INFLUENCE OF HUMAN FACTORS ON PERFORMANCE OF SELECTED MEDICAL LABORATORY PROJECTS MANAGED BY CENTRE FOR DISEASE CONTROL IN CENTRAL KENYA

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DECLARATION

This research project is my original work and has not been presented for any award degree in any other university**.**

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This research project report has been submitted for Examination with my approval as University supervisor

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DEDICATION

I dedicate this project in memory of my beloved mother Magdalene Syombua, to my father Fredrick Munyalo, son Winston Munyalo for Financial and moral support and constant encouragement throughout my education.

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I would like to express my very great appreciation to Mr. Evanson Mbuva for his valuable and constructive guidance during the entire development of this project. I would like to acknowledge the role played by school of open and distance learning as well as all my Lecturers. I acknowledge laboratories management who participated in the research and research assistants. I wish to thank my family and friends for their support and encouragement throughout my study.

ABBREVIATION AND ACRONYMS

ASLM African Society for Laboratory Medicine

CAP College of American Pathologists

CDC Centre for Disease control

ISO International Standard Organization

MOH Ministry of health

QMS Quality Management System

SANAS South African National Accreditation System

SDG Sustainable development goals

SSA Sub-Saharan Africa

WHO World Health Organization

WHO-AFRO World Health Organization Regional Office for Africa

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ABSTRACT

Performance of medical laboratory services and patient outcomes are improved by Quality management systems. Previous studies have been dedicated to identifying the critical factors for successful implementation of Quality Management System. However, high failure rates in laboratories in low-resource settings have been reported. It is likely that human factors significantly affect the outcomes of laboratory performance. Some human factors such as staff training, top leadership commitment, team work and staff appraisal have not been adequately covered in the literature. Also, it has not been established whether the quality management practices should be universally adopted or they should be adapted to the unique characteristics of organizations. The objectives of study were to examine influence of human factors on performance of selected Medical laboratory a case of Central Kenya. A cross-sectional study of 27 laboratories in central Kenya that have implemented Quality Management System was adopted and the targeted respondents were Hospital Medical superintendent, Laboratory manager and Quality officer staff. A sample of 81 respondents was drawn from the target of 27 laboratories. Quantitative method was used for data collection; self-administered questionnaires was used to collect data from Hospital Medical superintendent, Laboratory manager and Quality officer staff. A sample size of 81 respondents was used. Prior to actual data collection pilot testing of the instrument was conducted in a controlled environment using a small number of respondents which were selected randomly to test the reliability of the research instrument. Data analysis and interpretation was based on descriptive statistics and measures of dispersion. The data was analyzed using SPSS version 15.0. The collected data was used to examine the effect of human factors on the on performance of selected Medical laboratory projects managed by CDC in central Kenya. The researcher finding shows that the leadership has taken the mantle and is steering quality improvement strategies, there is need to sensitize the leadership on importance of quality improvement to ensure quality of services. It is important that the concerned leadership mobilize resource required in the laboratory as they play a key role in quality improvement. There is need to prioritize customer needs and expectation. Pursuing long term objectives helps the involved team remain focused and work towards achieving the set goals and sustainability towards the set mark. The research findings show that there is need for training for both managerial staff and technical staff. Evaluation for training needs is important as it helps the stake holder to identify the demanding areas hence helping come up with a training that suits or rather addresses the prevailing issues. There is need to put a policy/guidelines on training in any institution Team work recognition is crucial as this encourages the employee to combine their efforts together in the focus of the determined goals. Staff appraisals should be conducted on defined period, staff motivation should be based on performance. The study concluded that staff training and staff appraisal influences significantly the laboratory performance. Measures need to be put in place to ensure that sustainability of laboratory performance is assured through top leadership involvement, access to right resources, capacity building and policy implementation in order to successfully address the issues of perennial episodes drop of laboratory performance. The researcher recommends that similar studies to be conducted in other laboratories implementing Quality Management Systems in Kenya.

CHAPTER ONE
INTRODUCTION

1.1 Background of the Study

Reliable and efficient laboratory services are essential to a functioning health system. Hence the importance of laboratory testing in patient care, surveillance and outbreak investigation (Schroeder & Amukele, 2014; Yao, 2016). It is estimated that up to 70% of the clinical decision-making is based on medical laboratory results (Alemnji, Zeh, Yao, & Fonjungo, 2014). In the recent times there has been a focus on the poor state of public health laboratories. Global healthcare authorities such as WHO have been advocating for strengthening of laboratory systems through accreditation (Yao, 2016).

Quality Management is a measure of the extent to which products and services conform to certain quality specifications (Habtoor, 2015). Different researchers have used various indicators to measure quality Management with the most common indicators used in these studies relating to quality conformance (Talib, Rahman, & Qureshi, 2010). Other commonly used variables unclude produt quality, customer relationship management, employee satisfaction and level of quality Management relative to industry norms (Talib, Rahman, & Qureshi, 2010). In this study, quality Management will be assessed using reduction in errors, changes in turn-around time, clinician satisfaction rates and reduction in nonconformities.

The effectiveness of quality management systems is reflected in the quality Management (Sila, 2007). The research framework for quality management proposed by (Flynn, Schroeder, & Sakakibara, 1994) has both inputs (quality management (QM) practices) and ouputs(quality management). Improve quality management practices will results to product quality improvement thereby reducing costs while improving delivery Management (Huang & Lin, 2002). Quality management is also associated with employee flexibility, improved decision making process and enhanced prodctivity through reduced product cycles (Huang & Lin, 2002).

Teams' focus on their internal customers and their knowledge of these customers' requirements has been shown to improve product cycle times in manufacturing companies (Huang & Lin, 2002). These teams' active involvement in production process through relevant knowledge on production priorities improves overall production process (Huang & Lin, 2002). In most cases production process differences between manufacturing and service firms does not exists as determined by TQM practices and quality Management in the two sectors (Talib, Rahman, &

Qureshi, 2010). A study by the US Government Accounting Office examined the effect of quality management practices on the Management of 20 US companies that won the MBNQA. The study estavblihed as association between TQM practices and production as measured through found quality management model (Talib, Rahman, & Qureshi, 2010).

Quality Management System is a process used to verify implementation of laboratory standards (Yao, 2016). Quality Management schemes is assessed through laboratories in accordance with laid down standards and that are accepted by key stakeholders. Medical laboratories account for laboratory assessments and they requires well-functioning quality management system focused on attention to customer and improvement in patient care (Schroeder, 2014).

Reliable and efficient laboratory services are key ingredients in well-functioning health system. And quality patient care (Schroeder & Amukele, 2014; Yao, 2016). It is estimated that up to 70% of the clinical decision-making is based on medical laboratory results (Alemnji, Zeh, Yao, & Fonjungo, 2014). Recently, there has been a focus on the poor state of public health laboratories. Global healthcare authorities such as WHO have been advocating for strengthening of laboratory systems through accreditation (Yao, 2016). The level of implementation of laboratory standards in the African region has historically been very low (Mokobela , 2014). A survey carried out in 2013 showed that most countries in sub-Saharan Africa have no recognized internationally accepted laboratories, with majority of accredited laboratories found in South Africa. (Schroeder & Amukele, 2014).

