	65.0	87.84
3. Good Relationship with other staff	61.0	81.33
4. Consultation and Consensus Building	52.0	70.27
5. Delegation	50.0	66.67
6. Work plan Preparation	47.0	64.38
7. Empowerment of others	47.0	62.67
8. Work Plan Implementation	47.0	62.67
9. Motivation and inspiration of others	39.0	52.70
10. Uses Inspection tool	39.0	52.00
11. Residence of Managers in Hospitals	22.0	29.33

Source: Author.

Table 4.2 presents the management practices as used by different managers in various hospitals. The management practice of supervision was leading with 98.7% followed by good communication of information at 87.8%, good working relationship with staff 82.4%, consultative and consensus building at 70.3%, delegation with follow up at 67.6%, empowerment of others at 63.5% and motivation and inspiration at 52.7%. Of the 75 managers interviewed, 74 (98.7%) carried out regular supervision. Half of them (50%) did it daily, 25 (33.8%) weekly and 12 (16.2%) monthly. Majority of the managers 64.4% had work plans implementation reports. Of the 75 managers interviewed, 53 (71%) resided outside the hospital while 22 (29%) resided within or near the hospitals.

Table 4.3: Summary Statistics of Hospital Management Scores and VRS Scores

No.	Hospital Name	Hospital Level	Management Score (%)	Technical Efficiency Scores (VRS)
1.	Ruiru	SDH	52.0	1.000
2.	Kianyaga	SDH	67.0	1.000
3.	Kangema	SDH	49.0	1.000
4.	Kimbimbi	SDH	70.0	1.000
5.	Nyahururu	DH	67.0	1.000
6.	Othaya	SDH	76.0	1.000
7.	Kiambu	L5	69.0	1.000
8.	Nanyuki	DH	62.0	1.000
9.	Engineer	SDH	61.0	1.000
10.	Gatundu	SDH	63.0	1.000
11.	Thika	L5	64.0	1.000
12.	Nyeri	L5	73.0	1.000
13.	Nyathuna	SDH	60.0	1.000
14.	Kerugoya	L5	55.0	0.981
15.	Kirwara	SDH	63.0	0.877
16.	Kihara	SDH	52.0	0.858
17.	Tigoni	SDH	75.0	0.848
18.	Igegania	SDH	47.0	0.838
19.	Muriranjas	SDH	83.0	0.732
20.	Mt. Kenya	DH	31.0	0.676
21.	Mukurweini	SDH	65.0	0.664
22.	Muranga	L5	73.0	0.526
23.	Maragua	SDH	76.0	0,504
24.	Karatina	L5	57.0	0.498
25.	Olkalaou	DH	63.0	0.423

KEY: L5=level 5 hospital DH=district hospital SDH=sub-district hospital

Source: Author.

Table 4.4: Cross-Tabulation of Management Scores and Efficient Scores

	Technical Efficiency, n (%)			
Management Practice	Efficient	Inefficient	Total	Odds Ratio
Good	10 (59%)	7 (41%)	17 (100%)	2.4
Poor	3 (38%)	5 (62%)	8 (100%)	
Total	13 (52%)	12 (48%)	25 (100%)	

Source: Author.

The analysis of management practice and technical efficiency was done as follows: 1) Technical efficiency was recoded into two groups namely, Efficient (a score equal to 1) and Inefficient (a score <1); 2) Management practice, on the other hand, was also recorded into two categories – Good Practice (>60%) and Poor Practice (less than or equal to 60%).Upon the recording of the two variables, a cross-tabulation was done to determine whether or not there existed a correlation between the two variables. The findings revealed that 17 (68%) of the hospitals had good management, whereas, in terms of efficiency, 13 (52%) were technically efficient. Specifically, 10 (59%) of the 17 hospitals that had good management practice were also technically efficient as a result of the same. Of the eight hospitals that were poorly managed, 5 (62%) were technically inefficient. Following these observations, an odds ratio statistic was employed to reveal the correlation of these frequencies. Based on this result, a hospital with good management practice was 2.4 times more probable to be technically efficient compared to hospitals with poor management practices.

In this study, when the performance indicators were regressed against management practices, the outcome was the contribution of the various management practices towards hospital performance. Seven management practices contributed 13.04% each while two contributed 4.34% respectively as follows: Delegation contributed 13.04%, Empowerment contributed 13.04%, residence of senior managers in hospitals with 13.04%, daily

supervision with 13.04%, effective communication with 13.04%, work plan implementation with 13.04%, work plan with 13.04%, motivational and inspirations with 4.35% and consultation and consensus building contributed 4.35 % giving a total of 100%. Good relationship with staff and use of inspection tool did not have any contribution (See table 4.20 page 143).

4.3: Effect of Management Practices on Quantity of Health Care Services

The second objective of this study intended to establish the connection between hospital management practices and performance of hospitals measured by the quantity of hospital service. Quantity of health care in a hospital setup is defined as the volume of health services delivered by the hospital. In this study, the hospital performance indicators used to measure volume were total outpatients visits and total inpatient admissions.

Table 4.5: Mean and Standard Deviations of Hospital Inputs (2011/2012 FY)

Variables (Hospital Inputs)	Statistics	
	Mean	Std. Dev.
Catchment Population	59290.0	42592.0
Number of beds	121.0	114
Hospital occupied bed days	60.10	31.1
Entire staff	156.0	137.8
Number of doctors	12.0	14.0
Number of nurses	75.0	75.0
Facility Improvement Fund (FIF) collected (Kshs-millions)	28.4	31.9
The proportion of FIF banked	99.3%	3.20
Percentage of FIF earmarked for drugs	26.0%	13.9
Percentage of FIF earmarked for management	3.1%	2.63
Labor cost, Kshs (millions)	163.0	182
Capital expenditure, Kshs (millions)	81.4	11.1

Source: Author.

This table 4.5 shows the descriptive statistics of hospital inputs taken from various hospitals in the 2011/2012 financial year. The shows the averages and standard deviations of hospitals inputs from twenty-five hospitals. These included the number of beds, total doctors, total nurses, total staff, total labor cost and total facility improvement fund collected among others. The results show that the mean catchment population for the participant hospitals was 59289 (SD=42592). The findings also show that for the health facilities that were involved in the study, on average, 26% of FIF was earmarked for drugs whereas on average, 99% of FIF was banked. As expected, the participant hospitals had a lower number of doctors (mean=12; SD=14) than nurses (mean=75; SD=75).

The total hospital beds, Doctors, and Nurses were used as in puts in DEA Methods calculation of hospital's efficiency of the hospitals studied.

Table 4.6: Mean and Standard Deviations of the Hospital Outputs (2011/2012 FY)

Variables (Hospital Outputs)	Statistics	
	Mean	**Std. Dev.**
Number of outpatients	71,462.10	55,574.10
Number of inpatients	6,736.20	7,821.70
Number of surgical cases	1,012.50	1,278.90
Hospital occupied bed days	33,614.30	39,350.00
Number of discharges	5,960.40	6,449.60
Maternal deaths rate	2.24	3.41
Emergency wait time at outpatient departments in minutes.	9.10	10.30
Emergency wait time, for caesarian sections in minutes.	23.10	12.30
Number of deliveries	2,341.70	2,335.80
Fresh stillbirths, numbers	56.92	68.95
Number of total live births	2,284.80	2,288.30
Under one-year deaths rate	16.96	13.69
Under 5years deaths	41.00	26.72

Source: Author.

This table 4.6 shows the descriptive statistics of hospital outputs taken from various hospitals in the 2011/2012 financial year. Table 4.6 shows the means and standard deviations of the hospitals' outputs' or hospital workload. The variables were clustered as either quality or quantity indicators. Variables measuring quantity were total outpatients, total inpatients, total discharges, total deliveries, and total live births. Variables measuring quality were hospital occupied bed days, the total number of fresh stillbirths, total live births, maternal deaths rate, under 1year death rate, under 5years death rate, emergency waiting time for cesarean section and outpatients' department emergency waiting time.

The total number of outpatients and inpatients were used in DEA method as outputs in calculating efficiencies of hospitals studied. Using inputs from table 4.5 and outputs from table 4.6, the efficiencies of each hospital were produced as shown on table 4.3 to measure

effect of management practices on quantity of hospital services, each of hospital quantity measuring indicators on table 4.6 were regressed against each of the eleven management practices indicated on table 4.2. The result are shown on tables 4.7and 4.8.

Table 4.7: Management Practices and Hospital Performance: Dependent Variable Log Outpatient Visits (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan exists? (yes =1)	0.489** (2.52)									
Work plan implemented?(yes=1)		0.052** (2.54)								
Empowerment of staff (yes = 1)			0.704*** (3.73)							
Effective communication?(yes=1)				1.183*** (4.31)						
Delegation exists? (yes =1)					0.734*** (3.8)					
Consultation and consensus building?(yes=1)						0.092 (0.42)				
Daily supervision done? (yes =1)							0.112 (0.56)			
Motivation and inspiration of staff encouraged?(yes=1)								0.129 (0.65)		
Hospital residence for senior staff exists?(yes =1)									(-0.03) (-1.29)	
Log of management index										2.43 (5.92)
Constant term	10.56 (67.9)	10.55 (67.5)	10.42 (69.7)	9.83 (38.2)	10.37 (65.8)	10.8 (58.6)	10.8 (75.1)	10 (73.9)	10.94 (93.4)	12 (56.3)
R-squared	0.083	0.082	0.16	0.205	0.165	0.002	0.004	0.006	0.022	0.325
F	0.014	0.013	0	0	0	0.677	0.58	0.52	0.201	0
P value	0.014	0.013	0	0	0	0.677	0.58	0.52	0.201	0
Sample size	73	75	75	74	75	74	74	74	75	75

Note: ***,** and * represent 1%, 5% and 10% level of significance level respectively

Note: T-Statistics in Parentheses

Source: Author.

Table 4.7 shows regression results for the associations between specific management practices and the volume of outpatient visits. A1% increase in the empowerment indicator (the proportion of empowered workers) is associated with a .7% increase in the number of

outpatient visits. The elasticity of outpatient visits with respect to other management practices is interpreted similarly. For example, a 10% increase in the proportion of hospitals with a work plan is associated with a 4.89% increase in outpatient visits. Five out of nine management practices had a statistically significant association with the increase in outpatients' visits between 95% and 99% confidence levels. The positive sign for the coefficients in this table is what is expected from theory and literature.

Table 4.8: Management Practices and Hospital Performance: Dependent Variable Log Inpatients Admissions (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan (yes =1)	0.582*									
	(1.93)									
Work plan was implemented? (yes=1)		0.056*								
		(1.86)								
Staff Empowered? (yes =1)			0.718**							
			(2.40)							
Effective communication? (yes=1)				1.334***						
				(3.18)						
Consultation/ consensus building(yes=1)					0.131					
					(0.04)					
Delegation?(yes=1)						0.813***				
						(2.69)				
Daily supervision? (yes=1)							0.071			
							(0.24)			
Motivation and inspiration (yes =1)								0.375		
								(1.27)		
Hospital residence(yes =1)									-0.270	
									(-0.81)	
Log of management index										2.498
										(3.77)
Constant term	7.80	7.82	7.71	7.03	8.10	7.62	8.13	7.97	8.25	9.38
	(31.80)	(32.50)	(31.90)	(17.90)	(30.20)	(30.60)	(38.20)	(37.50)	(48.10)	(27.10)
R-squared	0.08	0.05	0.08	0.13	0.00	0.09	0.00	0.02	0.01	0.17
F	0.06	0.07	0.02	0.00	0.69	0.01	0.81	0.21	0.42	0.00
P value	0.06	0.07	0.02	0.00	0.69	0.01	0,814	0.21	0.42	0.00
Sample size	73.00	73.00	72.00	71.00	71.00	72.00	71.00	71.00	72.00	72.00

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.8 indicates that a 1% increase in the empowerment indicators (proportion of empowered workers) was associated with 7.18% increase in the number of inpatients admissions. The elasticity of inpatients admission with respect to other management

practices has a similar interpretation. For example, a 10% increase in delegation indicators (proportion of workers empowered via delegation) is correlated with an 8.13% increase in inpatients admissions. In summary, five management practices (work plan, work plan implementation, staff empowerment, effective communication and delegation), are statistically and significantly associated with an increase in inpatients admissions at between 90% and 99% confidence level. The positive sign associated with the coefficients of these management practices is what is expected here from both theory and literature.

4.4. Effect of Management Practices on Quality of Health Care Services

Patients in both inpatient and outpatient departments were asked their perception of service delivery at hospitals. Among the questions asked included: overall satisfaction with hospital (good, fair or poor), whether patients would return to the hospital or not, their rating on staff (whether they found hospital staff as warm and kind, fair or unkind), food served (good, fair or poor) and cleanliness of hospital bathrooms and toilets as either very clean, fairly clean or dirty. The result of this was presented in proportions. Patients at the outpatient department were asked their overall satisfaction and whether they would return to the hospital.

Table 4.9: Perception of Patients on Service Quality Disaggregated by OPD and IPD Service Delivery Points

Perception	OPD		IPD	
	N	%	N	%
Overall Satisfaction				
Good	296.00	74.37	346.00	83.78
Fair	95.00	23.87	59.00	14.29
Poor	7.00	1.76	8.00	1.94
Would Return to Hospital				
Yes	376.00	96.91	395.00	94.95
No	12.00	3.09	21.00	5.05
Staff Rating				
Warm/ Kind	Not	Not	346.00	83.57
Fair	Applicable	Applicable	51.00	12.32
Unkind			9.00	2.17
Some kind, others unkind			8.00	1.93
Food Served				
Good	Not	Not	281.00	68.70
Fair	Applicable	Applicable	103.00	25.18
Poor			24.00	5.87
Other			1.00	0.24
Bathrooms and Toilets				
Very clean	Not	Not	279.00	68.05
Fairly clean	Applicable	Applicable	117.00	28.54
Dirty			14.00	3.41

Source: Author.

Table 4.9 above presents the perception of patients who received health services at OPD and IPD. Patients at the OPD rated the overall assessment of the quality of service and/or treatment as good at 74 percent while patients attended to at IPD rated the services as good at 84 percent. On whether patients would return to the hospital later if the need arose or

otherwise, 97 percent of patients at OPD and 95 percent at IPD would return to the hospital respectively. Eighty-three (83) percent of the patients at IPD rated the staff as warm and kind with 12 percent rating the hospital staff as fair. On the quality of food served at hospitals, 69 percent of IPD patients rated food served as good while about 26 percent said the quality of food was fair. About six percent of patients were unsatisfied with the food served in the hospital. Sixty-eight (68) percent of IPD patients felt that hospital bathrooms and toilets were very clean while 29 percent said that the bathrooms and toilets are fairly clean. The general perception of patients on hospital services, staff rating, and the quality of food served, and the condition of toilets and bathrooms was good. Based on patients rating of hospital services, the general perception of patients' indicates good hospital performance hence good management.

Table 4.10: Management Practices and Hospital Performance: Dependent Variable is Log Emergency Waiting Time for Caesarian Surgery (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan? (yes=1)	-0.008									
	(-0.03)									
Work plan implemented? (yes=1)		-0.006								
		(-0.29)								
Empowerment?(yes=1)			0.230							
			(1.02)							
Effective communication? (yes =1)				-0.330						
				(-1.01)						
Delegation (=1)					0.250					
					(1.14)					
Consultation/ consensus building? (yes=1)						-0.990				
						(-0.44)				
Daily supervision (yes = 1)							0.240			
							(1.19)			
Motivation and inspiration?(yes=1)								-0.62***		
								(-3.47)		
Hospital residence? (yes = 1)									-0.06***	
									(-3.28)	
Log of management index										-0.590
										(-1.27)
Constant	3.01	3.07	2.85	3.32	2.84	3..09	2.89	3.39	3.20	2.76
	(14.60)	(16.20)	(14.10)	(10.60)	(15.20)	(15.80)	(20.5	(24.50)	(30.10)	(11.90)
R squared	0.00	0.00	0.02	0.02	0.03	0.00	0.03	0.20	0.18	0.03
F	0.97	0.77	0.31	0.32	0.26	0.66	0.24	0.00	0.00	0.21
P value	0.97	0.77	0.31	0.32	0.26	0.00	0.24	0.00	0.00	0.21
Sample size	49.00	51.00	51.00	51.00	51.00	51.00	50.00	51.00	51.00	51.00

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.10 indicates that log management index correlates negatively with log emergency waiting time for cesarean section. 1% rise in management index is correlated with .59% reduction in the emergency waiting time for caesarean surgeries, but the association is statistically insignificant. A 1% increase in motivation indicators (the proportion of motivated workers) is associated with .62% decrease in the emergency waiting time for caesarean section. The elasticity of emergency waiting time for the Caesarean section with respect to other management practices is interpreted similarly. For example, a 10% increase

in the proportion of hospitals with the managers residing in the hospital compound is associated with .6% reduction in the emergency waiting time for caesarean surgeries. The management practices of motivation and inspiration and residence of managers in hospitals were statistically and significantly correlated with the reduction of caesarian surgeries at a 99% confidence level. The negative sign in the coefficients of these management practices is as expected from theory and the literature.

Table 4.11: Management Practices and Hospital Performance –Overall Satisfaction with In-Patients' Services.