Factors that have affected rapid implementation of QMS include understaffing, lack of staff training and education, poor physical infrastructure, climatic extremes and financial constraints (Audu, *et al.*, 2014; Alemnji , 2014). Poor laboratory quality as well as lack of functioning quality management systems are known problems in Sub- Saharan Africa that have led to high degree of levels of laboratory error. This has consequently lowed public and patient confidence in such services (Alemnji , 2014).

The unreliable laboratory test results partly accounted for the over reliance on clinical judgment and empirical therapy by most physicians thus resulting to undue direct patient costs. For instance physician's poor perception on reports from laboratory tests has contributed to this. (Alemnji , 2014). There call for the need to quality of laboratory systems as a way of building confidence in health system services.

The Kenya health service delivers medical laboratory tests via 958 laboratories, with approximately 70% government owned while the result belong to private sector (The World Bank, 2009). Clinical laboratories are found in different location where health facilities are found. The effectiveness of quality management systems is reflected in the quality Management (Sila, 2007). The research framework for quality management proposed by (Flynn, Schroeder, & Sakakibara, 1994) entails both inputs and outcomes in the forms of quality management (QM) practices and quality Management outcome respectively.

Researchers have identified critical human and technical factors that determine the success of quality management systems (Habtoor, 2015). The human factors include management commitment, employee involvement, teamwork, education and training, award, recognition, and the technical aspects include process control (Sila, 2007; Talib, Rahman, & Qureshi, 2010).

These aspects are addresses differently in various studies. Sohal and colleagues (2007) grouped them into human resources issues, general quality practices, quality program evaluation and quality control processes (Sila, 2007) while Dow and colleagues (1999) grouped them into nine aspects that include supplier relations, benchmarking practices, employee commitment, customer centrism, teamwork, in job training, use of latest technology and use of just-in-time principles (Talib, Rahman, & Qureshi, 2010).

Most studies have established that organizations tend to focus on the technical aspects during implementation of quality management programs (Habtoor, 2015). The most plausible explanation given is that quality management leaders prioritize production. Previous studies demonstrated that there is a significant relationship between human factors and quality outcomes. As such, not considering them is likely to lead to failure in meeting quality objectives (Habtoor, 2015). In this study, the influence of top management commitment, mentorship, teamwork, continuous training, awards and recognition on quality Management will be assessed.

Kenya was amongst the first African countries to design national laboratory policy guidelines and a five-year national strategic plan geared at addressing laboratory quality testing for HIV testing and other communicable diseases (Kenya Ministry of Health, 2005). Developed with support from PEPFAR, significant emphasis of the strategic plans was on strengthening laboratory needs and establishing quality systems in line with accepted international standards.

These framework provided the springboard for building quality laboratory system in Kenya from April 2010 (Makhoha, et al., 2014). The first cohort established under this framework included 12 laboratories at national and regional levels across the country. These laboratories were functionally engaged in the following testing: blood transfusion, hematology, tuberculosis microscopy, parasitology, CD4, clinical chemistry and cytology (Makhoha, et al., 2014). The laboratories were equipped with high-throughput equipment and qualified staff, with the laboratories operating to 24/7 services (Makhoha, et al., 2014).

By the end of 2012, five of these research laboratories had international accreditation. However, not one of the existing 300 public sector clinical laboratories had received such accreditation (Schroeder & Amukele, Medical laboratories in sub-Saharan Africa that meet international quality standards, 2014). To enhance the accreditation process of public laboratories, the US government through PEPFAR programme provided resources and facilities for public laboratories in Kenya (Makhoha, et al., 2014). To date, Kenya has initiated at least six cohorts of QMS resulting to over 200 laboratories and seven blood banks (Yao, 2016). The criteria for enrollment is a facility which have enrolled more clients in HIV care and High volume facilities.

1.2 Statement of the Problem

It is clear that maintaining continuous quality improvement is the biggest challenge facing laboratories in Kenya. Failure to maintain Quality in the laboratory services may lead to misdiagnosis, prolonged turnaround time and customer unsatisfactory. This study reviews Management of laboratories enrolled in Quality Management System in Central Kenya with the aim of identifying the Human factors critical to the realization and performance of the quality improvements achieved in Quality Management System program.

There is evidence that milestones in improvement of laboratory quality systems achieved in sub-Saharan Africa have not been maintained, during to frequent staff transfer during programmes implementation leading to decline in Quality Management (Mokobela , 2014.) and failure of management to provide the necessary resources required for the operation of the laboratory.

An assessment carried out in a virology and a TB laboratory in Nigeria 9 months after the exit audit showed that even though most of the improvements had been sustained, the Quality

Management had reverted to the baseline score of 67% after improving to 90% during implementation (Audu, et al., 2014).

Kenya has few empirical studies that have directly analyzed the human factors that influence the performance of medical laboratories. This study looked at human factors: Top leadership commitment, staff training, team work and staff appraisal and how they influence the performance of medical laboratories.

1.3 Purpose of the Study

The purpose of this study was to establish influence of human factors on performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya.

1.4 Objectives of the study

i) To find out the extent to which top leadership commitment influences the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

ii) To examine the extent to which staff training influences the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

iii) To establish the extent to which Team work influences the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

iv) To establish the extent to which staff appraisal influences the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

1.5 Research Questions

i) To what extend does the top leadership commitment influence the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya?

ii) To what extent does the staff training influences the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya?

iii) To find out how teamwork influence the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya?

iv) To what extent does staff appraisal influence the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya?

1.6 Significance of the Study

This research focuses on laboratory quality management practices due to their link to sustainable development goals (SDG). Target 3 under SDG 3 aims at ending the epidemics of malaria, HIV/AIDS, tuberculosis and other neglected tropical diseases (UN, 2016). Improved laboratory quality Management will significantly contribute towards achievement of this objected by providing reliable data to support epidemiological studies and clinical management of the infectious disease.

This research identified the enabling human factors that influenced laboratory quality management practices. Establishing the impact of these factors will enable laboratory managers and other stakeholders to determine whether to adopt a universal or a context-dependent approach while implementing and scaling up quality management systems.

To transform the overall health systems and patient care, it is imperative that Quality Management System is expanded to countries that have not adopted the approach and adapted for other healthcare services such as pharmacy. As such, the information obtained from this study might facilitate development of expansion and extension of quality-based management systems by key decision makers, policy makers and health care provider.

1.6 Basic assumption of the study

The study assumed that the information given by the respondents was in good faith without bias.

1.7 Delimitation of the study

This study was delimited to selected medical laboratories in Central Kenya due to limited time and resources available for the research. This study focused on the laboratories that have been selected by CDC to implement Quality Management system and have all or some of the four departments namely, hematology, tuberculosis microscopy, parasitology, clinical chemistry. Information was obtained from laboratory managers, quality assurance officers, and laboratory staff. The study was also being delimited to the study variables only.

1.8 Limitation of the study

The study was expected to face a number of limitations: the study was limited to central Kenya, some of the professionals that were involved in the implementation of the Quality Management System might have been deployed to other facilities and the current staff may not have adequate knowledge required for to this study. To address this challenge, the researcher sought additional information by reviewing documents and records such as baseline an exit audit reports.

The human resources in laboratories are few and may lack sufficient time to commit to this study. The researcher designed brief questionnaires to encourage the employees to complete the questions.

1.9 Definition of Significant Terms as Used in the Study

Staff appraisal :	Practice of recognizing exceptional Management and compensating individuals based on the level of their performance (Basinga 2010).
Teamwork:	Process which stresses the involvement of different cadre in organizational decision making (Somatung 2015)
Top leadership commitment:	Extent to which the highest level executives directly participate in quality improvement efforts Ahire 1996); Flynn (1994, 1995)
Staff Training:	Teaching geared at enhancing skills and make proficiency in healthcare quality (Somatunga, 2015); (Tung, 1981)
Laboratory performance:	A measure of the extent to which laboratory services conform to certain quality specifications (Habtoor, 2015).
Influence	Power to affect a situation or impact on something

1.10 Organization of the study

This study was structured into five chapters. Chapter one was a generation introduction of the study by providing context, problem, purpose, scope, study significant and assumptions. Chapter two covered literature reviewed in terms of study objective as well as theories and conceptual framework. Chapter three covered the research methodology of the study in terms of appropriate design, population, sampling, data collection process, data analysis techniques and necessary ethics considered during the study. Chapter presents the findings are attending interpretation while chapter five gives summary of the findings, conclusions, recommendation and suggestions for further research.

CHAPTER TWO
LITERATURE REVIEW

2.1 Introduction

In this chapter, a conceptual framework is developed and a research model has been proposed to examine the extent to which the quality management practices are implemented in the selected laboratories in Central Kenya. The model will also explore the relationships between the identified quality management practices and quality Management. The proposed conceptual framework is depicted in Figure 1. In this theoretical research framework, the independent variables are quality management practices and a dependent variable is laboratory performance.

2.2 Human Factors that Determine the Success of Quality Management Systems

Human factors are addressed differently in various studies. Sohal and colleagues (2007) grouped them into human resources issues, general quality practices, quality program evaluation and quality control processes (Sila, 2007). Dow and colleagues (1999) grouped them into nine aspects that include supplier relations, benchmarking practices, employee commitment, customer centrism, teamwork, in job training, use of latest technology and use of just-in-time principles (Talib, Rahman, & Qureshi, 2010).

Most studies have established that organizations tend to focus on the technical aspects during implementation of quality management programs (Habtoor, 2015). The most plausible explanation given is that quality management leaders prioritize production. Previous studies demonstrated that there is a significant relationship between human factors and quality outcomes. As such, not considering them is likely to lead to failure in meeting quality objectives (Habtoor, 2015). In this study, the influence of top leadership commitment, teamwork, staff trainings and staff appraisal on quality Management was assessed.

2.3 Top Leadership commitment and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Evidence shows that the level of top leadership involvement affects the outcome of quality improvement programs (Andiric & Massambu, 2015, Nzabahimana, 2014, Somatunga , 2015). Andiric & Massambu (2015) reported that management teams that were active and highly engaged led their teams to success. In contrast, teams with less active and less engaged management lagged in implementation and improvement in quality.

A study carried out USA showed quality improvements among the health personnel participating in Quality Improvement teams (Weiner, et al., 2006). According to Somatunga and colleagues(2015), top leadership commitment has the greatest influence on continuous quality improvement programme as compared to teamwork, physical structure and monitoring system.

Management support plays a substantial role in ensuring maintenance of the gains achieved after implementation of Quality Management System (Mokobela, Moatshe, & Modukanele, 2014, Nzabahimana, 2014). In Rwanda, the KMH laboratory was able to increase Quality Management score from 56% at the exit audit to 90% a year later. According to Nzabahimana, (2014), this improvement was due to high levels of management support. The national reference laboratory on the other hand experienced non consistent results. This variability was attributed to the management lack of commitment to the accreditation preparation process (Nzabahimana, et al., 2014).

Similarly, a study in Botswana by Mokobela, Moatshe, & Modukanele (2014), found that buy-in is a key predictor of quality improvement. Managers who feel part of the process are motivated to improve the laboratory process thus improvement workforce morale and commitment. This commitment plays a crucial role in sustenance of a quality program (Mokobela, Moatshe, & Modukanele, 2014). Hence, top management commitment has a significant relationship with quality Management in medical laboratories.

2.4 Staff training and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Training enables the laboratory management team and staff to become aware of the need to participate in quality improvement programmes. Mokobela, Moatshe; (2014), showed that as understanding and ownership of the quality improvement process is increased amongst management and staff, they become more engaged and actively involved. These findings were replicated by Somatunga , (2015) who found a statistically significant correlation of training with the Continuous Quality Improvement Program Implementation.

Andiric; (2015), who studies establishment of the Quality Management system programme in Tanzania established that training contributes tremendously to the success of the Quality Management system implementation through providing adequate and qualified personnel for Quality Management system supervision, mentorship, and supervision. Training enhances

achievement of rapid improvements in quality management systems. In a study of Quality Management system implementation in the National HIV Reference Laboratory (NHRL), Gachuki and colleagues (2014) found that the laboratory used Quality Management system as a platform to make incremental changes in different projects and services that cover all aspects of the QMS.

Training of new staff members enhances continuity even when the older members are transferred to other laboratories. Several studies have established that staff attrition affects maintenance of the Quality Management system program (Gachuki, et al., 2014), (Nzabahimana, et al., 2014). In Rwanda, Nyagatare Hospital Laboratory, quality management practices suffered due to loss of staff trained (Nzabahimana, et al., 2014).

In any professional organization continuous training of staff at all levels is extremely important an activity and deserves full attention of the management. However, training program are undermined by lack of standardized training program and the lack of trainers (Gachuki, et al., 2014). This study proposes that training has a positive impact on quality Management.

2.5 Teamwork and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Studies assessing the role of teamwork to success in quality management systems show inconsistent results. According to Mokobela, (2014), training is crucial to success in the roll-out of QMS. The researchers established that the training sessions helped to cultivate staff involvement through team building process and organization culture amongst laboratory staff, who felt empowered to implement improvement projects previously considered beyond their capability. Further, Mokobela Moatshe, & Modukanele (2014), found that active engagement of employees increases their dignity and willingness to be involved in process improvement teams,

Similarly, Gachuki and colleagues found that collective involvement is important in implementing change. It enables the team to build a shared vision and strive to meet the quality objectives. In their study, teamwork was established as a pre-requisite of quality improvement According to Gachuki, employees showed collective responsibility by holding weekly section meetings, brainstorming local solutions and sharing of best practices. This ensured that there was no slackening of momentum (Gachuki, et al., 2014).