Management Practices	1	2	3	4	5	6	7	8	9	10
Work plan? (yes=1)	-0.03									
	(-0.56)									
Work plan Implemented?										
(yes=1)		-0.0024								
		(-0.49)								
Empowerment of staff?										
(yes=1)			-0.03							
			(-0.57)							
Effective communication										
(yes=1)				0.06						
				(0.52)						
Delegation (yes=1)					-0.06					
					(-1.25)					
Daily Supervision (yes=1)						0.03				
						(0.64)				
Consultation/ consensus										
building?(yes=1)							0.130***			
							(2.81)			
Motivation and inspiration?										
(yes=1)								0.024		
								(0.55)		
Hospital residence(yes=1)									0.008*	
									(1.76)	
Log management index										0.25
										(1.68)
Constant	1.20	1.20	1.20	1.13	1.22	1.16	1.09	1.17	1.16	1.30
	(27.40)	(27.80)	(30.90)	(10.40)	(31.10)	(40.50)	(28.20)	(33.70)	(45.80)	(18.17)
R-squared	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.01	0.01
F	0.51	0.63	0.57	0.60	0.21	0.52	0.01	0.58	0.08	0.09
P value	0.51	0.63	0.57	0.60	0.21	0.52	0.01	0.58	0.08	0.09
Sample size	411.00	413.00	413.00	410.00	413.00	392.00	413.00	410.00	413.00	413.00

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.11 shows that a 1% increase of hospitals whose managers reside in hospital correlated with 0.008% increase in the probability of patients reporting satisfaction with inpatient services. Similarly, a 10% increase in management index is linked with a 2.5% increase in the possibility of patients reporting satisfaction in inpatient services. From the table 4.11, only two management practices were statistically and significantly correlated with an increase in satisfaction with inpatient services. These were consultation and consensus building at 99% confidence level and residence of managers at the hospital at 90% confidence level. The positive sign of the coefficients associated with the two management practices is what is expected in theory and literature.

Table 4.12: Management Practices and Hospital Performance –Overall Satisfaction with Out-Patients' Services

Management Practices	1	2	3	4	5	6	7	8	9	10
Work plan? (yes=1)	-0.020 (-0.29)									
Work plan Implemented? (yes=1)		-0.0002 (-0.04)								
Staff Empowerment (yes=1)			0.020 (0.28)							
Effective Communication (yes = 1)				-0.008 (-0.10)						
Delegation ?(yes=1)					-0.040 (-0.69)					
Consultation/ consensus building?(yes=1)						-0.170 (-3.06)				
Daily Supervision (yes = 1)							0.09* (1.91)			
Motivation and Inspiration? (yes=1)								0.007 (0.14)		
Hospital residence? (yes=1)									0.005 (0..63)	
Log management index										0.310 (1.89)
Constant	1.30 (25.55)	1.28 (26.04)	1.30 (27.81)	1.28 (16.49)	1.31 (24.84)	1.23 43.60	1.22 (36.10)	1.27 (33.00)	1.27 (48.70)	1.41 (18.40)
R –squared	0.00	0.00	0.00	0.00	0.00	0.02	0.09	0.00	0.00	0.01
F	0.77	0.97	0.78	0.92	0.49	0.05	0.07	0.80	0.53	0.06
P value	0.77	0.97	0.78	0.92	0.49	0.05	0.07	0.89	0.53	0.06
Sample size	393.00	398.00	398.00	397.00	398.00	410.00	397.00	397.00	398.00	398.00

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.12 shows that the log of management index correlated positively with the log of overall satisfaction in outpatient services. 1% increase in management index is correlated with .31% increase in the probability of patients reporting satisfaction with outpatient services. A 10% increase in the proportion of hospitals practicing daily supervision correlates with a .9% increase in the likelihood of patients reporting satisfaction in outpatient services. The positive sign of coefficients of these two practices is what is expected from theory and literature. From the table 4.12, only daily supervision management practice was statistically and significantly associated with improvement in overall satisfaction with outpatients' services at a 90% confidence level. The positive sign is what is expected in theory and literature.

Table 4.13: Management Practices and Hospital Performance: Dependent Variable Log Fresh Still Births (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan? (yes=1)	0.446									
	(1.34)									
Work plan implemented?(yes=1)		0.032								
		(0.95)								
Staff Empowerment?(yes=1)			0.620							
			(1.88)							
Effective communication (yes=1)				0.470						
				(0.80)						
Delegation (yes=1)					0.540					
					(1.55)					
Consultation/ consensus building?(yes=1)						-0.413				
						(-1.55)				
Daily supervision (yes=1)							0.024			
							(0.08)			
Motivation and inspiration (yes=1)								-0.210		
								(-0.64)		
Hospital residence (yes=1)									-0.069**	
									(-2.02)	
Log of management index										1.098
										(0.99)
Constant	2.35	2.47	2.29	2.73	2.31	2.67	2..74	2.80	2.89	3.18
	(8.67)	(9.05)	(8.69)	(15.90)	(8.01)	(11.40)	(13.50)	(11.50)	(15.30)	(6.01)
R-squared	0.03	0.01	0.05	0.01	0.03	0.00	0.00	0.01	0.06	0.01
F	0.19	0.34	0.06	0.43	0.13	0.94	0.94	0.52	0.05	0.33
P value	0.19	0.34	0.06	0.43	0.13	0.94	0.94	0.52	0.05	0.33
Sample size	71.00	72.00	72.00	71.00	72.00	71.00	71.00	71.00	72.00	72.00

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.13 shows that only the residence of top managers in the hospital was significantly associated with a reduction of fresh stillbirths at 95% confidence level. The negative sign associated with the coefficient is expected from theory and literature. Motivation and inspiration and consultation and consensus building were also associated with a reduction of fresh stillbirths but not statistically significant.

Table 4.14: Management Practices and Hospital Performance: Dependent Variable Log One Year Death Rate (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan exists? (yes =1)	0.560 (2.59)									
Work plan implemented?(yes =1)		0.052 (2.50)								
Empowerment of staff (yes = 1)			0.340 (1.49)							
Effective communication?(yes =1)				-0.120 (-0.21)						
Delegation exists? (yes =1)					-0.280 (-1.13)					
Consultation and consensus building?(yes =1)						0.220 (0.93)				
Daily supervision done? (yes =1)							-.43** (-2.14)			
Motivation and inspiration of staff encouraged?(yes =1)								-0.046 (-0.21)		
Hospital residence for senior staff exists?(yes =1)									-0.001 (-.050)	
Log of management index										1.600 (2.07)
Constant term	2.50	2.55	2.64	3.00	3.10	3.10	3.20	2.94	2.90	3.60
R-squared	-14.00	-14.70	-13.00	-5.50	-14.10	-14.10	-20.70	-17.90	-24.00	-10.60
F	0.110	0.102	0.039	0.022	0.022	-0.016	0.078	0.000	0.000	0.073
P value	0.012	0.015	0.143	0.265	0.265	0.355	0.036	0.831	0.958	0.043
Sample size	56	57	57	57	57	56	56	56	57	57

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.14 shows that only daily supervision practice which was statistically and significantly associated with a reduction of under 1 year mortality rate at 95% confidence level. The negative sign associated with daily supervision coefficient is expected in theory and literature. The management practices, empowerment of staff, effective communication, delegation, motivation and inspiration of staff and residence of top managers in the hospital were associated with a reduction of under 1-year mortality rate but were not statistically significant. However in life-saving situations even the slightest improvement in the right direction matters. With continuous improvement even what is not statistically significant can turn out to be significant.

4.5. Effect of Management Practices on Hospital Efficiency

Table 4.5 and 4.6 on page 119 and 120 respectively show hospitals input and outputs in the study area respectively. To calculate the hospitals efficiency, the total outpatients and inpatients in each hospital as shown on table 4.6 were used as the hospital's outputs. On the other hand, the total number of beds, doctors and nurses on table 4.5 were used as hospitals inputs which were put through DEA software and efficiencies in all hospitals in study area were generated as shown on table 4.15 on page 132 and figure 4.2 on page 134. In the next phase of the analysis hospital outputs were used as dependent variables in OLS regression in determining the effects of management practices on hospital performance. Regression Tables for each objective shows how measures of hospital performance were associated with various management practices. The dependent variables were large absolute figures while management variables were dummies and small figures. To standardize the equation, the dependent variables were log-transformed. In other words, the regression model consists of highly screwed variables given the difference in scale between dependent variables and independent variables and therefore needed log transformation.

Table 4.15 shows the regression results obtained by regressing Log of Efficiency Score against the nine management practices. From this table, it is evident that only daily supervision *(p=.00)* was statistically and significantly associated with an increase in efficiency at a 99% confidence level. From this study, hospitals which practiced daily supervision had 1.4% efficiency score higher than those hospitals which did not do supervision. Considering that all organizations struggle to become efficient, this makes daily supervision an important management practice for hospitals to consider implementing.

Table 4.15: Management Practices and Hospital Performance: Dependent Variable Log Efficiency Score (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan? (yes=1)	-0.005 (- .96)									
Work plan implemented? (yes=1)		-0.001 (-1.1)								
Staff Empowerment? (yes=1)			0.002 (0.37)							
Effective communication (yes = 1)				-0.006 (-.80)						
Delegation? (yes=1)					0.005 (1.02)					
Consultation/ consensus building?(yes=1)						0.005 (0.87)				
Daily supervision (yes =1)							0.014*** (3.14)			
Motivation and inspiration? (yes=1)								-0.004 (-.78)		
Hospital residence (yes = 1)									-0.004 (-.72)	
Log management index										0.009 (0.79)
Constant	-0.01 (1.16)	0.00 (1.13)	0.01 (-2.2)	0.00 (0.37)	0.01 (2.69)	-0.01 (-2.48)	0.02 (4.63)	-0.01 (-1.64)	0.01 (-2.31)	0.00 (-0.50)
R-squared	0.02	0.01	0.01	0.01	0.01	0.01	0.12	0.01	0.00	0.01
F	0.34	0.29	0.71	0.43	0.31	0.39	0.00	0.44	0.48	0.43
P value	0.34	0.29	0.71	0.43	0.31	0.39	0.00	0/436	0.48	0.43
Sample size	73	75	75	74	75	74	74	74	75	75

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

The findings in table 4.15 show that hospitals where there is supervision of the hospital activities was done on daily basis, had a 1.4% higher efficiency scores than comparative peer hospitals (supervision co-eff =.014, *t*= 3.14). Management improves efficiency by daily supervision practices that makes sure inputs are not misallocated or wasted. Daily supervision is statistically and significantly associated with an increase in efficiency at a 99% confidence level. The positive sign of coefficient associated with daily supervision is expected from theory and literature. The delegation, staff empowerment and consultation, and consensus building are associated with efficiency increase but are not statistically significant.

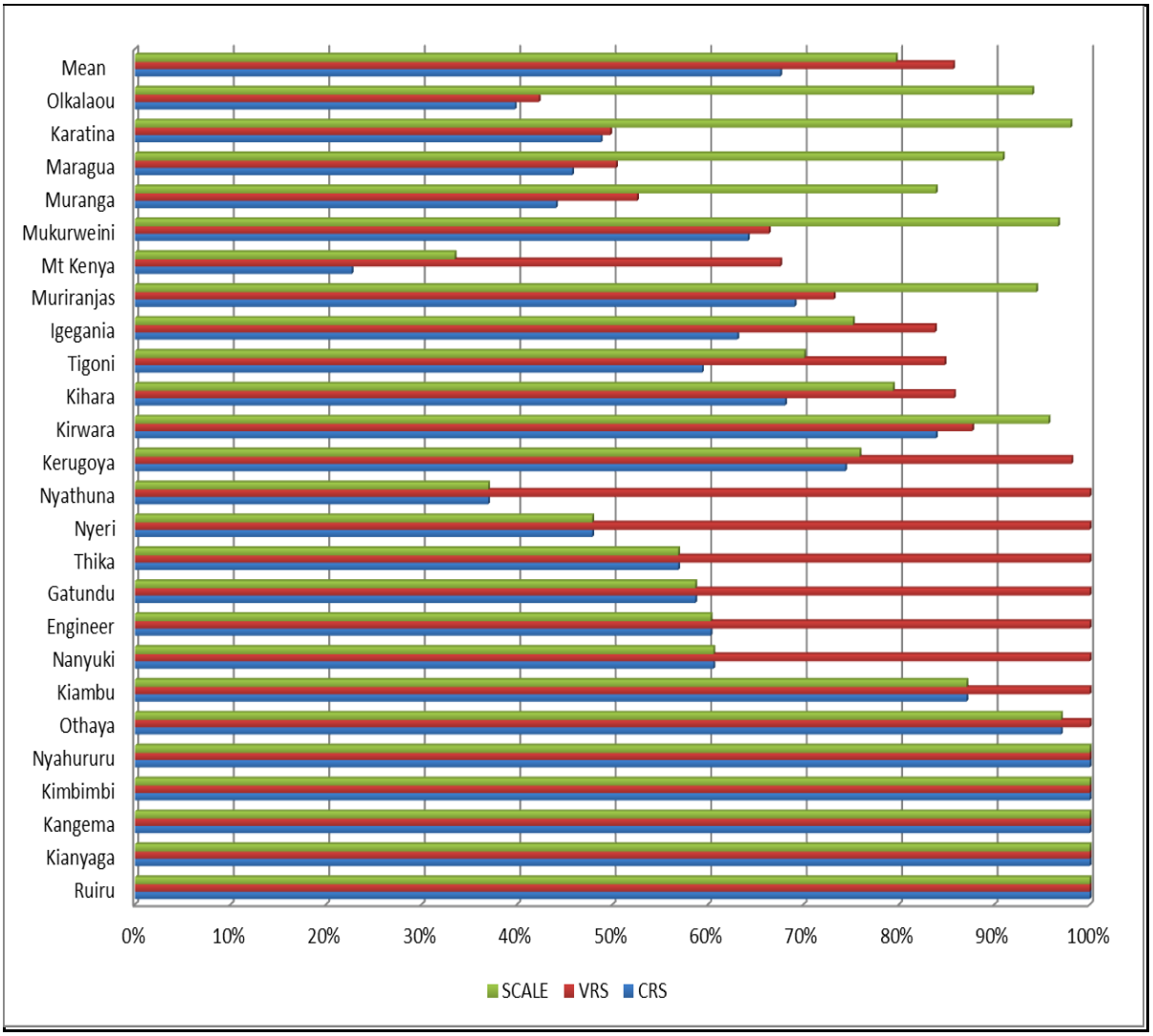

Figure 4.2: Technical, Scale, and Constant Returns to Scale Efficiencies

Source: Author.

Table 4.16: Hospital Efficiency Scores by size

Large Hospitals 200-400 Bed Capacity

No	Hospital	Bed Capacity	CRS	VRS	SE	Return To Scale
1	Kiambu	383	0.871	1	0.871	DRS
2	Thika	299	0.569	1	0.569	DRS
3	Nyeri	366	0.479	1	0.479	DRS
4	Kerugoya	264	0.744	0.981	0.759	DRS
5	Muranga	240	0.441	0.526	0.839	DRS
6	Karatina	214	0.488	0.498	0.98	IRS
7	Olkalaou	200	0.398	0.423	0.94	IRS
	Average		0.57	0.78	0.77	

Medium Hospitals 100-199 Bed Capacity

No	Hospital	Bed capacity	CRS	VRS	SE	
1	Nyahururu	154	1	1	1	CRS
2	Nanyuki	129	0.606	1	0.606	DRS
3	Gatundu	107	0.587	1	0.587	DRS
4	Mukurweini	144	0.642	0.664	0.967	IRS
5	Maragua	110	0.458	0.504	0.909	IRS
Average			0.659	0.83	0.81	

Small Hospitals 7 to 99 beds

No	Hospital	Bed capacity	CRS	VRS	SE	
1	Ruiru	22	1	1	1	CRS
2	Kianyaga	23	1	1	1	CRS
3	Kangema	7	1	1	1	CRS
4	Kimbimbi	46	1	1	1	CRS
5	Othaya	77	0.97	1	0.97	IRS
6	Engineer	15	0.603	1	0.603	IRS
7	Nyathuna	10	0.37	1	0.37	IRS
8	Kirwara	16	0.839	0.877	0.957	IRS
9	Kihara	66	0.681	0.858	0.794	IRS
10	Tigoni	65	0.594	0.848	0.701	DRS
11	Igegania	14	0.631	0.838	0.752	IRS
12	Muriranjas	66	0.691	0.732	0.944	IRS
13	Mt Kenya	21	0.227	0.676	0.335	IRS
Average			0.74	0.91	0.8	

Source: Author.