However, Somatunga et al (2015) established that hospital staff did not rate teamwork as an important element to continuous improvement programmes. Though the correlation of teamwork with the continuous quality improvement programme was statistically significant at 0.227, it was the lowest when compared with other independent variables (Somatunga , 2015). Hence, teamwork has a direct positive effect on quality Management.

2.6 Staff appraisal and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Management-based financing models are used by many NGOs organizations for transparency and accountability purposes (Nzabahimana, et al., 2014**).** Haiti was the first low-income country to establish a Management based remuneration strategy in 2000 in the health care sector. Initially, the payment structure was based on documented expenditures. A comparison study between 2000 and preliminary 2005 data for Haiti and aggregate Management showed that Management is best in 2005 when the majority of the health care providers are under Management -based payment (Eichler, Auxila, & Antoine, 2007).

In Cambodia, the government health facilities in Cambodia suffered from poor Management. Research established that the primary factor was poor motivation of staff (Soeters & Griffiths, 2003). The government then adopted a Management -based financing system in the health sector. An assessment of this system three years after implementation showed that the services were of better quality and the utilization of health services in the contracted districts improved significantly (Soeters & Griffiths, 2003). However, other initiatives were implemented during the same period and the improvements cannot be attributed entirely to the revised financial scheme.

In Africa, Rwanda has been at the fore front of implementing Management -based financing in several sectors since 2002. An evaluation study by Basinga, Gertler and Binagwaho (2010) showed that paying for Management had a large and significant positive impact on institutional deliveries and preventive care visits by young children, and improved quality of prenatal care. The researchers concluded that this approach has the potential to improve both the use of and the quality of health services (Basinga, Gertler, & Binagwaho, 2010). This study proposes that awards and recognition have a direct positive impact on quality Management.

2.7 Theoretical Framework

2.7.1 Quality Management Practices Theories

An extensive review of literature yielded a large body of research that supports the relationship between quality management practices and quality performance (Flynn, et al., 1994; Ahire, et al., 1996; Dow, et al., 1999; Samson, et al., 1999; Abdullah, et al., 2008). Flynn, et al., (1995) claimed that there quality management practices is dependent on human factors, technical factors and quality management infrastructures. A number of researcher have supported the effect of human factors on quality outcome (Flynn, et al., 1995; Ahire et al., 1996; Abdullah et al., 2008). These studies revealed that quality improvement is determined by the level of human factors.

In 2009, Gadenne & Sharma (2009) found that organization performance is influenced simultaneously by both soft and hard factors, particularly benchmarking practices, top management support, employee training and customer relations (Habtoor, 2015). Samson & Treziovsk (1999) found that human factors such as leadership, people management, customer centrism have a greater impact on organization performance as compared to the technical factors. These findings were in alignment to the findings of Dow et al. (1999) that the hard factors such as benchmarking, do not contribute significantly to superior performance as the human factors.

2.7.2 The Institutional Theory

According to institutional theory, organization are forced to adapt through new procedures, structures to fit in changing environment institutions. These forces can involve competition, government regulations amongst others (Wagner, et al., 2001). Institutions implementing quality management practices improve their systems through adoption of quality improvement processes that meet customer needs. The theory proposes that adoption of quality improvement processes and practices differentiate themselves from non-implementers (Sila, 2007). These hypotheses have been supported by various authors. Harzing and Sorge in 2003 established that country of origin affects the organizational practices of companies. This is because cultural characteristics differs across different societies and this affects the organization practices of such firms (Sila, 2007).

Institutional theory also affirms that conformity to existing norms leads to better production efficiency and effectiveness. Hence, institutions that implement quality management practices

and that are certified would be expected to have enhance performance as opposed to companies without quality management practices (Sila, 2007).

2.7.3 The Contingency Theory

Contingency theory suggests that the degree of uncertainty in environment leads organizations to orient and adapt fitting structures and process characteristics (Sila, 2007). Contingency factors may be internal or external. Various constructs have been put forward by different authors to measure internal and external contingency factors. Common to all these factors are the different task variables of (variability, difficulty and interdependence) (Gupta et al., 1994).

In health care quality management area, Wagner et al. (2001) used contingency factors that include centralization, formalization and organizational size. The theory suggests that organizations establish structure that not only fit their environment but also results to performance improvement (Sila, 2007). Thus this theory was key in the study as it helps analyzes relationship between core quality management practices; technical factors and quality management infrastructure; human factors.

2.8 Conceptual Framework

Definition of the conceptual framework comprises of deliberated model which identifies the variables in the research and their associations (Mugenda & Mugenda, 2003). This study made use of various variables. The dependent variable in this study was laboratory performance as it is affected by four key factors thus top leadership support, staff training, team work and staff recognition /motivation. This is best illustrated in figure 1.