Quantitative Evidence: Estimation Results Using Tobit Regression – Determinants of Efficiency

Table 4.17 Determinants of efficiency Tobin's method

	Dependent Variables		
Explanatory Variables	**CRS Efficiency Scores**	**VRS Efficiency Scores**	**Scale Efficiency Scores**
Hospital size (1=large)	0 .19 (0.82)	0.35 (0.96)	0.25 (1.35)
Dummy for sex (1=Male)	.3607242** (2.51)	-0.13 (-0.58)	.3838616*** (3.14)
Dummy for residence (1=hospital residence)	-.5403332*** (-2.23)	-1.706404** (2.98)	0.11 (0.54)
Dummy for marital status (1=married)	.4199405*** (3.31)	0.32 (1.62)	0.4362205*** (3.88)
Log of Age	0.57 (0.51)	5.101959** (3.08)	-2.151877*** (-2.32)
Log manager's distance from residence)	(0.16) (-1.50)	-.7233776*** (-2.82)	0.10 (1.13)
Log managers year years of service	-1.312675*** (-2.99)	-2.634538*** (-2.63)	(0.46) (-1.27)
Log of distance from Nairobi	(0.27) (-1.47)	(1.10) *** (-3.00)	0.18 (1.19)
Log of average length of stay at hospital	-.5628852** (-2.7)	-.8732002** (-2.37)	-.3769319** (-2.12)
Constant term	1.58 (1.19)	(1.21) (-0.57)	3.83 (3.49)
LR chi-square (9)	22.71	20.25	26.85
Prob> chi-square	0.01	0.02	0.00
Pseudo R^2	0 .14	0.76	0.26
Sample size	25.00	25.00	25.00

Note: ***, **, and * represents 1%, 5% and 10% level of significance.

Note: T-Statistics in Parentheses

Source: Author.

Table 4.17 shows Tobit regression results for CRS, VRS, and SCALE efficiency equations, where efficiency levels were regressed against their determinants. The upper limit Tobit regression was used to get these results. The reason for this was that the regression results

of both lower and upper limits were compared with the lower option having no censored data while upper option had 194 observations censored this confirmed that upper limit was most appropriate for the above analysis. From the two outputs that are a lower limit option and upper limit option pseudo R^2 value for the lower limit was negative indicating that the model was not better than the horizontal line.

Table 4.17 displays a lot of information on how hospital efficiencies were affected by a variety of factors. The first result that is likely to raise controversy among hospital administrators is that the coefficient of a manager's residence within the hospital or its immediate vicinity was negatively and statistically associated with the levels of VRS and CRS efficiencies scores (*p*-value =.009 and .040). The coefficient of managers' age was significantly and positively associated with VRS efficiency score but negatively associated with the scale efficiency score. The coefficient of the manager's sex is shown to be statistically and significantly positively associated with CRS and scale efficiencies scores (*p*-value =.023 and .006), suggesting that men are better hospital managers. The coefficient of the manager's marital status is significantly and directly correlated with Scale efficiency and CRS scores (*p*-value =.004 and .001). Thus an increase in the proportion of married managers would improve hospital efficiency. The coefficient of the manager's house distance to the hospital was negatively associated with VRS efficiency score, meaning that the longer the distance the lower was the efficiency score. The coefficient of manager's years of service was negatively associated with the VRS and CRS efficiency scores (*p*-value =.008 and .009), meaning that increasing the proportion of hospitals being managed by long-serving managers would reduce hospitals efficiency. The coefficient of distance from Nairobi to the hospital was negatively, statistically and significantly associated with the VRS efficiency score (*p*-value = .009). This finding suggests that the longer the distance between a hospital and Nairobi, the lower is its operational efficiency. Finally, the

coefficient of the average length of patients stay in hospitals was statistically and significantly negatively correlated with all efficiency scores (*p*-values = .031, 015 and .050). This means that long stays inpatients at hospitals are strong signals of hospital inefficiency.

4.6. Effect of Management Practices on Hospital Outcomes

Tables 4.18 and 4.19 shows the findings for the association between management practices and hospital outcomes and outputs. The indicators used are maternal death rates and total number of live births.

Table 4.18 shows that management practices, that is, dummies for empowerment, effective communication, delegation, and daily supervision were associated with a reduction in maternal death rate but the results are not statistically significant. However, in matters of life and death even the slightest improvement in the right direction matters and need to be noted.

Table 4.18: Management Practices and Hospital Performance: Dependent Variable is Log Maternal Death Rate (t-statistics in parentheses).

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan exists? (yes =1)	0.13									
	(0.68)									
Work plan implemented?(yes =1)		0.012								
		(0.67)								
Empowerment of staff (yes = 1)			-0.176							
			(-084)							
Effective communication?(yes =1)				-0.123						
				(-0.30)						
Delegation exists? (yes =1)					-0.32					
					(-1.61)					
Consultation and consensus building?(yes=1						0.16				
						(0.77)				
Daily supervision done? (yes =1)							-0.072			
							(-0.44)			
Motivation and inspiration of staff encouraged?(yes =1)								0.003		
								(0.02)		
Hospital residence for senior staff exists?(yes =1)									0.032	
									(1.67)	
Log of management index										1.96
										(2.84)
Constant term	4.5	4.5	4.8	4.7	4.8	4.5	4.7	4.6	4.6	5.5
	(27.60)	(29.10)	(25.50)	(11.80)	(28.10)	(25.20)	(42.70)	(32.50)	(46.30)	(17.90)
R-squared	0.012	0.011	0.017	0.002	0.061	0.015	0.005	0.987	0.065	0.167
F	0.502	0.509	0.407	0.767	0.115	0.445	0.665	0.987	0.102	0.007
P value	0.502	0.509	0.407	0.767	0.115	0.445	0.665	41	0.102	0.007
Sample size	41	42	42	41	42	41	42		42	42

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.19: Management Practices and Hospital Performance: Dependent Variable is Log of Total Live Births (t-statistics in parentheses)

Management practices	1	2	3	4	5	6	7	8	9	10
Work plan? (Yes=1)	0.56**									
	(2.05)									
Work plan implemented? (Yes=1)		0.06**								
		(2.04)								
Staff Empowerment (yes = 1)			0.76***							
			(2.79)							
Effective communication (yes = 1)				1.39***						
				(3.47)						
Delegation (=1)					0.88***					
					(3.17)					
Consultation/consensus building?(yes=1)						0.05				
						(0.16)				
Daily supervision (yes = 1)							0.10			
							(0.36)			
Motivation and inspiration?(Yes=1)								0.18		
								0.63)		
Hospital Residence?(Yes=1)									-0.06	
									(-1.88)	
Log of management index										2.57
										(4.08)
Constant	6.85	6.84	6.72	5.98	6.61	7.16	7.13	5.98	7.36	8.44
	(31.30)	(30.70)	(30.90)	(15.90)	(29.10)	(27.60)	(35.80)	(15.90)	(45.40)	(25.66)
R-squared	0.06	0.05	0.10	0.14	0.12	0.00	0.00	0.14	0.05	0.19
F	0.04	0,045	0.01	0.00	0.00	0.88	0.72	0.53	0.06	0.00
P value	0.04	0.05	0.01	0.00	0.00	0.88	0.72	0.53	0.06	0.00
Sample size	73	75	75	74	75	74	74	75	75	75

Note: ***, ** and * represent 1%, 5% and 10% level of significance

Note: T-Statistics in Parentheses

Source: Author.

Table 4.19 shows that log of management index is positively associated with log total live births. 1% increase in management index is associated with a 2.57% increase in total live births. The elasticity of total live births with respect to other management practices show that a 10% increase in the proportion of hospitals practicing effective communication, delegation and empowerment is associated with 13.9%, 8.8% and 7.6% higher total live births, respectively. In summary, five management practices that are work plan, work plan

implementation, staff empowerment, effective communication, delegation, were all statistically and significantly associated with an increase in total live births between 95% and 99% confidence level. The positive sign associated with the coefficient is the expected sign in theory and literature.

Consultation and consensus building and hospital residence of senior managers were statically and significantly associated with the overall improvement of inpatient service at 99% confidence level for consultation and consensus building *(p=.01)* and 90% for hospital residence*(p=.08).* This study shows that the management practices identified in this study had an effect on improving the health outcome.

4.7. Results from Qualitative Analysis

4.7.1 Qualitative Evidence

The study carried out twelve focus group discussions (FGDs) with the members of the public who came to visit their friends and relatives in the hospitals. The FGDs were conducted in 6 large hospitals in the region studied. There were 6 groups for women and 6 for men, each consisting of 6-10 members. The same issues were discussed in each group. The key informants were seventy-five in number, three from each hospital.

4.7.2 Key Informants

The results from key informants showed that a majority of hospitals in the study had annual work plans for hospital, departments, sections, and units that were implemented on a quarterly basis. They also reported that there was daily unit supervision, fortnight departmental supervision and, monthly management supervision. The key informants also confirmed understanding of how the hospital affairs were conducted.

4.7.3 Focus Group Discussions

The results obtained from the focus groups discussions revealed that there was a general consensus that hospitals served the community well. Majority of the focus groups discussions showed that shortage of drugs was evident with patients being sent to buy them from private pharmacies. Ambulance charges were also said to be high. They reported that staff was generally warm and welcoming, hospital cleanliness was good and the food served was well prepared. Despite the positive responses from the focus group discussions they also indicated some areas that hospitals needed to improve on. Such areas included: a shortage of drugs supplies, high ambulance charges, some hospitals had high bed charges while other hospitals had high consultation fee. These factors reduce the effectiveness of good management practices.

Table 4.20: Results obtained from regression of Hospital Performance Indicators on Hospital Management Practices

Management practices	Log total outpatient	Log total inpatient admission	Log total live birth	Log emergency for C/S	Log fresh still birth	Overall satisfaction with OPD services	Overall satisfaction with IPD services	Log efficiency score	Log <1yr mortality rate	Log <5yrs mortality rate	Log maternal mortality rate	Total CoE Sig.	Percentage
Work plan	0.49** (2.52)	0.582* (1.93)	0.56** (2.05)	-0.008 (-0.03)	0.446 (1.34)	-0.020 (-0.29)	-0.030 (-0.56)	-0.005 (-0.96)	0.560 (2.59)	0.544 (1.13)	0.420 (2.29)	3	13.04
Delegation to some staff	0.734*** (3.80)	0.813*** (2.69)	0.89*** (3.17)	0.25 (1.14)	0.54 (1.55)	-0.04 (-0.69)	-0.06 (-1.25)	0.01 (1.02)	-0.28 (-1.13)	0.37 (0.67)	-0.32 (-1.61)	3	13.04
Empowerment of staff	0.704*** (3.73)	0.718** (2.40)	0.76*** (2.79)	0.230 (1.02)	0.620 (1.88)	0.020 (0.28)	-0.030 (-0.49)	0.002 (0.37)	-0.220 (-0.86)	-0.750 (-1.57)	-0.176 (-0.084)	3	13.04
Residence of managers in hospital	-0.08 (-1.29)	-0.270 (-0.81)	-0.056 (-1.88)	-0.06*** (-3.28)	-0.069** (-2.02)	0.005 (0.63)	0.008* (1.76)	-0.004 (-0.78)	-0.001 (-0.050)	-0.772 (-1.58)	0.032 (1.67)	3	13.04
Daily supervision	0.112 (0.56)	0.071 (0.24)	0.100 (0.36)	0.240 (1.19)	-0.024 (-0.8)	0.09* (1.91)	0.030 (0.64)	0.014*** (3.14)	-0.43** (-2.14)	-0.063 (-0.14)	-0.072 (-0.44)	3	13.04
Effective communication	1.183*** (4.31)	1.334*** (3.18)	1.39*** (3.47)	-0.33 (-1.01)	-0.470 (-0.80)	-0.008 (-1.10)	0.060 (0.52)	-0.006 (-0.80)	-0.120 (-0.021)	0.890 (0.89)	-0.123 (-0.30)	3	13.04
Work plan implementation	0.052** (2.54)	0.056* (1.86)	0.06** (2.04)	-0.006 (-0.29)	0.032 (0.95)	-0.000 (-0.04)	-0.002 (-0.49)	-0.001 (-1.1)	0.052 (2.50)	0.037 (0.77)	0.012 (0.67)	3	13.04
Consultation & consensus	0.920 (0.42)	0.130 (0.40)	0.490 (0.16)	-0.100 (-0.44)	-0.143 (-1.14)	0.170 (-3.14)	0.130*** (2.81)	0.005 (0.39)	0.220 (0.93)	-2.16 (-0.43)	0.160 (0.77)	1	4.35
Motivation inspiration	0.125 (0.65)	0.375 (0.24)	0.177 (0.63)	-0.62*** (-3.47)	-0.210 (-.64)	0.007 (0.14)	0.024 (0.55)	-0.004 (-0.78)	-0.046 (-0.21)	0.001 (0.00)	0.003 (0.02)	1	4.35
TOTAL												**23**	**100%**

Note: ***, **, and * represent 1%, 5%, and 10% level of significance.

Note: T-Statistics in Parentheses

Source: Author.

Table 4.20 above shows results of the regression analysis for various performance indicators (dependent variable) against management practices (regressors) identified in the study. Table 4.20 shows the contribution of each management practice towards overall hospital performance as indicated in the right most column. The contribution of each management practice is expounded in objective one.

i) Management practices utilized in public hospitals

The purpose of measuring the management scores was to find out whether the management status correlated with hospital efficiency scores. This study identified nine management practices and their effects on hospital performance estimated. The hospital-wide management is an example of how three top managers put up strategic mechanisms that enabled lower level service delivery points to produce favorable results. This study concurred with Finley, Ivanitskaya, & Kennedy (2009) in that supervision is one of the strong management practices with regard to effective service delivery.

A supervisor has two main roles; a mediator or link pin who communicates the plans, policies, decisions, and strategies of top management to the subordinates and secondly, a supervisor plays a guiding role whenever subordinates are in doubt and need help and get them out of problems. The supervisor also monitors the workers and ensures that checks and balances are in place to ensure actual matches the planned output. In addition, supervision maintains discipline, gives feedback, improves communications, motivation and gives group unity. Supervision ensures that there is appropriate utilization of resources to reduce wastage. Delegations involve a senior manager assigning a junior officer authority to do the work while the senior staff concentrate on other duties (Yukl, 2017).

4.8 Discussion of the Findings

4.8.1 Discussion on Effectiveness of Management Practices

From literature authors who have written on management practices appear to have a different approach. Bloom et al. (2008), in their article "why do management practices differ across firms and countries?" looked at the following management practices: introduction of modern manufacturing techniques, processes, problem documentation, performance tracing, performance analysis, and performance negotiations. Significance management practice is implemented when there is failure to achieve any or all of the following: agreed objectives, target interconnection, target time limit, target broadening, performance simplicity, acceptable handling of human investment, rewarding of good performance, not rejecting deprived performance, promote high performers, attract human investment and retain human investment. Information on all these aspects of management practices was obtained through telephone call interviews. They were all condensed to measure monitoring, setting targets and giving incentives in hospitals and firms. Bloom has applied this approach in both manufacturing industries and hospitals particularly in Europe, the United States, Asia, and South America.

Bloom et al. (2008), studied competition effects on quality of management, employing the above-outlined practices where 61% of acute hospitals were involved and concluded that quality management intensely correlates with monetary and medical outcomes. Bloom et al. (2008), studied hospital management practices in the United Kingdom by interviewing 182 managers and physicians in private and public hospital of English acute trusts. He stated that management procedures were strongly associated with hospitals

performance on a clinical outcome such as survival rates from myocardial infarctions, general operations, and financial outcomes. The public hospitals (the National Health Service) management were poorer than private hospitals.

Global Hospital Management Survey (2013) studied twenty hospitals in China and others in Europe, USA and South America covering 1200 hospitals. The management practices focused on; Target Management (optimizing efficiency of hospital operations), performance management (maximizing quality of hospital results), Standardizing Care (optimizing the efficiency of hospital operation) and Talent Management (improving quality of hospital workforce).

Global Hospital Management Survey targeted clinical management by interviewing directors, physicians and nurses at the specialized departments such as cardiology, neurosurgeon, orthopedic and endocrinology. The target was to middle-level managers, the Chinese study year findings were compared with results of a similar study done during the same period in United States, United Kingdom, Germany, Sweden, Canada, France, and Italy. The study looked at the quality of care at the specialized department in additional the staffing level.

The current study looked at the top managers of public hospital such as the medical superintendent or the chief executive officer (CEO) and two assistants in Kenyan hospitals. The way the CEO and his team applied the identified management practices, to ensure that all departments in the hospitals performed well in all service delivery points to the satisfaction of patients and that quantity, quality, and efficiency were achieved as well as a community health outcome.

Bloom et al. (2008) and Bloom & Reenen (2010), comparable studies in United States, Germany, United Kingdom, France, Sweden, Canada, Italy and indicated that management measures were intensely associated with hospitals performance to clinical outcomes including survival rates from heart attacks, and universal operational and financial results. These studies focused on myocardial infarctions and other specialized areas which are their priority and were reduced by good management from their specialists. The present study in Kenya showed that good management practices positively correlated with hospital performance and clinical outcomes as demonstrated by the reduction of the emergency waiting time for caesarian surgeries and outpatient emergencies. Reduction of fresh stillbirths, under one-year death rate, under five years' death rate and maternal mortality rate were also illustrated by the study. This study and those quoted above compare well despite the good economy, technology and better human resource numbers of these developed nations. However, Bloom's study used micromanagement at clinician's level while the Kenyan used meso or hospital wide method.

According to Bloom & Reneen (2010), in relation to competition and its impact on the quality management, they observed that an increase management index quality by over 1 standard deviation was correlated to 6% reduction in heart attack mortality rate. In the current study, 1% increase in the proportion of hospitals practicing delegation was associated with 0.95% decrease in fresh stillbirths, a 10% increase in hospitals practicing consultation and consensus building, motivation of staff and residence of senior managers in hospitals were associated with 11.9%, 6.2% and .6% of reduction in emergency waiting time for caesarian surgeries respectively, 1% increase in proportion of hospitals

practicing staff empowerment was correlated with 1.02% decrease in under five years mortality rate and 10% increase in proportion of hospitals practicing daily supervision was associated with 4.3% decrease in under 1year mortality rate. The two studies concur despite the different entry points and hospital management practices studied.