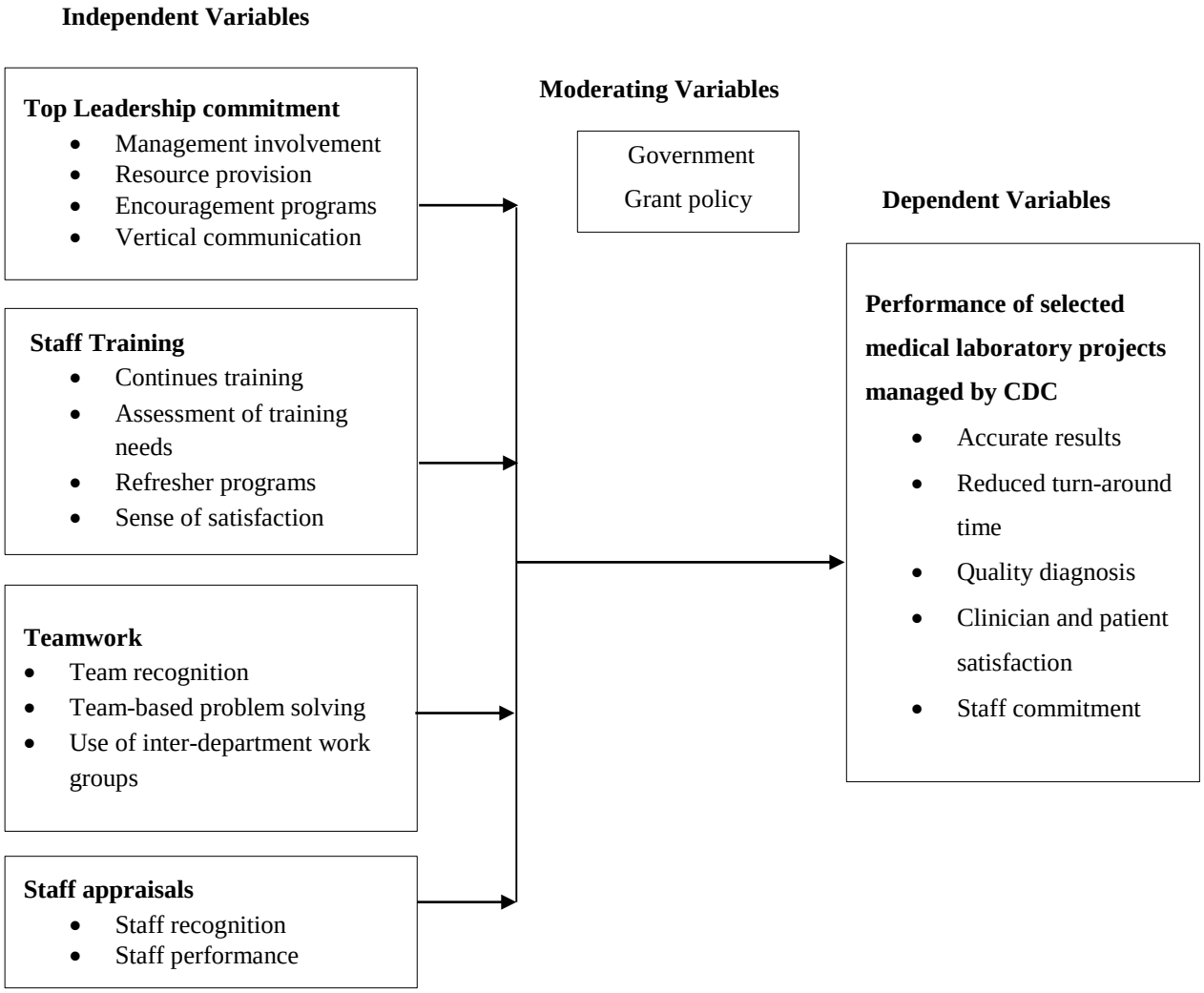

Figure 2.1: Conceptual Framework

According to (Mugenda ,2003) independent variables are those that cause change in the dependent variable while the dependent variable is one whose outcome depends on the manipulating the independent variables.

In this study the dependent variable was Performance of selected medical laboratory projects managed by CDC in central Kenya. It is considered dependent since performance of laboratory depends on the efficiency of many factors. The independent variables in this case were the factors that influence the performance of selected medical laboratories projects managed by CDC in central Kenya. Among these factors are top leadership commitment, Staff training, team work, staff appraisal. The level of top leadership commitment will influence the laboratory performance since laboratories requires resources in day to day operations, the level of employee's skills, team work and staff appraisal will affect the laboratory performance if

the standards are not met. The intervening variables are government policy on grants management.

2.9 Summary of Literature Review

Literature review comprised the theoretical framework, conceptual framework and empirical review. A review of empirical literature on quality Management (Abdullah , 2008; Dow , 1999; Flynn , 1994) clearly demonstrated that top management commitment, continuous training, staff involvement and teamwork play a fundamental role in determining the success of quality improvement programs. However, literature shows that they are not sufficient to sustain the benefits of these programs. This study therefore spught to establish how human factors in influence quality Management in selected medical laboratories .

2.10 Research Gaps

Multiple studies have sought to establish the critical factors influencing success of quality improvement programs. While many organizations have integrated these elements in their institutions, some have reported a decline in the quality standards established during implementation of the programs. This creates the need to identify other factors that promote sustenance of program results. The role of mentorship in quality programs has not been extensively studied. Hence, there is need to investigate the relationship between mentorship and quality Management.

Some previous studies have suggested that poor compensation mechanisms demotivate highly performing staff and affect the output of quality improvement programs (Somatunga, 2015). This strategy has not been adopted by many institutions in low-resource settings and there is poor documentation on its influence on quality Management. This creates the need to study its effect on quality Management outcomes in the context of laboratories in Kenya.

The question of whether quality management practices should be customized to the unique needs and capabilities of individual organizations has not been extensively studied. Given the potential of human factors to affect project outcomes it is critical to design studies to ascertain the extent of their influence.

CHAPTER THREE
RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the research design, the sampling design and the statistical methods used to determine the interrelationship between the study variables. Specific information includes data collection methods, validity, reliability, data analysis and ethical issues.

3.2 Research Design

The design was a cross-sectional study as it determined the association between variables at one point in time. This design was an ideal for this study as it described the various dimensions of quality management practices. It sought the relationship between these dimensions and quality Management in a healthcare setting. This design had the ability to minimize bias and enhance the reliability of the evidence collected (Creswell, 2014).

3.3 Target Population

The target population for this study was medical laboratories that have implemented Quality Management System in Central Kenya. The study participants were; Hospital Medical superintendent, Quality officer and laboratory manager staff implementing Quality Management System in the 27 laboratories in Central Kenya implementing Quality Management System.

Table 3.1: Target Population Distribution (Staff)

Designation	Number of staff
Medical superintendent	27
Laboratory manager	27
Quality Officers	27
Total	**81**

Source: Kenya Medical Laboratory Technicians and Technologists Board (2018)

3.4 Sample size Sampling Procedure

The study was a census of laboratory staff for medical laboratory projects managed by CDC in central Kenya.

3.4.1 Sample size

Since the staff of interest were few that is eighty-one, it was possible to survey the entire population so all eighty-one employees constituted the sample size.

3.4.2 Sampling procedure

Census sampling methods is a special type of survey where data is collected from all the units in the population of interest. Because of the manageable nature of the study, census method was used to get the entire 81 respondents who are employees at the selected medical laboratories a factor that is acceptable by Kothari (2014). This was done until no new data is obtained from the respondents (Bowen, 2008) thus reaching saturation point.

3.5 Research instruments

Data collection instruments are tools used to measure the variables in the research questions (Carroll, 2011). A structured questionnaire was used as the primary tools for data collection. The questionnaire was adopted from literature on quality management studies such as (Flynn, 1994; Samson & Terziovski, 1999). The questionnaire had 28 items measuring the quality management practices constructs and 5 items measuring the quality Management variable.

3.5.1 Pilot Testing of the research instruments

Pilot study is a sub-section of the entire study conducted in order to prepare for the study and field testing the survey in order to provide rationale for the design (Orotho, 2004). It includes pre-testing of tools to determine the validity and reliability.

A pilot study on the questionnaire was carried out one month prior to the main study, 5 laboratory managers, quality officials and Hospital Medical superintendent were identified to participate in the pilot study. Piloting the research instrument helped to determine comprehensiveness, clarity and acceptability of the questionnaire (Mugenda, 2003). This process contributes to enhancing the validity and reliability of the instrument (Allan and Emma, 2011). The questionnaire was refined based on the feedback.

3.5.2 Validity and Reliability of the Research Instrument

Content and construct validity was determined in this study. Content validity is the degree to which attempts to measure a given construct yield near similar results. It is determined by the loading factors. Statistically significant loading factors greater than the threshold of 0.6 indicate strong content validity (Bagozzi, Yi, & Phillips, 1991). Content validity measures the degree to which a construct and its indicators are different from another construct and its indicators.

Content validity is assessed by conducting a series of Chi-square (x^2) difference tests between factor analysis models for all pairs of constructs. A statistically significant difference between the Chi-square (x^2) difference tests suggests strong content validity (Bagozzi, Yi, & Phillips, 1991).