Merchant, Kenneth, & Stede (2017), in Brazil, looked at the clinical experience of managers in public hospitals and the management control systems they employed. The measurable variables were the clinical experience of managers, perceived usefulness of management, horizontal management mechanism, and hospital performance. They used the interview method and borrowed heavily from Bloom measurement tool. The objective of the research was to increase understanding of the appliances that enriches hospital performance.

Management Science for Health (2006), was an agent request to make professional the worldwide healthcare management. In this case, they identified the requirements needed to meet management challenges. They included; staff motivation, teamwork, time management, partnership formation, decision making, resource management (Human and financial) monitoring, evaluating, reporting, leadership, ability to keep teams focused on outcomes and satisfaction of the client.

Langabeer (2018), looked at the influence of board on management practices and their association to hospital performance using clinical quality metrics. The study was a survey that collected data from nationality representative group of U.S. and England hospitals to scrutinize the associations amongst hospital boards, the management practices of

frontline managers and quality of care conveyed. The type of practices looked at were not clear.

The findings show that hospitals with good management practices gave high-quality care. High valued hospital boards made hospital management staff to improve performance. Hospitals board that had a superior commitment to clinical quality influenced management to monitored quality performance. Hospitals boards which employed clinical excellence standards more effectively had a higher performance by management staff on targets setting and operations. It is not clear what the board was using for management practices and how they related to the hospitals' managers to achieve the above result.

Zhu et al. (2018), noted that lack of techniques to enumerate the inter-hospital differences in hospital management practice (HMP) was a bottleneck for study on HMP and quality care. They came up with a rating scale but its focus was on target balance, target setting, target involvement, target management, target expanse, medical setting, layout service, operations management (patient-centered services) clinical pathway, constant quality enhancement, hospital performance assessment department, performance assessment, staff appraisal and sanctions on staff with displeased performance (performance management). Talent management (which include irregular workload, rewarding, staff gratification and attracting abilities. The team did not go out of micromanagement. There is still a need for a meso-management tool for HMP. The tool used in this study was modified from the micromanagement tool developed by (Bloom & Reenen, 2007).

Sheikh (2014), study exemplified how strategic management process has been used by M.P Shah Hospital and how it influenced the performance. The study involved interviewing six managers from different departments. The findings were that MP Shah is an open system that interrelates with its surrounding environment. It's dependent on the external environment for its inputs and outputs (Sheikh, 2014).

Njenga, (2014), studied the influence of management team heterogeneity on performance. The results were that workplace diversity leads to improved decision making, enhanced implementation of customer-related strategies that result in the achievement of strategic targets, enhanced creativity, and innovation.

Njoroge (2015), carried out research on inventory management practices and their associate impact on the performance of Kenyan public hospitals. The study involved level 5 hospitals in Nairobi Kenya. The study concluded that the well-known inventory management practices employed in Nairobi and former Central Counties' public hospitals are enterprise resource planning systems, EOQ, ABC systems, e-procurement, and simulation. Though the results were good, they were focusing on a small area or subsection of hospital compared to the present study. Most of the management practices, from various authors, are more or less micro or specialized and focusing on one or two areas of clinical or other areas. In addition, they never interviewed patients or members of the community. The present study is a meso (hospital-wide) management and starting at the top and ensuring impact trickles down to the services areas. Despite the difference in the approach, results as proved later are comparable.

Kakooza et al. (2015), indicated that good management practices result in improved service delivery, with high levels of efficiency and effectiveness in any organization. However, Bagire & Namada (2015), felt that there was inadequate research that focused specifically on management practices that can function efficiently and effectively in African organizations. Stanley (2002), and Northouse (2018) felt that management research lacks impact on management practices.

Among the management practices studies reviewed, only Kakooza's study came close to the present study. It looked at management from the top managers. Kakooza's study used decision making management process, management structure, management style, communication, management practices and correlated the results of management practices and hospitals performance. The findings showed highest correlation was between communication and performance (64.4%), followed by management style and performance (56.5%), and finally decision making and performance (45.8%). The rest of the variables had a moderate effect. Management composite variable accounted for 76.4% variation. Kakooza's study performance indicators used in his study were not clearly stated. The study mentioned tangible and non-tangible measures of performance. The patients and the community were not involved in the research.

In this study, when the performance indicators were regressed against management practices, the outcome was the contribution of the various management practices towards hospital performance. Seven management practices contributed 13.04% while two contributed 4.34% respectively as follows:

Delegation contributed 13.04% to hospital performance. Empowerment contributed 13.04% to hospital performance. The others were the residence of senior managers in hospitals with 13.04%, daily supervision with 13.04%, effective communication with 13.04%, work plan implementation with 13.04%, work plan with 13.04%, Motivational and inspirations with 4.35% and consultation and consensus building contributed 4.35 % giving a total of 100%.

The researcher has not come across any standard by WHO or Kenyan government guidelines on management practices. However, WHO (2005), stated that Six competencies are required in all levels of a health care system: leadership, communication, resource management, results based management, problem-solving skills, and customer focus. Nor has the researcher come across any study that has utilized activities and tasks that managers use at the hospital-meso level to improve the performance. This study has shown that management specific activities and tasks (management practices executed by the manager) has remarkable improvement on efficiency, quality, volume and outcome.

4.8.2 Effect of Management Practices on Quantity of Health Care Services

With respect to management practices and their effect on quantity of hospital service, table 4.7(see page121) regression results show that the management practices of work plan , work plan implementation, empowerment of staff, effective communication and delegation of work to some staff were statistically and significantly associated with increase of outpatients visits at 99% confidence level for empowerment *(p=.00)*, effective

communication *(p=00),* delegation*(p=.01)* of duties practices and 95% confidence level for work plan (p=.06) and work plan implementation management practices *(p=.07).*

On the other hand, table 4.8 (see page 122) shows that the management practices (work plan, work plan implementation, staff empowerment, effective communication and delegation of duties) were statistically and significantly associated with increase in inpatient admissions at 99% confidence level for delegation *(p=.01*) and effective communication management *practices (p=.00),* at 95% confidence level for staff empowerment management practice *(p=.02)* and 90% confidence level for work plan *(p=.06)* and work plan implementation *(p= .07)* on the same.

Kaspers, Pieters Caron, & Kremer (2013), in their review opined that higher volume hospitals, higher case volume providers, and specialized hospitals are related to the better outcome in pediatric oncology. This review did not report any negative effect of high volume. The better outcomes here relate to surgeons handling high volumes and hence getting experience through practice which implies 'practice makes perfect'. Kadow, Joshi, Kutikov, Handorf, Smaldone, Uzzo, & Geynisman, (2019), report that many studies have indicated a correlation between hospital surgical volume and clinical outcomes. They go on to enumerate reasons why high-volume surgeons and institutions have superior outcomes such as improved technical surgical experience, streamlined perioperative protocols, access to multidisciplinary care, or the availability of new treatment modalities through clinical trials. Though these studies relate to surgery they were more about clinical practice and case management while the current study relate to general treatment of both outpatient and inpatient through application of general hospital

management. In the current study five out of nine management practices had positive effect on volume statistically and significantly.

Goodney, Stukel, Lucas, Finlayson & Birkmeyer (2003), studied hospital volume and resource utilization and found out that it was the nature of the procedures themselves rather than hospital volume that correlated with length of stay or 30-day readmission rate for 14 high-risk surgical operations. Volume was found to be an important predictor of operative mortality, it did not correlate with resource utility as reflected by means of length of stay or readmissions. These authors looked at only a narrow aspect of management (resource utilization) good management as a precondition of proper resource utilization. This study employed management practices for overall utilization of all resources human, equipment, medical supplies, processes and procedures to ensure improved health care services.

Snowden, Cheng, Kontgis, & Caughey (2012), found an inverse correlation between hospital obstetric volume and birth asphyxia. They observed that as asphyxia increased there was a decrease in hospital volume overall and among term, non-low-birth weight infants. Snowden et al. shows that as volumes increased there was mismanagement of labor which resulted into poor outcome (asphyxia) which in turn drove patients away resulting to low volumes. It infers that poor volume can result from poor quality and outcome.

4.8.3 Effect of Management Practices on Quality of Health Care Services

The third objective aimed to establish the connection between hospital management practices and the quality of healthcare services. In quality of services, WHO (2016),

defines quality patient care as the extent to which the healthcare services for an individual increases the chances of desired impact on one's state. The hospital performance indicators used to measure quality of service were caesarian surgery emergency waiting time. This is the time taken for a woman with delivery complications waits to be taken to the theatre from the time emergency caesarian surgery is prescribed. The shorter the time the better in saving the lives of the mother and the baby or either. The other measures of quality of service in hospitals were the reduction of fresh stillbirths, overall satisfaction with outpatients' services and inpatients services. In addition, there was a reduction of under 1 year, under 5 years and maternal mortality rates as shown in tables 4.14 and 4.18 (see pages 130 &139 respectively). The management practices of motivation and inspirations of staff and residence of managers in the hospital were statistically and significantly correlated with the reduction of emergency caesarian surgery waiting time at 99% confidence level.

On overall satisfaction with inpatients services table 4.11 (see page127) the management practice of consultation and consensus building and hospital residence of senior managers exhibited statistically and significantly correlation with increase in overall satisfaction with inpatients services at 99% confidence level for consultation and consensus building and 90% level for the residence of managers in hospitals.

In case of overall satisfaction of patients with outpatients' services, from table 4.12 (see page128).The management practice of daily supervision was statistically and significantly associated with an increase in the overall satisfaction of patients with outpatients' services at a 90% confidence level. On fresh stillbirths, tables 4.16 and 4.20

(see pages 135 & 143 respectively) indicate that the management practice of hospital residence of senior managers was statistically and significantly associated with the reduction of fresh stillbirths at 95% confidence level. The incidence of fresh stillbirths in the study area was 15 per1000 live births, the maternal death rate of 90 per100000 live births and 16% caesarian section rate. Donabedian (2012), on quality assurance analysis study in two district hospitals in Tanzania, found that hospital A and B reported 13 maternal deaths out of 3054 deliveries (426 maternal deaths per 100,000 live births and a perinatal death rate (fresh stillbirths) of 74 deaths per 1000 births and 1 maternal death out of 1072 deliveries (93 maternal deaths per 100,000 live births) and 45 perinatal deaths (fresh stillbirths) per 1000 births respectively. They had caesarean section rate exceeding 20% in both facilities. This study had better results compared to those reported by Donabedian (2012).

On hospital efficiency, tables 4.15 and 4.16, (see pages 132 & 135 respectively) the management practice was daily supervision was statistically and significantly associated with an increase in hospital efficiency by 1.4% above the hospitals which do not practice daily supervision. This is at a 99% confidence level. The positive sign associated with daily supervision is what is expected in theory and literature.

From table 4.14 (see page 130) the management practice of consultation and consensus building, hospital residence of senior managers and daily supervision were associated with a reduction of under 1 years' mortality rate but not statistically significance. Table 4.20 (see page 143) shows that the management practice of daily supervision was statistically and significantly associated with a reduction in under 1-year death rate at

95% confidence level. In addition, effective communication, delegation of duties and daily supervision were associated with a reduction of under one-year mortality rate but not statistically significant.

On Table 4.20 (see page 143) the management practices of empowerment of staff, effective communication, delegation, and daily supervision were associated with a reduction of maternal mortality rate but are not statistically significant. The negative sign associated with the coefficient of these management practices is expected in theory and literature. On quality issues matters touching on life and death (e.g. fresh still births, emergency C-S) the slightest improvement is very important and is worth noting.

Institute of Medicine (IOM), defines quality in healthcare as having safety, effectiveness, patient-centered, timeliness, equitable and efficient Parand et al. (2014). They defined the safety of patients as the act preventing any harm from befall them. (Parand et al., 2014). Managers in healthcare have the responsibility in ensuring high-quality patient care hence striving in improving care. In addition, health care managers play a key part to ensure proper care and patient security. Security is among the highest priority of healthcare managers (Parand et al., 2014). It is for this reason that hospital managers should have management practices that work and produces high-quality results. The present study has identified these practices which can be simplified into hospitals management guidelines for every hospital manager particularly for Africa and other developing countries.

Death rate within 30 days of hospital admission for a heart attack is utilized as a measure of quality care (Dlugacz, 2017). World Health Organization states that the following measures are used to gauge health performance per country globally, life expectancy at

birth overall years, death rate per 1000 live births, infant mortality, gross domestic product, gross domestic product per type of health systems.

From the results of both fresh stillbirths and total live births indicated that specific management practices that had a negative effect on fresh stillbirths and all those that had positive effect on total live births were indicators of better labor management with improved clinical outcome, that is, reduction in the number of fresh stillbirths and increase in the number of total live births. This translates to the reduction in neonatal mortality and infant mortality in the hospitals which leads to good health indicators in the community hence it impacts on maternal, neonatal and child health and also on life expectancy at birth. This implies that timely intervention is critical in service delivery and community uptake of health care services (Dlugacz, 2017).

Intrapartum-related neonatal deaths account for 10% of deaths to children aged less than 5 years globally. Intrapartum deaths are huge and indiscernible but potentially preventable as they are mainly a result of mismanagement of labor (Treadwell et al., 2015). Treadwell et al. asserts that programmatic focus and improved information are needed. Programmatic attention was applied to the helping babies breathe program in Tanzania that was related with a sustained 47% decline in early neonatal mortality within 24 hours and a 24% decline in fresh stillbirths after 2 years (WHO, 2000). In this study management practice of residence of managers in the hospital compound was associated with reduction of fresh still births by 6.9% (t= -2.02) at 95% confidence level. This shows that the current study results are in tandem with WHO 2000 case above though at low level. Management practice of hospital residence indicates can be used to improve quality

of services and outcomes. On total live births the following specific management practices increased by 0.56% (t= 2.05) work plan; 0.06% (t= 2.04) work plan implementation; 0.76% (t=2.79) staff empowerment; 1.39 % (t= 3.47) effective communication; 0.89% (t= 3.17) delegation, 1.39% (t=3.47) and 2.57% (t=4.08) management index. The reduction in fresh stillbirths translates to an increase in total live births, reduction of neonatal, less than five-year mortality rates and increases life expectancy at birth. This is a clear indicator that hospitals that employ best management practices have better outcomes for both the patients and the hospitals.

Results from tables 4.11 and 4.12 (see pages 127 & 128 respectively) show that good management practices had an effect on the overall satisfaction of both inpatient and outpatient services implying that good management is a pre-condition of health services provision and uptake in hospitals as they are good pointers of hospital image and quality of services provided. These results compare well with what Treadwell et al. (2015), found that is, patient satisfaction with care improves at well-managed hospitals. In United Kingdom hospitals, where patient satisfaction rating associated with management scores (WHO, 2000), compares well with this study where log management index in both cases of inpatient and outpatient overall satisfaction exhibited remarkable positive association 0.25 (t=1.68) and 0.31 (t=1.89) respectively. The other management aspect that had a remarkable positive implication on both inpatient and outpatient overall satisfaction was the residence of managers in the hospital compound by 0.0082 (t= 1.76) and 0.0046 (t=1.27) respectively. Although the results of log management index, the residence of managers in the hospital compound, effective communication, daily supervision, motivation, and inspiration did not have statistical significance on overall patient

satisfaction on both inpatient and outpatient services, they were indicative of important effects and direction of hospital performance. They suggested that specific management practices had an effect on the way hospital affairs are conducted and on hospital outcome. Hospital precise management practices were intensely associated with a hospital's quality of patient care and productivity results. The results pointed out that upgraded management practices in hospitals were connected with highly reduced mortality rates (Marcinko & Hetico, 2013).

Overall satisfaction in both inpatient and outpatient services is perception issue and any improvement is important to all stakeholders: patients, managers, caregivers, policymakers and the general public. It was revealed that the perception about the quality of service and the patient's willingness to recommend the hospital to others were positively and significantly related (Gannon, 2005). Likewise, when asked whether they would come back to the hospital if need be, 97% outpatient and 95% inpatient interviewed accepted that they would come back. This implies that there is a high likelihood of these recommending others to seek services in the same hospitals.

The qualitative results on the overall satisfaction of both inpatient and outpatient services suggest that any incremental improvement in healthcare is welcome as it means forestalling death or health deterioration of the patients. A good example is a reduction in the emergency waiting time for caesarian surgery even if by a slight fraction may result in saving both the life of the mother and child, avoidance/reduction of health complications for both mother and child. It also results in increasing total live births, life expectancy at birth, and reduction in fresh stillbirths, neonatal and infant mortality. In

table 4.13 (see page 129) some management practices such as consultation and consensus building (-0.413, t= -1.14) and motivation (-.210, t= -0.64) exhibits insignificant statistical correlation with fresh stillbirths. However, good overall satisfaction with both inpatient and outpatient services suggest that such slight improvements mean a lot (as it is a quality issue) as they seem to feed into general overall satisfaction with patients giving positive and favorable responses as to whether they would come back to the hospital if need arose or recommend others to seek medical attention in these hospitals.