The reliability of the constructs was assessed using Cronbach's alpha. According to Creswell, an alpha value of zero implies lack of internal consistency while a value of one indicates complete internal consistency. The acceptable alpha value for the constructs is equal to or greater than 0.70. At this range, the construct have high construct reliability and cannot change substantially if items were to be deleted from them (Creswell, 2014).

3.6 Data collection Procedure

The researcher obtained a research letters of introduction from the University department offices that assisted in getting authorization from the local administration in central Kenya counties. The reliability of the data collection tool was tested using a pilot study. The researcher also enlist trained qualified assistants who supported the questionnaire distribution. Primary data collection from the respondents was collected by use of questionnaires. The research assistants were trained on how to administer the questionnaire.

3.7 Data Analysis Techniques

The data obtained was analyzed using STATA version 15.0. Descriptive analysis was done for all the independent and dependent variables to obtain frequency. The purpose was to summarize the data and present it in a manageable form. The statistical tools of analysis used were: Frequencies, percentages, Mean and standard deviation.

The results were presented in tables and figures. Finally, an interpretation of the results was done to draw conclusions for the research questions and hypothesis.

3.8 Operationalization of the study

Table 3.2: Operationalization of the variables

Variable	Nature of variable	indicator	Measurement	Level of measurement	Data collection	Data analysis
Top leadership commitment	Independent	Management involvement Resource provision Encouragement programs Vertical communication	Number of review meetings Number of encouragement programs Number of vertical communication	Ordinal	Structured Questionnaire	Frequencies descriptive analysis Percentages Mean Standard deviation
Staff training	Independent	Continues training Assessment of training needs Refresher programs Sense of satisfaction	Number of trainings Number of refresher training Number of assessment of trainings needs done	Ordinal	Structured Questionnaire	Frequencies descriptive analysis Percentages Mean Standard deviation

Team work	Independent	Team recognition Team-based problem solving Use of Inter-departmental work groups	Number of inter-departmental work groups. Number of meetings	Ordinal	Structured Questionnaire	Frequencies descriptive analysis Percentages Mean Standard deviation
Staff appraisals	Independent	Staff appraisals Staff recognition	Number of staff appraisal done per year Number of staff recognized	Ordinal	Structured Questionnaire	Frequencies descriptive analysis Percentages Mean Standard deviation
Performance of selected medical laboratory projects managed by CDC	Dependent	Accurate results Reduced turn-around time Quality diagnosis Clinician and patient satisfaction Staff commitment	Number of accurate results released Number of Client surveys done Number of results released on time	Ordinal	Structured Questionnaire	Frequencies descriptive analysis Percentages Mean Standard deviation

3.9 Ethical Considerations

Informed verbal consent was taken from each participant before administering the questionnaire. The confidentiality of the respondents was assured and anonymity guaranteed as an integral part of the research.

CHAPTER FOUR
DATA ANALYSIS, PRESENTATION, INTERPRETATION AND DISCUSSION

4.1 Introduction

This chapter presents data analysis presentation and interpretation. The objective of the study was to examine influence of human factors on Medical laboratory performance in selected laboratories in Central Kenya. Results from the study were presented in order of the research questions and objectives.

4.2 Questionnaire Response rate

The researcher administered questionnaires to 81 targeted respondents hence the return rate was 100% this was as result of full support from county representatives and university of Maryland colleagues support. The respondents were first called to confirm their availability in order to administer the questionnaires.

4.3 Demographic characteristics of respondents

Background information of the respondents can influence performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya. It was therefore important to study the background of the respondents as academic qualification and duration they have worked in the laboratories.

4.3.1 Distribution of staff by level of academic qualification

Staff respondents' feedback on the level of academic qualification attained was as presented

Table 4.1: Level of Academic qualification of staff respondents

Qualification	Frequency	Percent
Diploma	12	15
Bachelor degree	65	80
Master's degree	4	5
Total	**81**	**100**

Majority of staff respondents were found to be bachelor degree holders at 80%, diploma at 15%. all respondents seemed to understand the importance of research and thus they cooperated well. This is indicative of a fair distribution of skills and qualification levels expected in most organization.

4.3.2 Distribution of staff respondents by number of years worked

To establish the staff respondents level of understanding of performance of laboratory, they were requested to indicate the number of years they have worked for the organization.

Table 4.2: Distribution of staff respondents by number of years worked

Number of years bracket	Frequency	Percent
< 1 year	0	0
1-2 years	0	0
3-5 years	65	80
6-10 years	10	12
>10 years	6	8
Total	**81**	**100**

Majority of the employees 80% have worked between 3-5 years, 12% have worked for a period of 6-10 years and 0 % have worked for less than two years. This shows that at least each staff understands the functionality and operation of the laboratory systems.

4.4 Top leadership commitment and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

The first objective was to find out the extent to which top leadership commitment influences the performance of medical laboratory in selected medical laboratories in Central Kenya.

Table 4.3: Top leadership commitment and laboratory performance

(1 = strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree)

		1	2	3	4	5
1	Laboratory management is actively involved in quality improvement	5(6.2%)	0(0.0%)	**5(6.2%)**	31(38.3%)	40(49.4%)
2	Management provides the necessary resources to carry out activities efficiently	0(0.0%)	5(6.2%)	21(25.9%)	25(30.9%)	30(37%)
3	Laboratory management encourages employee to consider customer needs and expectations	0(0.0%)	0(0.0%)	10(12.4%)	44(54.3%)	27(33.3%)
4	Management quality objectives are disseminated to all employees	5(6.2%)	0(0.0%)	23(24.8%)	6(7.4%)	47(58%)
5	Top management pursues long term objectives	19(23.5%)	0(0.0%)	0(0.0%)	53(65.4%)	9(11.1%)

The extent to which laboratory management is actively involved in laboratory performance was assessed. According to this study, out of the 81 respondents, 6.2% strongly disagreed, 6.2% moderated, 38.3 % agreed and 49.4% strongly agreed. This depicts that in majority of the sites, the leadership has taken the mantle and is steering quality improvement strategies, however in some laboratories, the leadership has neglected quality issues as 6.2% strongly disagreed. This shows that there is need to sensitize the leadership on importance of quality improvement to ensure that the quality of services offered cut across the region.

On resources provision by the management, it was found that in most settings laboratory management avails the necessary resources to carry out activities efficiently. Out of the 81 participants accessed, only 5% indicated that there is no provision of the required resources, hence is important that the concerned management mobilize these resource as they play a key role in quality improvement.