The qualitative results from both focus group discussions and key informants does not only support but also augment the quantitative results because any slight incremental improvement in healthcare is welcome as they also suggest at forestalling death or health deterioration of the patients. For example, focus group discussions reported that hospitals were serving the community well, had good levels of cleanliness and staff attitude was good. Implying that hospitals were well managed. However, they also pointed out areas that required attention. These were: a shortage of drugs in hospitals. This implies that patients would not receive clinical intervention timely and their case may deteriorate, get complicated and may even lead to death. The same case may be said for high ambulance charges.

4.8.4 Effect of Management Practices on Hospital Efficiency

Farrell described technical efficiency as the ratio of a firm's actual output to the potential output on the frontier given observed factor utilization or the optimum possible output from a certain quantity of inputs. In other words technical efficiency is the ability of a

firm to produce the optimum output for a given set of inputs (Moshiri, Aljunid, Amin, Dahlui, & Ibrahim, 2011).

In this study, efficiency for twenty-five hospitals in the study area was estimated. Variables in table 4.5 (see page 119) were used as inputs total beds, doctors and nurses while variables in table 4.6 (see page 120) total outpatients and total inpatients as outputs. DEA method was used and results on table 4.16 (see page 135) were generated. During data analysis, hospitals were categorized by bed capacity. Large: 200-400, medium: 100-199 and small: less than 100 beds. Efficiency in health care setup can be taken to mean the maximum use of inputs at a lower cost, implying avoiding or reducing waste of valuable economic resources as a result of under-utilization and misuse of resources provided (labor, capital, and supplies) to provide maximum health services to individual clients and community served. In the production of health care, hospitals should act efficiently in terms of utilizing minimum inputs to produce maximum output possible.

The results indicate the average efficiency scores for CRS, VRS, and SE for the large hospitals 0.57 (57%), 0.78 (78%), and 0.77 (77%) respectively; medium hospitals 0.66 (66%), 0.83 (83%) and 0.81(81%) respectively; and small hospitals 0.74 (74%), 0.91 (91%) and 0.80 (80%) respectively. Five hospitals (20%) had technical efficiency score between 83.8 % and 98.1%, 3(12%) had technical efficiency score between 66.4 and 73.2% and 4(16%) a score between 42.3% and 52.6%. The inefficient hospitals in this study had an average technical efficiency score of seventy percent and a standard deviation of 18%. This denotes that on average the hospitals would reduce the utilization of all inputs by 30% without reducing outputs.

On the other hand, out of 25 hospitals studied, 5(20%) had scale efficiency score between 33.5% and 58.7%, 2(8%) a score between 60.3% and 60.6%, 4(16%) had a score ranging from 71.0% to 79.4%, 2(8%) a score between 83.9% and 87.1%, 7(28%) had a score between 90.9% and 98% and 5(20%) had 100% scores. Eighty percent of hospitals were scaled inefficient, implying that the scale efficiency score was less than one (1). Average scale efficiency score for inefficient hospitals in this study was 75% having a standard deviation of 21% indicating that there was room to increase total output by 25% without increasing the inputs. This conforms Banker, Cooper, Seiford, Robert, Thrall, & Zhu (2004), findings where returns to scale was shown to have an unambiguous meaning in cases when DMU is on the efficiency frontier since tradeoff between inputs and outputs needed to improve efficiency only occurs at that level. What happens at constant return to scale is that all outputs and all inputs are increasing (or decreasing) at the same rate so no mix change are involved in the inputs.

In the last column of table 4.15 (see page 132) the hospitals with CRS (constant return to scale) mean that they were operating on the most productive scale size (100%). Those with DRS (decreasing return to scale) mean that they had excess resources and needed to reduce both inputs and outputs proportionately to function highest productive scale sizes. Finally, those with IRS (increasing return to scale) mean that they had less resource and required increasing both inputs and outputs proportionately so as to operate utmost productive scale sizes. This study's goals were: to measure individual hospitals technical efficiency with a view of identifying those working efficiently and those which were not, propose how to improve those inefficient to catch up with efficient ones while

encouraging those efficient to keep up and create the spirit of healthy competition on maintaining efficiency and quality of health care service delivery in their operations.

This study compared well with Zere (2000), which found that the technical efficiency of small hospitals 74%, medium size 68% and the largest size 70%, a trend which is also similar to the findings in this study where technical efficiency score was 91% for small, 83% for the medium size and 78% for the largest hospitals. The outcome further in the Zere study, however, differed as they indicated that small and large hospitals scored highly while middle ones performed poorly. This gave them a U–picture while in this study the small and middle hospitals performed better than the large hospitals giving it a down-hill picture. Kiambu hospital however, with a bed capacity of 383 beds (the largest in central Kenya) had technical efficiency score of 100% and scale efficiency of 87.1%, Nyeri hospital with 366 beds and second largest had technical efficiency of 100% and scale efficiency of 47.9%, Thika hospital with 279 beds had technical efficiency of 100% and scale efficiency of 56.9% and Kerugoya with 264 beds had technical efficiency of 98.1% and scale efficiency of 75.9%. These were good efficiency scores for these large hospitals.

This study compared well with the study done by Osei et al. (2005). In this study, 13(52%) of 25 hospitals were technically efficient and 12(48%) were technically inefficient. Osei et al. (2005) found that out of 17 hospitals in Ghana, 9(53%) were technically efficient while the remaining 8 (47%) were technically inefficient.

Zere, Mbeeli, Shangula, Mandlhate, Mutirua, & Tjivambi (2006), stated that in DEA the frontier against which TE is measured and dictated by those hospitals in that group that

scores a technical efficiency score of 100%. Kirigia, Emrouznejad & Sambo (2002), studied technical and scale efficiencies in 54 district hospitals in Kenya using input oriented VRS DEA and found that out of 54 hospitals 40(74%) were technically efficient while 14(26%) were technically inefficient. Kirigia et al. (2004), also studied technical and scale efficiency of 32 health centers in Kenya and found that 14(44%) were technically efficient while 18(56%) were technically inefficient. On the other hand, 19(59%) scaled inefficient. Kirigia et al. (2000), revealed that on average the scale efficiency score of hospitals in Kwazulu-Natal Province of South Africa was 95.3%.

Tlotlego et al. (2010), carried out the technical efficiency analysis among a sample of 23 zonal hospitals in the Republic of Benin over a period of five years, between 2003 to 2007. The yearly result showed that 87%, 87%, 61%, 52% and 35% of the hospitals were run inefficiently in from 2003 to 2007 respectively; and they required to either decrease their inputs or increase their outputs in order to be on the best frontier. This research found average variable returns to scale (VRS) technical efficiency scores were 63%, 64%, 78%, 78%, and 86% respectively in the period under review. The under-utilization of health services was noted and associated to a high user fee.

Wamai (2009), in their study conducted to investigate how various factors affect technical efficiency as well as productivity in county hospitals during the reformation period, involving 114 sample of hospitals at the county level in Henan province, China, from 2010 to 2012. Their result demonstrated that from the year 2010 to year 2012, 98.2%, 98.2% and 91.2% of the 114 sample hospitals ran inefficiently respectively, with an average technical efficiency score of 0.697, 0.748 and 0.790, respectively. During 2010–

2012, the productivity of sampled county hospitals increased by 7.8% following improvement of technical efficiency by 0.9% and 6.8%, respectively. However, Tobit regression analysis showed that government subsidy, hospital size with above 618 beds and an average length of stay reduced technical efficiency (Lasso, !986). Hospitals producing on the efficient frontier are used to describe the best practice and thus also used as role models and benchmark for comparison for technical inefficient hospitals in the same category.

The present study compares well with other studies quoted. This study used total out-patient and total in-patients for outputs and total doctors, nurses, and beds as inputs in calculating the technical efficiency. The presence of inefficiencies exhibits that hospitals that has excess inputs or insufficient outputs compared to those hospitals on the efficient frontier of 100%.

A lot of hospital efficiency studies have been conducted worldwide. Most of these studies attempted to compare the efficiency of hospitals in the same geographical, economic and social settings while others compared hospital efficiency in different continents and countries with different geographical, economic and social settings. Unfortunately, recommendations have been the same that is to reduce excess inputs and redistribute to facilities with less or increase outputs. (Examples of such studies include (Majusi, Zere & Puig-Junoy (2016), study recommend that policymakers should try and understand the mechanisms enabling uptake of hospitals services, by looking at how to improve low efficient hospitals and taking into consideration the environment in which they operate in order to assist them to better their services, Tlotlego, Nonvignon, Sambo, Zere, & Kirigia

(2010), pointed out at increasing outpatient visits by (18%) and inpatient days by (13%) in order for inefficient facilities to operate at an efficient frontier. Tlotlego et al. also recommended the transfer of clinical staff and hospital beds to other facilities as the other option of improving their efficiency. None of these studies have pointed out at management and specific management practice(s) that can help improve efficiency. This study found out that management is central to improving hospital efficiency. Daily hospital supervision has a direct effect at improving hospital efficiency as it improved efficiency score by 1.4% compared to hospitals that do not practice daily supervision at a 99% confidence level. It also affects efficiency indirectly through the reduction of under one-year mortality rate at 95% confidence level, and overall patient satisfaction with outpatient services at 90% confidence level. Other management practices also affect hospital efficiency though indirectly.

Table 4.16 (see page 135) shows Tobit regression results for CRS, VRS, and SCALE efficiency equations, where efficiency levels were regressed against their determinants. The table displays a lot of information on how hospital efficiencies were affected by a variety of factors. The first result that is likely to raise controversy among hospital administrators is that the coefficient of a hospital manager's residence within the hospital or its immediate vicinity was negatively and statistically associated with the levels of VRS and CRS efficiencies scores (p-value =.009 and .040 at 99% and 95% confidence level respectively). However, the result is part of a broad spectrum of the determinants of hospital efficiency. In particular, in the hospitals where senior managers, usually doctors and nurses reside, the hospitals offer quality services, from the perspective of the patients. One particular aspect of quality in such hospitals is a quick response to patients' needs.

Thus, it is not uncommon to see a high influx of both in- and out-patients at such hospitals, but the high volume of patients is not matched with additional staff or medical supplies. If the hospital reaches maximum output for the given input the manager ought to mobilize for more resources so as to maintain the same level of output. Thus such hospitals end up being congested, an outcome that can reduce morale of staff, including that of management where residence within the hospital was significantly and statistically associated with reduction of emergency waiting time for caesarian section and reduction in fresh stillbirths while (tables 4.10 and 4.13 on page 126 & 129 respectively) were associated with increase of both inpatients and outpatients' services satisfaction respectively. The negative sign for the residence variable arises from the fact that hospital residence is positively associated with factors which undermine efficiencies, such as hospital congestion and staff fatigue.

In Kenyan public hospitals, if no daily ward round or daily patients review by senior doctors or other delegated senior staff, this leads to delayed diagnosis, investigation, the start of the right medication, delayed recovery hence long average length of hospital stay, complications or death. The complications make patients stay longer which brings hospital congestion. This is common in hospitals where the top managers are not committed with their management responsibility and this trickles down to the service delivery units. Jones (2016), studied the average length of stay in hospitals in the USA. The study sought to find out the causes of the different average length of stay in the hospitals. He found out that US hospitals had a short average length of stay (4.6 days) because most of the hospitals are small with a bed capacity of less than 200. And there exist the pressure to maximize profit in a healthcare system which cannot achieve

economies of scale for its acute providers. The need to reduce health services cost is another cause of reducing the length of stay. However, Marcinko & Hetico (2013) discovered factors causing the long average length of stay in the US which include; non-medical factors, mainly inadequate nursing homes which account for 30% of long-stay days; ability to discharge a patient is a key factor in overall length of stay (LOS) (Becker, Shortell, & Neuhauser, 1980) and destination in which patiently are discharged ultimately was commonly recognized as a key determinant of length of stay; availability of supportive infrastructures such as hospice care, step-down community facilities, nursing homes. GPs per weighted head of population and social care funding all play a role in delivering lower acute length of stay (Becker, Shortell, & Neuhauser, 1980). When Jones compared US LOS with that of UK, he found out that the average LOS for English Primary Care Trusts (PCTs) in 2011/2012 was ranging from 4 to 7 days. PCT is similar to Primary Care Organization (PCO) in US or Primary Health Organization (PHO) in New Zealand.

There is a common perception that the free market nature of their economy in the USA contributes to higher efficiency. However, lower average length of stay in hospitals in is shown to decline in proportion to the number of beds available per hospital. Jones (2016), found a vicious cycle of lower length of stay and high re-admission, therefore, ensures small hospitals attempt to maximize profit. While lower LOS may be taken as efficiency by some, readmission is seen as a lack of proper diagnosis or incomplete treatment (American Society of Anesthesiologist)

Lasso (1986), in their study on the hospital performance evaluation found that small hospitals (those with less than 100 beds) tend to have the lowest bed occupancy rates and the shortest average stays in both 1977 and 1980; middle-size institutions (with 100-199 beds) tend to have intermediate bed occupancy rates and average stays; and large hospitals (with 200 beds or more) tend to have the highest bed occupancy rates and longest average stays. Going by the current study where the long average length of hospital stay correlates with inefficiency, the small hospitals, in this case, will be the most efficient followed by medium and then large hospitals.

Issues that reduce technical efficiency of hospitals include government subsidy, hospital size (large) and average length of stay, medical insurance reforms while the ratio of beds to nursing, ratio of nurses to doctors and bed occupancy rate, type of practice, and ownership of hospitals increased technical efficiency (Wamai, 2009; Lega, Anna, & Peter, 2013).

4.8.5 Effect of Management Practices on Hospital Outputs and Health Outcomes

These health outcomes may either be measured in terms of intermediate outputs such as number of patients treated, patient-days, waiting time and among others or final health impact low mortality rates, longer life expectancy, to mention but few (Palmer, 1908). In this study the following health outputs and outcome indicators used were total live births, fresh still births, infant mortality rate, the hospital based under five mortality rate, maternal mortality rate, and client satisfaction with hospital services.

The hospital performance indicators for health outcome identified in this study were the overall satisfaction of both inpatient services and outpatient, fresh stillbirths under one

year mortality rate and total live births. The first four are also appearing in objective three. Their results are already sited there as table 4.11 (see page 127) for overall satisfaction with inpatients services, table 4.12 (see page 128) for overall satisfaction with outpatient services, table 4.13 (see page 129) for fresh stillbirths and table 4.14(see page 130) for under one year mortality rate. On overall satisfaction with outpatient services, table 4.12 (see page 128) show that management practice of daily supervision *(p=.07)* was statistically and significantly associated with improvement of overall satisfaction with outpatient services at 90% confidence level. On fresh stillbirths, table 4.13 indicate that the management practice of hospital residence of senior managers in hospitals *(p=.05)* was statistically and significantly associated with the reduction of fresh stillbirths at 95% confidence level. Under 1-year mortality rate table 4.14 shows that only daily supervision practice *(p=.036)* which was statistically and significantly associated with a reduction of under 1 year mortality rate at 95% confidence level. On total live births, table 4.18 (see page 139) shows that the management practices of work plan, work plan implementation, staff empowerment, effective communication, and delegation were statistically and significantly associated with increase in total live births at 99% confidence level for staff empowerment *(p=.01),* effective communication *(p=.00*) and delegation *(p=.00)* and 95% confidence level for work plan *(p=.04)* and work plan *(p=.05)* implementation. Maternal death rate. Table 4.17 (see page 136) shows that management practices that is empowerment, effective communication, delegation, daily supervision were associated with a reduction in maternal death rate but not statistically significant. However, in matters of life and death even the slightest improvement in the right direction matters and

need to be noted. The results in this section showed that the management practices improved hospital performance.

Morche, Mathes, & Pieper (2016), conducted study on surgeon volume and outcomes and found positive connection between volume and outcome for most conditions or procedures. The authors proposed that the study can be used as a basis for gauging minimum volume thresholds of surgeries performed by single surgeons. Volume of outputs and outcomes in hospital is an important element of measuring performance because of the invested resources as inputs. These include overheads (infrastructure: buildings, beds, equipment, electricity, and water), human resources (doctors, nurses, clinical officers, laboratory technologists, pharmacists and health records officers) and medical supplies. Time is also crucial input resource because when patients are attended to timely or promptly it helps avert complications and even death.

Iversen, Bjertnæs & Skudal (2014), reported both positive and negative patients' perception of outputs. On the positive the patients reported friendly staff, shorter waiting time, cleanliness and good food quality. Other patients were reported as having commented on poor sanitation, poor assessment by doctors, delays in examination and treatment. This study compares well in some of the aspects dealt in by the current study. These parameters employed by Iversen et al. (2014) were part of the items used in assessing overall satisfaction with both OPD and IPD services, waiting time for both emergency caesarian section and outpatient department. However, Iversen's et al. study was not as comprehensive as the current study.

Specialization of doctors is also a critical success factor in treatment of patients and outcomes. This is because specialists do not only have unique knowledge about the conditions being treated but also have accumulated experience which enable them to make correct diagnosis and prescription the right treatment hence resulting into better outcomes. Epstein & Salinas (2002), reported better outcomes in specialist cancer centers because well trained surgeons can produce good outcome in surgery. They cite a study of breast cancer conducted in the United Kingdom that indicated that risk of inadequate treatment of the breast cancer among patients treated by specialists was half that of patients treated in non-specialist units (24% vs 47%, $P<0.001$), where inadequate treatment' was defined as treatments where breast-conserving surgery was performed for tumors larger than 30 mm, or if resection margins were positive, or if radiotherapy was omitted. This clearly shows that specialization of surgeons was a critical success factor in treatment and recovery of breast cancer patients.