Prioritizing the customer needs was assessed and the findings were appealing as the laboratory managers are encouraging employees to prioritize customer needs and expectation. Out of the 81 participants assessed, 12.4% moderated, 54.3% agreed and 33.3% strongly agreed. Laboratory management should always embolden their employees on this to ensure that the customers are satisfied with the services offered

The extent to which management quality objective are disseminated to all employees too was agreed where, 6.2% strongly disagreed, and 28.4% moderated, 7.4% agreed while 58% strongly agreed. This shows that most management teams are sharing the objectives with the employees. However with the 6.2% who disagreed and the moderators, there is need to encourage the management to always disseminate their objectives as the employees are always hand on work hence play a vital role in quality issues. Sharing these aims with them will help the employed direct their efforts toward achieving them

Finally, the extent to which top management pursue long term goals was assessed where of the 81 participants, 23.5% strongly disagreed,65.4% agreed and 11.1% strongly agreed. This shows that there is no streamlined strategy that cuts across all facilities in the region as some are ragging behind according to this study. Pursuing long term objectives helps the involved team remain focused and work towards achieving the set goals. Long term goals also help in daily improvement of the quality of the services delivered as the focus is sustained towards the set mark.

4.5 Staff training and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

The second objective was to examine the extent to which staff training influences the performance of medical laboratory in selected medical laboratories in Central Kenya

Table 4.4: Staff training and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

(1 = strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree)

		1	2	3	4	5
1	Continuous training is provided for managerial personnel	5(6.2%)	5(6.2%)	43(53.1%)	28(34.6%)	0
2	Continuous training is provided for non-managerial personnel	5(6.2%)	0(0.0%)	22(27.2%)	37(45.7%)	17(21%)
3	Training needs are always evaluated	0(0.0%)	16(19.8%)	23(24.8%)	37(45.7%)	5(6.2%)
4	Refresher training programs have been established	0(0.0%)	23(24.8%)	6(7.4%)	51(63%)	1(1.2%)
5	The institution measures employee satisfaction with training received	5(6.2%)	18(22.2%)	27(33.3%)	27(33.3%)	4(4.9%)

Provision for continuous managerial personnel's training was assessed where, out of the 81 participants assessed 6.2% strongly disagreed, 6.6% disagreed 53.1% moderated and 34.6 % agreed. This information stipulates that training of managerial team is yet to be prioritized in the region hence there is ineffective leadership or old methods are employed hence there is need for training in order to incorporate the new skills and strengthen the existing ones. Continuous and regular trainings boast one's knowledge hence improving management skill's which means the quality of the services offered down the line.

The concerned stake holders should therefore consider offering continuous training to the management teams as if directly affects the services offered.

Out of the participants assessed for provision of continuous training for the non-managerial personnel's, 6.2% strongly disagreed, 27.2 moderated, 45.7% agreed while 21% strongly agreed. This shows that in majority of the sites audited, non-managerial personnel are continuously trained and hence the outcome is evident in the services provided. However, some participants recorded that there were no trainings at all which depicts that there is a gap in some facilities which calls for bridging in order to improve the overall performance in the region. Continuous trainings ensures that the quality of services offered is maintained and is always up to the standard.

The extent to which the training needs are evaluated was assessed where 19.8% disagreed, 28.4% moderated, 45.7 agreed and 6.25 strongly agreed. Evaluation for training needs is important as it helps the stake holder to identify the demanding areas hence helping come up with a training that suits or rather addresses the prevailing issues. According to this study some stake holders have embraced this evaluation however there is need to consider the left our group (up to 19%) which has been left out. Not evaluating for training needs means that blind trainings are offered which may end up being ineffective as their content may not be addressing the personnel's needs.

The extent to which refresher training programs have been established was also assessed where 28.4% disagreed, 7.4 moderated, and 63%agreed and 1.2% disagreed. This indicated that refresher trainings have picked up in majority of the facilities involved. On the other hand the 28.4 %(disagreed) number is alarming and therefore there is need to put up guidelines that will enhance this practice regularly

Lastly the extent to which the institution measures employee satisfaction with training received was also assessed where 6.2% strongly disagreed, 22.2% disagreed, 33.3% moderated, 33.3% agreed while 4.9% strongly agreed. According to these findings it's clear that some institutions are really concerned about meeting the employee's needs while others have no priority in their satisfaction. Measuring whether the employee was contented with the training offered is very important as this helps in the determining whether the training was effective or not. The information given by the employee is also very crucial as it will help in establishing the kind of content that will be offered in the forthcoming trainings.

4.6 Teamwork and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Third objective was to establish the extent to which Team work influences the performance of Medical laboratory in selected laboratories in Central Kenya

Table 4.5: Teamwork performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

(1 = strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree)

		1	2	3	4	5
1	Teamwork recognition is favored over individual recognition	12(14.8%)	21(25.9%)	11(13.6%)	28(34.6%)	9(11.1%)
2	Our laboratory usually solves problems by team work	0(0.0%)	0(0.0%)	16(19.8%)	44(54.3%)	21(25.9%)
3	Inter-departmental teams and groups are usually used	5(6.2%)	6(7.4%)	22(27.2%)	37(45.7)	11(13.6%)

The extent to which team recognition is favored over individual recognition was also assessed where 14.8% strongly disagreed, 25.9% disagreed, and 13.6% moderated, 36.4% agreed while 11.1% strongly agreed. This depicts that in some institutions, team work is recognized while in others individuals work is recognized. Team work recognition is crucial as this encourages the employee to combine their efforts together in the focus of the determined goals which is quality

The extent to which laboratory solves problems by team work was also assessed where, 19.8% moderated, 54.3% agreed while 25.9% strongly agreed. This is positively effective as the concerned individuals are involved in problem solving .it also help helps to determine the root cause of the problem and hence coming up with lasting solutions

Finally the extent to which inter-departmental work teams and groups are usually used was assessed where 6.2% strongly disagreed, 7.4 %disagreed, 27.2% moderated, 45.7% agreed while 13.6% strongly agreed. This information shows depicts that some institutions have adapted the interdepartmental team work while others are yet to inter-departmental team work is important as it indirectly affects the overall quality laboratory performance and especially when there is outsourcing of resources from other departments.

4.7 Staff appraisals and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

The forth objective was to establish the extent to which staff appraisal influences the performance of laboratory in selected laboratories in Central Kenya

Table 4.6: Staff appraisals and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

(1 = strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree)

		1	2	3	4	5
1	Staff appraisals are regularly conducted	0(0.0%)	6(7.1%)	9(11.1%)	29(35.8%)	37(45.7%)
2	Laboratory performance is motivated by a performance-based strategy	26(32.1%)	13(16.1%)	17(21%)	25(30.9%)	0(0.0%)
3	Management uses a performance-based strategy to compensate staff	35(43.2%)	29(38.5%0	8(9.9%)	9(11.1%)	0(0.0%)
4	A performance-based approach contributes to improved quality performance	0(0.0%)	23(28.4%)	7(8.6%)	21(35.9%)	30(37%)

The extent to which staff appraisals are regularly conducted was assessed and out of the 81 participants, 7.1% disagreed, 11.1% moderated, 35.8% agreed and 47.5% strongly agreed. According to these findings, it is clear that majority of the involved institution are conducting staff appraisal regularly. The institutions left out should also consider this practice as staff appraisals helps to assess the value of the services offered by the staff. Having regular staff appraisals ensures that this this value is sustained.