On the qualitative part of the study, the results from focus group discussions showed that there was a general consensus that hospitals served the community well. Majority of the focus group discussions unanimously agreed that the shortage of drugs was evident with patients being sent to buy them from private pharmacies. The study results concur with Lunkes, Naranjo-Gil, & Lopez-Valeiras (2018), that drug shortage was evident and patients were sent to buy them from the private hospitals. Ambulance charges were also high. They also reported that staff was generally warm and welcoming, hospital cleanliness was good and the food served was well prepared. Despite the positive responses from the focus group discussions they also indicated some areas that hospitals needed to improve on. Such areas included: a shortage of drugs supplies, high ambulance

charges, some hospitals had high bed charges while other hospitals had high consultation fee. These factors reduce the effectiveness of good management practices.

The results from key informants showed that the majority of hospitals in the study had annual work plans for hospital, departments, sections, and units that were implemented on a quarterly basis. They also reported that there was daily unit supervision, fortnight departmental supervision and monthly management supervision. The key informants also confirmed understanding of how the hospital affairs were conducted.

4.9 Effects of Management Practices on Hospital Performance Indicators

Table 4.21: Summary of effects of management practices on hospitals performance indicators.

NO	MANAGEMENT PRACTICES	EFFECTS ON HOSPITAL PERFORMANCE (*P*-VALUES)
1	Daily supervision	-Increased efficiency score by 1.4% ***(0.001) table 4.15 page 132 -Decreased under1year mortality rate by 43% ** (0.005) table 4.14 page130 -Increased overall satisfaction with OPD services by 9%*(0.100) table 4.12 page 128
2	Residence of Managers in hospital compounds	-Decreased emergency waiting time for caesarian surgeries by 62% *** (0.001) table 4.10 page 126. -Decreased fresh still births by 6.9% **(0.005) table 4.13 page 129 -Increased overall satisfaction with IPD services by 0.8% *(0.100) table 4.11 page 127
3	Motivation and inspiration	-Decreased emergency waiting time for caesarian surgeries by 62% *** (0.000) table 4.10 page 126
4	Consultation and consensus building	-Increased overall satisfaction with IPD services by 13%***(0.001) table 4.11 page 127
5	Effective communication	-Increased total admissions by 133% ***(0.001) table 4.8 page 122 -Increased total live births by 139% ***(0.001) table 4.19 page 140 -Increased total OPD visits by 118.3% (0.001) table 4.7 page 121
6	Delegation	-Increased total OPD visits by 73% ***(0.001) table 4.7 page 121 -Increased total admission by 81% ***(0.001) table 4.8 page 122 -Increased total live births by 89% ***(0.001) table 4.19 page 140
7	Empowerment	-Increased total OPD visits by 70% ***(0.001) table 4.7 page 121 -Increased total admission by 72%**(0.005) table 4.8 page 122 -Increased total live births by 76% ***(0.001) table 4.19 page 140
8	Work plan preparation	-Increased total OPD visits by 49% ***(0.001) table 4.7 page 121 -Increased total admissions by 58%*(0.100) table 4.8 page 122 -Increased total live births by 56%**(0.005) table 4.19 page 140
9	Work plan implementation	-Increased total OPD visits by 5.2% **(0.005) table 4.7 page 121 -Increased total admissions by 56%*(0.100) table 4.8 page 122 -Increased total live births by 6% **(0.005) table 4.19 page 140

***, **, * = Statistically significant at .001, .005, .100, respectively

Source: Author.

Table 4.21 above shows a summary of effects of management practices on hospital performance indicators by order of merit. Daily supervision increased efficiency, reduced under one-year mortality, and increased overall satisfaction with OPD services. Other management practices were interpreted similarly.

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND POLICY IMPLICATIONS

5.1 Introduction

This chapters presents the main findings drawn from the research and the recommendations derived from the results of the analysis undertaken.

5.2 Conclusions

The main conclusions of the study are as follows:

5.2.1 Management Practices Used in Public Hospitals

This study found that eleven management practices are being practiced in Kenyan hospitals. These include staff supervision, effective communication of essential information, good working relationship with other staff, consultative and consensus building among staff, delegation of duties but with follow up support, empowerment of staff at lower levels of management, promotion of motivation and inspiration among staff, preparation of work plans, work plans implementation, use of check-lists as performance monitoring tools and encouragement of residence of senior managers within the hospital compound. The study also found that out of eleven management practices, nine had positive and significant effects on hospital performance indicators. The study concludes that the two most influential management practices with respect to hospital performance variations were daily supervision of staff and residence of senior managers within

hospital compounds. The data rejected the null hypothesis $H0_1$ that hospital management practices have no effect on hospital performance.

5.2.2. Management Practices and Health Care Service Provision

The study analysis shows that work plan preparation, work plan implementation, empowerment of staff, effective communication of information and delegation of duties are strongly and positively correlated with increases in outpatient visits and inpatient admissions. The evidence from our analysis rejected the null hypothesis $H0_2$ that hospital management practices have no effect on the quantity of healthcare services offered by hospitals.

5.2.3. Management Practices and Health Care Quality

The hospital performance indicators used to measure quality of services were outcomes of caesarean surgery emergency waiting time, reductions in fresh stillbirths, patients' overall satisfaction with services, and reductions in under one year mortality rate. From the study results it was concluded that consultations and consensus building among staff, and hospital-based residence of senior managers were statistically and significantly correlated with increases in overall satisfaction with inpatient services. It also found out daily supervision was statistically and significantly associated with an increase in the overall satisfaction of patients with outpatient services. This research concludes hospital-based residence of senior managers substantially reduces fresh stillbirths. Further, the results from this study reveal daily supervision of staff led to reduction of under one year mortality rate by a large margin. We are able to conclude that the commonly used management practices had remarkable positive effects on quality of hospital services and

to confidently reject the null hypothesis$H0_3$ that hospital management practices have no effect on quality of care.

5.2.4. Management Practices and Hospital Efficiency

From the study results, it is concluded that daily supervision increased efficiency. The hospitals which practiced daily supervision had 1.4% efficiency score higher than those hospitals which did not supervise. Considering that all organizations struggle to become efficient, this finding gives daily supervision an important edge over management practices as to what should be done to improve hospital efficiency in the public health sector. The study results rejected null hypotheses $H0_4$ that management practices have no effect on hospital efficiency.

5.2.5. Management Practices and Health Outcomes

The study concludes that availability of work plan, work plan implementation, empowerment of staff, culture of effective communication, and delegation of duties are key to increasing the number live births in hospitals. In order to increase overall satisfaction with inpatient and outpatient services, and to reduce the number of fresh stillbirths as well as under one-year mortality rate, it is recommended that *all* public hospitals adopt the management practices documented in this study. This recommendation finds cognizance with a study conducted by Bloom, Lemos, Sadun, & Van Reenen (2020) who concluded that supply of managerial capital improves hospital productivity. The study results rejected the null hypotheses $H0_5$ that management practices have no effect on hospital outcomes.

5.3 Recommendations

This study recommends that healthcare management in Kenya adopts and utilizes the score card for measuring health professionals' management practice effort. This tool can be modified and used by government to monitor performance in all health facilities. The study recommends that the hospital performance dashboard developed in this thesis be adopted and used at the national and county levels to monitor efficiency levels in public and private hospitals (annex 16 - see page 237).

This study also recommends that healthcare at the national, county and sub-county and facility levels be encouraged to apply the management practices documented in the thesis. It is recommended that the government should come up with policies that ensure that the three top hospital managers, such as the medical superintendent, the nursing officer-in-charge, and the hospital administrator be housed and reside within the hospital compound.

There should be continuous sensitization and training of hospital managers and prospective managers on various management practices that have been shown to improve efficiency and to save lives. This recommendation is in line with what Feng & Valero (2020) found that there exists complementarity between productivity enhancing management practices and human capital formation. The training of senior doctors, nursing officers in charge and hospital administrators on effective management practices will help improve efficiency in public hospitals. The training can be in the form of seminars, workshops, and continuous medical education. Further research is recommended to find out specific mechanisms through which good management practices improve hospital performance in public and private sectors.

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ANNEXES

Annex 1 Hospital Managers' Questionnaire

Section 1: Facility Information

Serial Number…….…….. Hospital Name……

District……..Date of Interview…….....

Interviewer's Name ……

Section 2: Manager's General Information (Tick appropriately where applicable)

2.1 Title of Manager (Tick appropriately)

- ☐ Medical Superintendent
- ☐ Hospital Administrator
- ☐ Nursing Officer In charge
- ☐ Others (Specify)……..

2.2 Manager's profession (Tick appropriately)

- ☐ Medical doctor
- ☐ Dentist
- ☐ Nursing officer
- ☐ Pharmacist
- ☐ Hospital administrator
- ☐ Others (specify) ……...……

2.3. Gender: Male ☐ Female ☐

2.4. Your marital status:

Married ☐ Single ☐ Widowed/separated ☐

2.5. In what range does your age fall? (Tick appropriately)

20-30 ☐ 31-40 ☐ 41-50 ☐ 51-60 ☐ >60 ☐

2.6. Do you reside within the Hospital? (Tick appropriately)

Yes ☐ ☐

2.7.If NO, what is the distance of your residence from the hospital (Kms)…..…….

2.8. Number of years in public service……...……

2.9. What's your job group? ……..…

Section 3: Management Processes (Tick appropriately where applicable)

3.1. Are you trained in management? (Tick appropriately)

Yes ☐ No ☐

3.2. If YES, please indicate how long ……..

3.3. In which country were you trained in? (Tick appropriately)

In Kenya ☐ Outside Kenya ☐

3.4. What area (s) were you trained in (for the management course) - Tick appropriately

Area	**Tick**
Budgeting and financing	
Human Resource management	
Planning	
Monitoring and evaluation	
Others (Specify below)	

3.5. Do you carry out regular Management Supervision? (Tick appropriately)

Yes ☐ No ☐

3.6. If YES, what is the frequency? (Tick appropriately)

Daily ☐ Weekly ☐ Monthly ☐

3.7. Do you have hospital inspection tool? - Tick appropriately (Provide sample)

Yes ☐ No ☐

3.8. Do you have reports of implemented work plans -Tick appropriately (provide sample)

Yes ☐ No ☐

3.9. What is your management practice? Describe

……..……..……

……

……

4.0. Based on No. 3.9 above, how frequently do you apply the following management style? (Tick appropriately)

Management practice	**Always**	**Often**	**Once in a while**	**Never**
Delegation with follow up				
Delegation without follow up				
Empowering others				
Good Communication of information				
Consultative and consensus building				
Good working relationship with colleagues and staff				
Motivates and inspire				
Management applies 'do as I say style'				
'Has no control'				

4.1. Have you received any recognition/benefit related to your management/leadership efforts from Headquarters, Provincial office or Hospital committees?

Yes ☐ No ☐

4.2. If YES above, what kind of recognition did you receive? Describe.

……

4.3. Do you receive support from your seniors in your work as a manager?

Yes ☐ No ☐

4.4. If YES above, what kind of support do you receive?

…….

4.5. What challenges are you facing in managing this facility?

…….

4.6. Do you receive budgetary allocation as per the estimates?

Yes ☐ No ☐

4.7. What were your estimates in the last financial year 2011/2012? Record in figures

……

4.8. How much was allocated? Record in figures (Provide sample)

..……...……

Annex 2 Data from Hospital Records

Serial Number…… Date of Interview……..……

Name of the hospital…….……. Hospital Code…….

District……

Name of the Interviewer ……

	Data Item (July 2011 – June 2012)	**Unit of Measure**	**Answer**
	Data on inputs		
1	Hospital total number of beds?	No.	
2	Average hospital bed occupancy?	%	
3	What is the total number of staff in this hospital? (Both technical and support staff)	No.	
4	The total number of Doctors	No.	
5	The total number of Nurses	No.	
6	What is the total FIF collection?	Kshs	
7	What is the proportion of FIF banked?	%	
8	What is the percentage FIF expenditure?	%	
9	What proportion of FIF collection was spent on:	%	
	Commodities		
	Infrastructure		
	Equipment		
	Salaries		
	Management (board meetings, teas, allowances etc)		
	Utilities- water, electricity fuel		
	Food and ration		
	Others (Please specify)		
10	What is the total labor cost for the hospital for the year 2011/2012?	Kshs	

11	What is the total capital expenditure for the year?	Kshs	
12	Number of days without tracer drugs for the last one month	No.	
	Data on outputs, outcomes and impacts		
13	What is the total number of outpatients' attendance?	No.	
14	What is the total number of inpatients?	No.	
15	What is the total number of surgical cases operated?	No.	
16	What is the hospital occupied bed day? (Inpatient days)	No	
17	What is the total number of discharges?	No.	
18	What is the total number of deaths that occurred in the hospital?	No.	
19	What is the average emergency waiting time at the outpatient?	Min	
20	What is the average emergency waiting time for an emergency CS(Time between diagnosis and operation)	Min	
21	What is the total number of deliveries conducted in the facility?	No.	
22	What is the total number of fresh stillbirths occurring in the hospital?	No.	
23	What is the Total number of live births in the facility?	No.	
24	What is the total number of deaths of < 1 year of age that occurred in the hospital?	No.	
25	What is the total number of the <5 years admitted in the hospital?	No.	
26	What is the total number of deaths of children <5 years of age that occurred in the hospital?	No.	
27	What is the total number of maternal deaths that occurred in the hospital?	No.	

Annex 3 Clients Questionnaire, In-Patients

Serial Number……District…….……..…

Name of the hospital……..Department…….…...

Name of the Interviewee (Optional)…….……

1. **General Patient/Guardian Information**

(Tick appropriately where applicable)

Only interview patients/guardians above 18 years old. For child patients, interview parent or guardian.

1.1. Age in years? (Tick appropriately)

18-30 ☐

31-40 ☐

41-50 ☐

51-60 ☐

>60 ☐

1.2. Main health problem (indicate the two sections below for the patient):

Self-assessed…….

Diagnosed…….

1.3. Gender:

Male ☐

Female ☐

1.4. Distance from hospital to your home……Kilometers

1.5. Highest level of education

None

Primary (Indicate class level reached) ☐

Secondary (Indicate form level reached) ☐

Post-secondary (Indicate years done in college or university) ☐

Others (Please explain)…….

1.6. Number of days in hospital……

1.7. What is your occupation?

Unemployed/housewife ☐

Informal ☐

Formal ☐

Self-employed/business/farming ☐

2. Management Processes (Tick appropriately where applicable)

2.1. Were you satisfied with the way you were received in the outpatient department?

Yes ☐ No ☐

Why? (Please explain)……

2.2. How long did you take in the outpatient department? (Indicate in minutes)……

2.3. How long did you wait before admission? (Indicate in minutes)……

2.4. Were you reviewed by a doctor on admission to the ward?

Yes ☐ No ☐

2.5. After admission, how long did you take before you were seen by a doctor?

Minutes ☐

Hours ☐

Days ☐

Not seen ☐

2.6. How would you describe the staff that attended to you in this ward?

……

……

2.7. Generally, how did you find the food served?

Good ☐ Fair ☐ Poor ☐

2.8. How are the bathrooms and toilets in this facility?

Very Clean ☐ Fairly Clean ☐ Dirty ☐

2.9. Overall assessment of quality of service/treatment received:

Good ☐ Fair ☐ Poor ☐

2.10. Would you return to this hospital if need arose?

Yes ☐ No ☐

Why (Please explain)?.....

2.11. What are some of the areas you would want the hospital to improve on?

Annex 4 Clients Questionnaire, Out-Patients

Serial Number…….…….……District……..…

Name of the hospital……Department…….…...

Name of the Interviewee (Optional)……

1 General Patient/Guardian Information

(Tick appropriately where applicable)

Only interview patients/guardians above 18 years old. For child patients, interview parent or guardian.

a. Age in years? (Tick appropriately)

18-30 ☐

31-40 ☐

41-50 ☐

51-60 ☐

>60 ☐

b. Main health problem (indicate the two sections below for the patient):

Self-assessed…….

Diagnosed…….

c. Gender:

Male ☐

Female ☐

d. Highest level of education

None ☐

Primary (Indicate class level reached) ☐

Secondary (Indicate form level reached) ☐

Post-secondary (Indicate years done in college or university) ☐

Others (Please explain)……..

e. What is your occupation?

Unemployed/housewife ☐
Informal ☐
Formal ☐
Self-employed/business/farming ☐

f. Distance from hospital to your home……KMS

2 Hospital processes (tick appropriately where applicable)

a. Were you satisfied with the way you were received in the outpatient department?

Yes ☐ No ☐

Why? (Please explain)……

b. How long did you take in the following areas (in minutes)?

Sno.	Department/service delivery area	Time in minutes
1	Registration	
2	Consultation room	
3	Pharmacy	
4	Laboratory	
5	Payment/cashier	

c. Is this the nearest public facility to your home?

Yes ☐ No ☐

d. What are the three main reasons of choosing this health facility?

e. How did you find the hospital staff?

f. Overall satisfaction with service/treatment received:

Good ☐ Fair ☐ Poor ☐

g. Would you return to this hospital if need arose?

Yes ☐ No ☐

Why (Please explain)?.....

h. What are some of the areas you would want the hospital to improve on?

Annex 5 Key Informants, Hospital Supervisors Interview Schedule

1. In your opinion, do you think the hospital is managed well? Explain.
2. Do you have a work plan in this hospital?
3. How is the hospital work plan developed, implemented and monitored?
4. Do you have supervision in your hospital/department?
5. How often do both senior and middle level managers conduct supervision?
6. What are the aspects covered during supervision?
7. In your own view, has supervision helped in improving service delivery in this hospital? Explain
8. How is the budgetary allocation done to various departments in this hospital?
9. How is the work environment in this hospital? (In terms of space, equipment, working tools, cleanliness, safety)
10. How is the staff morale generally?
11. Is there teamwork in this hospital? Elaborate.

Annex 6 Focus Group Discussions Interview Schedule

Health Services Management: Focus Group Discussion (FGD) Questions

A total of six focus group discussions will be done guided by the following questions

1. Is the hospital serving the community well?

2. What do you think are the major problems facing this hospital?

3. In your own view, how would you describe the hospital in terms of

    - Drugs and other supplies, food
    - The staff attitude
    - Hospital cleanliness and safety

4. What can be done to improve the hospital services?

Annex 7 Informed Consent

Questionnaire Serial Number: ……

Date……../……../……. (dd/mm/yy)

Study Title: Improving Health Service Delivery in Kenyan Public Hospitals:

The Essential Role of Management

Consent Form

	INVESTIGATORS	INSTITUTION	CONTACT
1.	Dr. Francis M. Kimani (PI)	MoH	0722 360 220
2.	Prof. Germano M. Mwabu	UoN	0721 565 387
3.	Dr. Elizabeth Owiti	UoN	0722 430 035
4.	Prof. Benson B. A. Estambale	JOOUST	0722700185
5.	UrbanusKioko	UoN	0712361392

RESEARCH ASSISTANTS

1.	Dr. Peter Mbugua	MoH.	0722 292 197
2.	Dr. Isaac Kimani	MoH	0722 761 746
3.	Dr. Isabel Maina	MoH	0722 710 176

Investigator's statement

My name is Dr Francis Kimani Mwihia, and I am a student at the University of Nairobi, on a PhD training program. I am requesting you to be one of the research participants. The purpose of this consent is to give you information that you will need to help you decide whether you would like to be a participant in the study. Kindly read this form carefully. You may ask questions about what we will ask you to do. For example, risks, the benefits, your rights as a volunteer, or anything about the research on this form that is not clear. When all of your concerns and questions have been fully answered, you can decide whether to be part of this study or not.

Purpose

You are currently participating in the study called: "Performance of Public Hospitals in Kenya: The Essential Role of Management". In this study we are going to study the relationship between type of hospital management and the quantity and quality of services delivered to the public by selected group of hospitals in Kenya. I will also investigate how the hospitals performance is affected by the presence of monitoring and evaluation system, service planning, the human resources deployment, the management of finances, and procurement of commodities and supplies.

We will summarize our findings from this study and disseminate it to various stakeholders in Kenya.

Procedures

If you agree to be a participant in this study, researcher will ask you some questions and your answers will be recorded. This will take approximately 30-40 minutes.

Risks, stress, or discomfort

There are no risks, stress or discomfort associated with this study.

Benefits

This study will provide the necessary information in the relationship between service delivery by public hospitals (which consume a very large share of public health budget) and management practices. It should be noted that without a capable hospital management, the resources allocated to hospitals can easily be wasted or misallocated. In such a situation, health outcomes would continue to deteriorate despite heavy expenditures on health service delivery.

In this regard, therefore, by participating in the study, you will be contributing information that will help the government efficiently and effectively manage the resources allocated to provide better health care services to all Kenyans, you included.

Confidentiality

Being in this study is voluntary. You may choose not to be in this study, and you may withdraw from the study at any time without penalty or loss of benefits to which you are otherwise entitled. Although we cannot guarantee absolute confidentiality, we will make every effort to keep your personal information confidential. Your name will not appear on any data files, only a study number. Any identifying information will be kept separate from data information and secured in a locked cabinet. All information that is obtained will be kept private. Your identity will not be known, except to those providing your medical care. The investigators listed on this consent form may look at and copy your research records for quality assurance and data analysis reasons. The research will be published, but your identity will not be reported. Study data will be kept for two years after completion of the study and then destroyed.

Compensation

There is no cost to you for participating in this study other than your time.

Participants' rights:

Your participation in this study is voluntary and therefore even if you decline to participate; you will not be denied any services in this hospital. You could also decline to answer any of the questions asked. Should you agree to be in the study, we request you to sign;

Contact information:

If you have questions now or in the future regarding the study you may ask any of the research officers involved in this study as listed above.

For questions about your rights you can contact the Chairman and/or the Secretary, KNH-UoN Ethics and Research Committee: Telephone: 020 2726300 Ext 44102 or 0722636427.

Participant's statement and consent:

I,----------,----------,

having fully understood the nature of this study, my role and rights, agree to be part of it and promise to give true and correct information as required. Just to reiterate that I have had the chance to ask questions and if I have questions in the future about the research I know I can ask one of the researchers listed above and/or the Chairman or the Secretary, KNH-UoN Ethics and Research Committee.

Signed---------- Date----------

Witnessed by---------- Date----------

Investigator's Signature

Name ---------- Date----------

Annex 8 Measurement of Indicators

Indicator	Measurement
Percentage Bed occupancy	Occupied bed days/Available bed days X 100
Occupied bed days	Patients who remain in the ward cumulated over period of time
Available bed days	Available beds in the ward for a period of time
The percentage of cost sharing expenditure	Total amount of expenditure on cost sharing/ Total amount of cost sharing budgeted
The proportion of the amount of cost sharing allocated for commodities	Amount of cost sharing allocated to commodities/ Total amount of cost sharing budgeted
Hospital average length of stay	Total number of in-patient days/Total discharges and deaths (i.e. occupied bed days in period/ discharges and deaths)
Percentage of deliveries conducted in the hospital	Number of deliveries conducted in the facility/The estimated number of expected deliveries in the catchment area X 100.
Percentage of fresh still births	Number of fresh still birth (s)/ Total number of deliveries in the facility X 100
The hospital based infant mortality rate	The number of deaths of < 1 year of age in the facility/ Total population of <1years of age admitted in the facility X 1000
The hospital based <5 mortality rate	The number of deaths of children <5 years of age in the facility/ Total population of <5years of age admitted in the facility X 1000
Hospital based maternal mortality rate	The number of maternal deaths in the facility/Total number of births in the facility
Percentage of Client satisfaction with hospital services	Number of clients satisfied with services/Total clients interviewed X 100
Hospital based Malaria case fatality	Number of Malaria related deaths in the facility/ Total number of malaria cases admitted

Source: Author.

Annex 9 List of Tracer Medicines

1. Capsules Amoxicillin 250mg
2. Syrup Amoxicillin 125mg/5ml
3. Tablets paracetamol 500mg
4. Tablets cotrimoxazole 480mg
5. Tablets Albendazole 400mg
6. Tablets chlorpheniramine 4mg
7. Tablets AL 20/120mg
8. Suspensions Metronidazole 200mg / 5ml
9. Injection Gentamycin
10. Injection Benzyl pencillin
11. Injection Adrenaline 1mg/ml
12. Injection Hydrocortisone 100mg
13. ORS 500ML/satchet
14. 1% tetracycline eye ointment
15. 1% Clotrimazole cream

Annex 10 Hospitals in Central Province

Central Province Workload for Facilities (2011)				
S/No	**Facility Name**	**No. of admissions**	**Average In-patients /Monthly**	**Average Daily Out-patient (First and Re-Attendances)**
1	PGH Nyeri	19682	1640	593
2	Mt. Kenya Hospital	542	45	30
3	Othaya Hospital	2242	187	149
4	Mukurweini Hospital	2409	201	96
5	Karatina Hospital	9984	832	308
6	Nyahururu Hospital	8863	739	290
7	Ol'Kalou Hospital	6489	541	421
8	Engineer Hospital	190	16	33
9	Tigoni Hospital	3605	300	205
10	Nyathuna Hospital	86	7	17
11	Kiambu Hospital	19039	1587	651
12	Kihara Hospital	1420	118	120
13	Ruiru Hospital	2489	207	251
14	Thika Hospital	14105	1175	440
15	Kirwara Hospital	976	81	103
16	Gatundu Hospital	7491	624	382
17	Igegania Hospital	725	60	100
18	Maragua Hospital	2676	223	190
19	Murang'a Hospital	10291	858	241
20	Muriranjas Hospital	2374	198	100
21	Kangema Hospital	1018	85	116
22	Kerugoya Hospital	33536	2795	366
23	Kimbimbi Hospital	3153	263	165
24	Kianyaga Hospital	733	61	131
25	Nanyuki Hospital	8463	705	453

Source: Author.

Annex 11 Outpatient Workload and Sample Size for Each Hospital

Central Province Outpatient Workload (2011) and Sample Size per Facility			
S/No	**Facility Name**	**Average Outpatient Attendance**	**Outpatients Sample Size per Hospital**
1	PGH Nyeri	213480	37
2	Mt. Kenya Hospital	10800	5
3	Othaya Hospital	53640	9
4	Mukurweini Hospital	34560	6
5	Karatina Hospital	110880	19
6	Nyahururu Hospital	104400	18
7	Ol'Kalou Hospital	151560	26
8	Engineer Hospital	11880	5
9	Tigoni Hospital	73800	13
10	Nyathuna Hospital	6120	5
11	Kiambu Hospital	234360	40
12	Kihara Hospital	43200	7
13	Ruiru Hospital	90360	16
14	Thika Hospital	158400	27
15	Kirwara Hospital	37080	6
16	Gatundu Hospital	137520	24
17	Igegania Hospital	36000	6
18	Maragua Hospital	68400	12
19	Murang'a Hospital	86760	15
20	Muriranjas Hospital	36000	6
21	Kangema Hospital	41760	7
22	Kerugoya Hospital	131760	23
23	Kimbimbi Hospital	59400	10
24	Kianyaga Hospital	47160	8
25	Nanyuki Hospital	213480	37
	Total	2,192,760	390

Source: Author.

Annex12 Summary Statistics for Management Practices

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
1. Regular supervision	75	0.987	0.115	0	1
2. Effective communication	74	0.878	0.329	0	1
3. Good Relation with others	75	0.813	0.392	0	1
4.Consultation and consensus building	74	0.703	0.460	0	1
5. Delegation	75	0.667	0.475	0	1
6. Work plan	73	0.644	0.482	0	1
7. Empowerment of others	75	0.627	0.487	0	1
8. Work plan implementation	75	6.267	4.869	0	10
9. Motivation and inspiration	74	0.527	0.503	0	1
10. Use of inspection tool	75	5.200	5.030	0	10

Source: Author.

Shows various variables, observations, mean, standard deviation, minimum and maximum of each variable.

Annex 13 a IPD Patients' Reasons for Returning to Badly Managed Hospitals

Responses	**Frequencies**	**Percentage**	**Cum. Percentage**
Good follow up	1	10	10
Good food	3	30	40
Hospital is near	3	30	70
No interns in hospital	1	10	80
The hospital is near	1	10	90
The hospital is near	1	10	100
Total	**10**	**100**	

Source: Author.

Annex 13 b IPD Patients' Reasons for Returning to well managed Hospitals

If others above, specify	Freq.	Percent	Cum.
Comprehensive services	1	3.57	3.57
Doctors and nurses are available	1	3.57	7.14
Staff available	1	3.57	10.71
Experienced doctors	1	3.57	14.29
Good equipment	1	3.57	17.86
Good food	4	14.29	32.14
Good management	2	7.14	39.29
Hospital is near	7	25.00	64.29
Hot shower	1	3.57	67.86
It's a government hospital near home	1	3.57	71.43
Only hospital that attends to complications	1	3.57	75
Provided items for admission	1	3.57	78.57
Services available	3	10.71	89.29
Clean hospital	1	3.57	92.86
Hospital is near	2	7.14	100
	28		

Source: Author.

Annex13c OPD Patients' Reasons for Returning to Badly Managed Hospitals

If others above, specify	Frequency	Percent	Cum
Affordable services	4	14.29	14.29
Booked appointment	1	3.57	17.86
Cheap drugs available	3	3.57	21.43
Kind staff	1	10.71	32.14
Efficient services	1	3.57	35.71
Good patient handling	1	3.57	39.29
Hospital is near	7	25	64.29
Issue receipts hence accountable	1	3.57	67.86
Nearest big hospital	2	7.14	75
Short waiting time	6	14.29	89.29
Skilled staff	1	3.57	96.43
Total	**28**	**100**	**96.43**

Source: Author.

Among the eight hospitals categorized as badly managed, only 28 of the patients gave their reasoning of coming back to the facility which was 32 percent based on distance, 18 percent on cost and 50 percent on hospital performance.

Annex 13 d OPD Patients' Reasons for Returning to Well Managed Hospitals

If others above, specify	Frequency	Percent	Cum.
Adequate drugs and Affordable	1	1.64	1.64
Affordable services	5	8.2	9.84
Affordable services and Hospital is near	1	1.64	11.48
Cheap drugs	1	1.64	13.11
Comfortable with hospital	1	1.64	14.75
Comfortable with services	1	1.64	16.39
Consultation services available	1	1.64	18.03
Consultation-clinic	1	1.64	19.67
Doctors experienced and friendly	1	1.64	21.31
Doctors listen keenly	1	1.64	22.95
Drugs available	8	13.11	36.07
Facility is near	1	1.64	37.7
Follow up	1	1.64	39.34
Have Referral services for my condition	1	1.64	40.98
Health education	1	1.64	42.62
Hospital accessible Safe any time	1	1.64	44.26
Doctor in charge available	1	1.64	45.9
It's near	6	9.84	55.74
Its near	1	1.64	57.38
Main referral hospital	1	1.64	59.02
Near home Public facility	1	1.64	60.66
Nearest hospital	2	3.28	63.93
No alternative	1	1.64	65.57
No corruption	1	1.64	67.21
Patients are attended well	1	1.64	68.85
Hospital is near	1	1.64	70.49
Referral facility	2	3.28	73.77
Services are free CD4 Drugs are good	1	1.64	75.41

Short waiting time	4	6.56	81.97
Staff present NHIF selected facility	1	1.64	83.61
Technical staff are good	1	1.64	85.25
cheap investigations	1	1.64	86.89
hospital has an ambulance	1	1.64	88.52
It’s a referral facility	2	3.28	91.8
services are affordable	2	3.28	95.08
short waiting time	2	3.28	98.36
short waiting time Affordable	1	1.64	100
Total	**61**	**100**	**100**

Source: Authors.

Annex 14 a Tobit Inefficiency Regression Results: Lower Limit (VRS Inefficiencies Regression without including Average Length of Stay).

VRS inefficiencies	Coef.	Std. Err.	t	P>t	[95% Conf.	Interval]
Hospital Size (1=large)	0.049	0.332	0.15	0.885	-0.652	0.749
Managers Sex(1=male)	-0.129	0.204	-0.64	0.533	-0.559	0.300
Managers residence (1=hospital residence)	1.080	0.387	2.79	0.013	0.264	1.897
Managers years of services	-0.112	0.186	-0.60	0.556	-0.504	0.280
Log of managers Age	-3.313	1.548	-2.14	0.047	-6.578	-0.047
Log managers house distance from hospital	0.458	0.179	2.56	0.020	0.080	0.837
Log managers years of service	1.365	0.579	2.36	0.031	0.144	2.587
Log hospitals distance from Nairobi	0.618	0.266	2.33	0.033	0.057	1.178
_cons	2.572	2.007	1.28	0.217	-1.663	6.807
/sigma	0.235	0.053		0.123	0.348	

Source: Author.

Annex 14 b Tobit Inefficiency Regression Results: Lower Limit (CRS Inefficiency regression without including Average Length of Stay).

CRS inefficiencies	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf.**	**Interval]**
Hospital Size (1=large)	0.002	0.240	0.010	0.995	-0.505	0.508
Managers Sex(1=male)	-0.441	0.158	-2.780	0.013	-0.775	-0.107
Managers residence (1=hospital residence)	0.393	0.263	1.490	0.154	-0.162	0.949
Marital status 1=married	-0.300	0.131	-2.290	0.035	-0.577	-0.023
Log managers age	0.896	1.122	0.800	0.436	-1.472	3.264
Log managers house distance to hospital.	0.108	0.119	0.910	0.378	-0.143	0.358
Log managers years of service	0.611	0.398	1.530	0.143	-0.229	1.450
Log hosp. distance from Nairobi	0.053	0.183	0.290	0.775	-0.333	0.439
_cons	-1.256	1.434	-0.880	0.394	-4.282	1.771
Sigma	0.195	0.032		0.126	0.263	

Source: Author.

Annex 14 c Tobit Inefficiency Regression Results: Lower Limit (Scale Inefficiencies Regression Analysis without Average Length of Stay).

Scale inefficiencies	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf.**	**Interval]**
Hospital Size (1=large)	-0.140	0.188	-0.740	0.468	-0.538	0.258
Managers Sex(1=male)	-0.419	0.126	-3.320	0.004	-0.685	-0.153
Managers residence (1=hospital residence)	-0.196	0.206	-0.950	0.355	-0.632	0.239
Marital status 1=married	-0.347	0.109	-3.190	0.005	-0.576	-0.117
Log managers age	3.016	0.889	3.390	0.003	1.141	4.891
Log managers house distance to hospital.	-0.130	0.093	-1.400	0.181	-0.327	0.067
Log managers years of service	0.006	0.310	0.020	0.984	-0.648	0.661
Log hosp. distance from Nairobi	-0.304	0.147	-2.070	0.054	-0.614	0.006
Cons	-3.170	1.123	-2.820	0.012	-5.539	-0.802
/sigma	0.150	0.024		0.099	0.202	

Source: Author.

Annex 15 a Tobit Regression on Average Length of Stay (VRS Inefficiency Regression).

VRS inefficiencies	**Coef.**	**Std. Err.**	**T**	**P>t**	**[95% Conf.**	**Interval]**
Hospital Size (1=large)	1.512	0.834	1.810	0.089	-0.256	3.279
Managers Sex(1=male)	0.821	0.758	1.080	0.295	-0.787	2.428
Managers residence (1=hospital residence)	-3.450	1.188	-2.900	0.010	-5.969	-0.931
Marital status 1=married	1.238	0.584	2.120	0.050	0.001	2.475
Log managers age	15.721	6.520	2.410	0.028	1.900	29.543
Log managers house distance to hospital.	-1.354	0.500	-2.710	0.016	-2.414	-0.294
Log managers years of service	-8.039	2.517	-3.190	0.006	-13.375	-2.702
Log hosp. distance from Nairobi	-2.854	0.957	-2.980	0.009	-4.882	-0.826
Log average length of patients stay in hosp.	-2.629	1.081	-2.430	0.027	-4.921	-0.337
_cons	-9.911	6.533	-1.520	0.149	-23.761	3.938
/sigma	0.566	0.124		0.304	0.828	

Source: Author.

Annex 15 b Tobit Regression on Average Length of Stay (CRS Inefficiencies Regression on Average Length of Stay).

CRS inefficiencies	**Coef.**	**Std. Err.**	**t**	**P>t**	**[95% Conf.**	**Interval]**
Hospital Size (1=large)	-0.185	0.226	-0.820	0.424	-0.664	0.293
Managers Sex(1=male)	-0.361	0.144	-2.510	0.023	-0.665	-0.056
Managers residence (1=hospital residence)	0.540	0.242	2.230	0.040	0.027	1.053
Marital status 1=married	-0.420	0.127	-3.310	0.004	-0.689	-0.151
Log managers age	-0.574	1.117	-0.510	0.614	-2.942	1.794
Log managers house distance to hospital.	0.162	0.108	1.500	0.153	-0.067	0.392
Log managers years of service	1.313	0.439	2.990	0.009	0.382	2.243
Log hosp. distance from Nairobi	0.268	0.182	1.470	0.161	-0.118	0.654
Log average length of patients stay in hosp.	0.563	0.207	2.720	0.015	0.124	1.001
_cons	-0.580	1.325	-0.440	0.668	-3.389	2.230
/sigma	0.171	0.028		0.112	0.231	

Source: Author.

Annex 15 c Tobit Regression on Average Length of Stay (Scale Inefficiencies Regression).

Scale inefficiencies	Coef.	Std. Err.	T	P>t	[95% Conf.	Interval]
Hospital Size (1=large)	-0.253	0.187	-1.35	0.196	-0.650	0.144
Managers Sex(1=male)	-0.384	0.122	-3.14	0.006	-0.643	-0.125
Managers residence (1=hospital residence)	-0.108	0.201	-0.54	0.599	-0.533	0.318
Marital status 1=married	-0.436	0.112	-3.88	0.001	-0.675	-0.198
Log managers age	2.152	0.927	2.32	0.034	0.187	4.117
Log managers house distance to hospital.	-0.103	0.091	-1.13	0.275	-0.295	0.090
Log managers years of service	0.460	0.363	1.27	0.224	-0.310	1.229
Log hosp. distance from Nairobi	-0.182	0.153	-1.19	0.251	-0.506	0.142
Log average length of patients stay in hosp.	0.377	0.178	2.12	0.050	-0.001	0.754
_cons	-2.831	1.099	-2.58	0.020	-5.161	-0.501
/sigma	0.141	0.023		0.093	0.189	

Source: Author.

Annex 16 Proposed Hospital Performance Dashboard

Hospital Name ----------								
Indicator		Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
A	Basic information							
1	Number of beds in the hospital	No.						
2	Number of cots for neonatal admissions to the nursery:	No.						
Human resource								
1	Consultants	No.						
a	Physicians	No.						
b	Obstetrician/Gynecologists	No.						
c	Pediatrician	No.						
d	General surgeons	No.						
e	E.N.T surgeons	No.						
f	Ophthalmologists	No.						
g	Orthopedic surgeons	No.						
h	Pathologists	No.						
i	Psychiatrists	No.						
j	Dental consultants	No.						
k	Clinical pharmacists	No.						
2	Medical officers	No.						
3	Medical Officers interns	No.						
4	Pharmacists	No.						
5	Pharmacists interns	No.						
6	Pharmaceutical technologists	No.						
7	Dentists	No.						
8	Dentists interns	No.						
9	Dental technologists	No.						
10	community oral health officers	No.						
11	clinical officers	No.						
12	CO interns	No.						
13	Nurses	No.						
14	Laboratory Technologists	No.						

15	Laboratory Technicians	No.						
16	Physiotherapists	No.						
17	occupational therapists	No.						
18	orthopedic technologists	No.						
19	Nutritionists	No.						
20	radiologists	No.						
21	medical social workers	No.						
22	Health records and information officers	No.						
23	Total	No.						
B	Hospital wait time survey	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
	Have you done a survey in the last six (6) months?							
	If Yes fill below Average waiting time for;							
1	Registration	Min						
2	Laboratory services	Min						
3	Pharmacy	Min						
4	Dispensing medicines	Min						
5	Maternity services	Min						
6	X-ray services	Min						
7	Emergency admission	Min						
8	Non-Emergency admission	Min						
9	Release of bodies from mortuary	Min						
10	Cash collection point	Min						
11	Oral health services	Min						
12	Waiting Time for Emergency Laparotomy for Acute Abdomen	Min						
13	Waiting time for Emergency caesarian section	Min						
14	Waiting Time for Elective /non-emergency surgery	days						
15	Transfer of referred emergency cases	Min						
16	Average waiting time for release of bodies	Min						
C	Reduced length of stay in hospitals		Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Average length of stay in general medical ward	Days						

2	Average length of stay in general surgical ward	Days						
3	Average length of stay in Pediatrics ward	Days						
4	Average length of stay in Maternity ward after caesarian section	Days						
5	Average length of stay in Psychiatric Wards	Days						
6	Average length of stay in Othorpeadic Ward	Days						
D	Accessible specialized services through referral	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Surgery services to lower hospitals / facilities	No.						
2	ENT services to lower hospitals / facilities	No.						
3	Obs/gyn services to lower hospitals / facilities	No.						
4	Ophthalmology services to lower hospitals / facilities	No.						
5	Physicians services to lower hospitals / facilities	No.						
6	Pediatric services to lower hospitals / facilities	No.						
7	Psychiatry services to lower hospitals / facilities	No.						
8	Oral Health outreaches done per quarter / facilities	No.						
9	Community Based Rehab. Services / facilities	No.						
	Surgery services	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	No. admitted due to Road traffic crashes	No.						
2	No. of inpatients deaths due to Road traffic crashes	No.						
3	No. admitted due to Acute abdomen	No.						
4	No. of inpatients deaths due to acute abdomen	No.						
5	No admitted with obstructed hernia	No.						
6	No of inpatients deaths due to obstructed hernia	No.						
7	No. admitted with intestinal obstruction	No.						
8	No. of inpatients deaths due to intestinal obstruction	No.						

E	Reduce Maternal Mortality	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Total number of live births	No.						
2	No. of Maternal deaths occurring in the hospital	No.						
3	Total number of Maternal death audits completed within 24 hours (evidenced by written audit records)	No.						
4	Total no. of macerated still births	No.						
5	Total no. of fresh still births	No.						
6	Total no. of ectopic pregnancies operated	No.						
7	Total no. of hysterectomies done	No.						
8	Total number of Caesarian section operations done	No.						
F	Reduced child mortality	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Number of Neonates admitted (all children less than 28 days old admitted in all areas of the hospital)	No.						
2	Number of inpatient deaths among Neonates (children less than 28 days old all areas of hospital)	No.						
3	Total number of under 1 year old admitted in hospitals	No.						
4	total number of under 1 year old deaths occurring in the hospital	No.						
5	Total number of admissions for under 5 year olds	No.						
7	Total number of deaths in under 5 occurring in the hospital	No.						
7	Total number of children 5-14 years admitted in the hospital	No.						
8	Total number of deaths in children 5-14 years occurring in the hospital	No.						
9	No. of under-fives admitted due to diarrhea and/or vomiting	No.						

10	No. of inpatients under-five deaths due to diarrhea and/or vomiting	No.						
11	No. of under-fives admitted due to Pneumonia	No.						
12	No. of inpatients under-five deaths due to Pneumonia	No.						
G	Reduce adult Mortality	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Total number of adults admitted in the medical wards (male/female)	No.						
2	Total number of adults deaths occurring in the medical wards	No.						
3	Total number of adults admitted in the surgical wards (male/female)	No.						
4	No. of patients with suspected Meningitis	No.						
5	No. of patients with suspected Meningitis undergoing lumbar puncture	No.						
6	No. Adults admitted due to Pneumonia	No.						
7	No. of Adult inpatients deaths due to Pneumonia	No.						
8	No. Adults admitted due to Meningitis	No.						
9	No. of Adult inpatients deaths due to Meningitis	No.						
10	No. admitted due to Cardiovascular diseases	No.						
11	No. of inpatients deaths due to Cardiovascular diseases	No.						
12	No. admitted due to Diabetes	No.						
13	No. of inpatients deaths due to Diabetes	No.						
14	No. admitted with kidney disease	No.						
15	Total no. of death due to renal failure	No.						
16	No. admitted with cancer	No.						
17	Total no. of death due to cancer	No.						
H	Efficient health care financing	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Waiver and exemption rate	%						

2	Amount of capitation fee expected based on the number of civil servants allocated to the hospital under NHIF scheme	Kshs						
3	Amount of capitation fee received	Kshs						
4	Total NHIF claims for the quarter	Kshs						
5	Total claims (out of quarters claims) reimbursed within 21 days	Kshs						
H	Improved commodity supply management	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Order fill rate for latest delivery of medicines and medical supplies received from KEMSA (by number of items)	%						
2	Order fill rate for latest delivery of medicines and medical supplies received from KEMSA (by value)	%						
I	Oral health services	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Number of fillings done per quarter	No.						
2	Number of dental rehabilitative appliances done per quarter.	No.						
J	Reduce the Incidence of HIV/AIDS, Malaria and TB	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Number of HIV clients seen in the Hospital	No.						
2	Total number of HIV/AIDS cases admitted in the hospital	No.						
3	Number of clients Counseled for HIV	No.						
4	Number of clients Counseled and Tested for HIV	No.						
5	Proportion of eligible HIV/ clients started on ARVs	%						
6	Total number of patients dying in hospital due to HIV	No.						
7	Reduce Malaria Fatality Cases	No.						
8	Total of Malaria inpatient fatality cases for under five in hospitals	No.						

i	Total number of admissions of under-five with Malaria	No.						
ii	Total number of inpatient deaths among under-five with Malaria	No.						
	Reduce Malaria inpatient fatality cases for children above five years and adults	No.						
i	Total number of admissions for over-five(children and adults) with Malaria	No.						
ii	Total number of inpatient deaths among over-five with Confirmed Malaria	No.						
	Reduce malaria inpatient fatality in pregnant women in hospitals	No.						
i	Total number of pregnant women admitted with Malaria	No.						
ii	Total number of deaths among pregnant women admitted with Confirmed Malaria	No.						
	Reduce incidence of Malaria							
i	Number of malaria deaths audited	No.						
	Reduce Incidence of TB	Unit of measure	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Annual total	Remarks
1	Number of TB cases admitted in the hospital	NO.						
2	Number of inpatients death due to TB	NO.						

Source: Author.

Annex 17 Research Ethics Approval

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

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

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

KENYATTA NATIONAL HOSPITAL APPROVED 15 JUN 2012 RESEARCH COMMITTEE

Ref: KNH-ERC/A/165

15th June 2012

Dr. Francis M. Kimani
College of Health Sciences
UNITID
University of Nairobi

Dear Dr. Kimani

Research proposal: "Improving Health service Delivery in Kenyan Public Hospitals: The essential role of Management" (P34/01/2012)

This is to inform you that the KNH/UoN-Ethics & Research Committee (ERC) has reviewed and **approved** your above revised research proposal. The approval periods are 15th June 2012 to 14th June 2013.

This approval is subject to compliance with the following requirements:

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

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

"Protect to Discover"

Yours sincerely

PROF. A.N. GUANTAI
SECRETARY, KNH/UON-ERC

c.c. The Deputy Director CS, KNH
The Principal, College of Health Sciences, UoN
The Director, UNTID, UON
Supervisors: Prof. Germano M. Mwabu, School of Economics, UON
Prof Benson B.A. Estambale, UNITID, UON
Dr. James Machoki I'Imunya, UNITID, UON
Dr. Urbanus Kioko, School of Economics, UON

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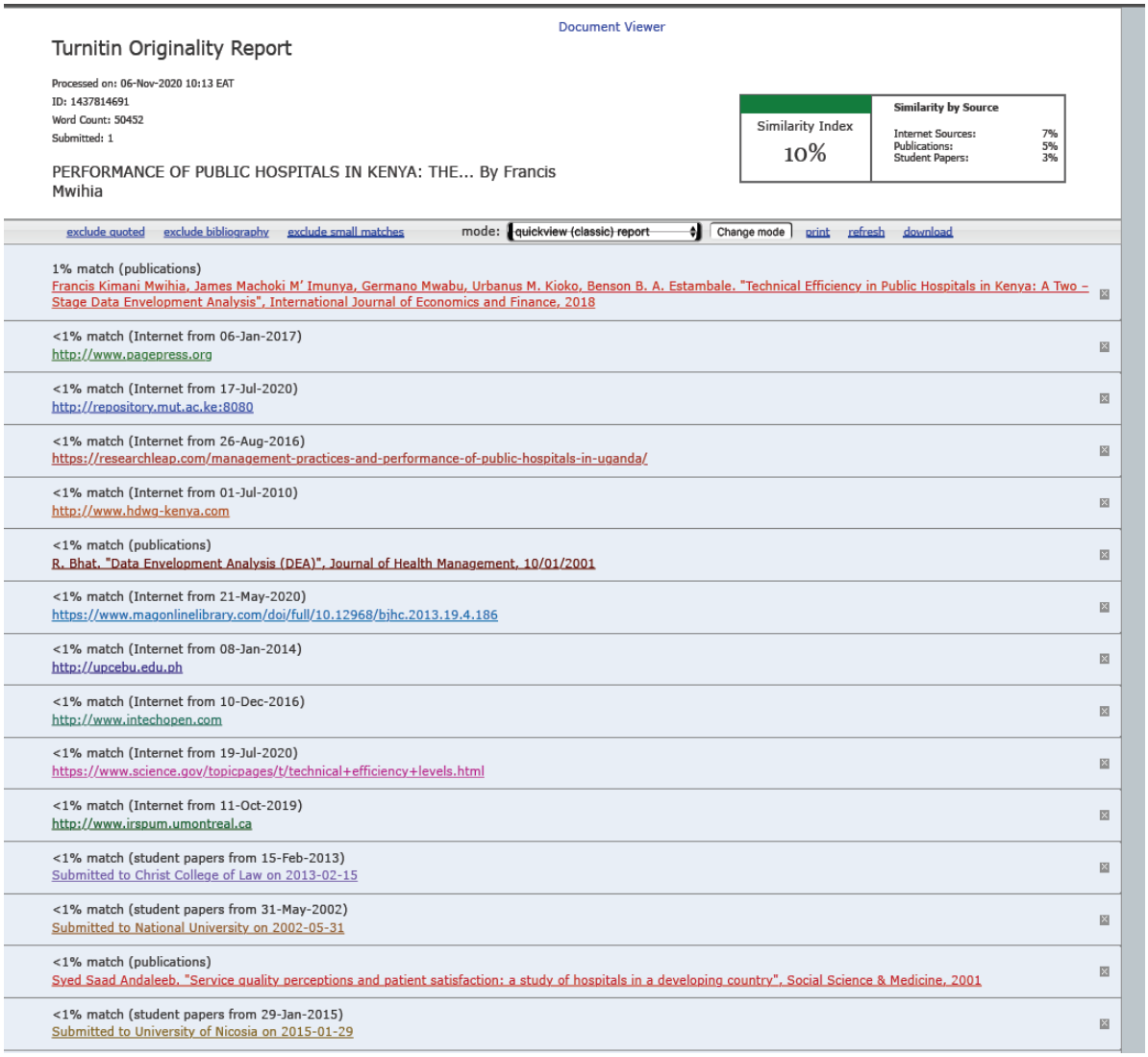

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Prof. Germano Mwabu (Supervisor)

School of Economics, University of Nairobi

Signed…… Date……...

Dr. Dufton Mwaengo

Director/ Dean UNITID, University of Nairobi

Signed…… Date……...