Laboratory staff motivation by a performance based strategy was assessed where 32.1% strongly disagreed, 16.1% disagreed, 21% moderated and 30.9% agreed. This clearly shows that few institutions are motivating their staffs based on performance while the majority are left. Motiving the staff on basis of performance boosts one's morale and also encourages the poorly performing staffs to do better

The extent to which the management uses performance based strategy to compensate staff was also evaluated where 43.2% strongly disagreed, 35.8% disagreed, 9.9% moderated and 11.15% agreed. This showed that the compensation of staff is not based on the work they do in majority of the institution. When staff are compensated based on their performance they tend to do better in their specified role which directly affects the final quality.

Finally, the extent to which a performance based approach contributes to improved quality performance was assessed, here 28.4% disagreed, 8.6% moderated, 35.9% agreed and 37% strongly agreed. This information show that when staffs are compensated based on what they do they become more vigilant in whatever they do and this means there will be improved quality as evidenced in the findings of this study.

4.8 Performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Table 4.7: performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

(1 = strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree)

		1	2	3	4	5
1	The turn-around time have greatly reduced post-quality program	0(0.0%)	0(0.0%)	319(38.3%)	36(44.4%)	14(17.3%)
2	The rate of sample rejection has significantly declined	0(0.0%)	0(0.0%)	18(22.2%)	24(29.6%)	39(48.2%)
3	Clinicians satisfaction rate with laboratory results have improved	0(0.0%)	697.4%)	5(6.2%)	52(64.2%)	18(22.2%)
4	External quality assessment results have improved	0(0.0%)	0(0.0%)	5(6.2%)	23(28.4%)	53(65.4%)
5	Non-conformities of laboratory examinations have reduced	0(0.0%)	0(0.0%)	18(22.2%)	49(60.5%)	14(17.3%)
6	Punctuality of laboratory staff has improved	0(0.0%)	5(6.2%)	36(44.4%)	18(22.2%)	22927.2%)

The extent to which the turn-around times have greatly reduced post-quality programs was assessed where 38.3% moderated, 44.4% agreed and 17.3% strongly agreed. This clearly indicates that the laboratory quality management system has reduced the turn-around time which in turn has improved the quality performance hence reducing the reducing the post-quality programs.

The extent at which the rate of sample rejection has significantly declined was also looked at where 22.2% moderated, 29.6% agreed and 48.4% strongly agreed. This shows that there is streamlined guidelines through laboratory quality management system that have helped reduce the rate of sample rejection. Also the involved personnel have well played their role in ensuring that the samples are properly collected and clients are directed accordingly.

The extent to which clinician's satisfaction rate with laboratory results have improved was assessed where 7.4% disagreed, 67.25% moderated, 64.2% agreed and 22.25% strongly agreed. This shows that the quality of the laboratory results has greatly improved as majority of the clinicians are satisfied. However as 7.4% disagreed, there is need to assess the implementation of the LQMS to ensure that the guidelines are properly followed .Clinicians satisfaction is very important as they use the results provided to make decisions on what medications to offer to the clients .Quality results means quality treatment which is the overall goal of the facility at large.

The extent to which external quality assessments results have improved was also looked at where 6.25% moderated, 28.4% agreed and 65.4% strongly agreed. This shows that following LQMS the quality of results offered have improved and this has also been reflected in external quality assessment results.

The extent at which non-conformities of laboratory examination have reduced was assessed where 22.2% moderated, 60.5% agreed while 17.3% strongly agreed. This shows that these non-conformities have really reduced and the QLMS has played its role in ensuring that this state is sustained.

Lastly the extent at which the punctuality of laboratory staff has improved was assesses where 6.2% disagreed, 44.4% moderated, 22.2%agreed and 27.2% strongly agreed. This indicates that in majority of institutions staff punctuality has improved however there is need to streamline protocols in the 6.2% that disagreed. Punctuality is very critical in the laboratory and this ensures that there enough and quality time to carry out the daily activities.

Table 4.8: Summary of mean and standard deviation computed for the variable

Mean estimation

Factors	Mean	Std. Err.	[95%_Conf	Interval]
Top leadership	2.82716	.1498869	2.528876	3.125445
Staff Training	2.679012	.149925	2.380652	2.977373
Teamwork	2.580247	.1627922	2.25628	2.904214
Motivation	2.765432	.1554281	2.45612	3.074744
Quality Performance	2.716049	.1533923	2.410789	3.02131

4.9 Pearson correlation coefficient

Pearson correlation is a measure of linear dependence between two variables. The researcher correlated the findings of each of the independent variables against that of dependent variables.

Table 4.9: Pairwise correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) Top leadership	1.000				
(2) Staff Training	0.958* 0.000	1.000			
(3) Teamwork	0.937* 0.000	0.905* 0.000	1.000		
(4) Motivation	0.985* 0.000	0.973* 0.000	0.939* 0.000	1.000	
(5) laboratory Performance	0.933* 0.000	0.917* 0.000	0.923* 0.000	0.923* 0.000	1.000

* shows significance at the0 .05 level

The result revealed that there was a positive and significant relationship between Top leadership and staff training (r=0.958, p=0.000). There was a positive and significant relationship between top leadership and Team work (r=0.937, p=0.000). There was a positive and significant relationship between Top leadership and laboratory performance (r=0.933, p=0.000).

4.10 Discussion of findings

Findings on Top Leadership commitment and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya is in line with Andiric and Massambu, (2015), Nzabahimana, (2014), Somatunga , (2015). Andiric and Massambu (2015) who reported that management teams that were active and highly engaged led their teams to success. In contrast, teams with less active and less engaged management lagged in implementation and improvement in laboratory performance and that the level of top leadership involvement affects the outcome of quality improvement programs . from this reseach majority of respondents felt that top leadership is very key in laboratory success and access to resources to high extend affect the laboratory performance.

Findings on Staff training and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya is in line with Mokobela, Moatshe; (2014), who quoted that training enables the laboratory management team and staff to become aware of the need to participate in quality improvement programmes. showed that as understanding and ownership of the quality improvement process is increased amongst management and staff, they become more engaged and actively involved. These findings were replicated by Somatunga , (2015) who found a statistically significant correlation of training with the Continuous Quality Improvement Program Implementation.it was clear according to the opinion of majority that staff training to high extend influences the laboratory performance.

Findings on team work and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya conforms to Gachuki and colleagues who found that collective involvement is important in implementing change. It enables the team to build a shared vision and strive to meet the quality objectives. In their study, they established that teamwork helped to prevent the mentality that quality improvement was ‘someone else’s job’ and ensured shared ownership of the process among the national HIV reference laboratory staff team. According to Gachuki, employees showed collective responsibility by holding weekly

section meetings, brainstorming local solutions and sharing of best practices. This ensured that there was no slackening of momentum (Gachuki, et al., 2014).

CHAPTER FIVE

SUMMARY OF FINDINGS, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

This chapter provides the summary of the findings, conclusions and recommendations of the study based on the objectives of the study.

5.2 Summary of findings

This section presents the results from the study on influence of human factors on performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

5.2.1 Top leadership commitment and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Majority of respondents strongly agreed that top leadership is actively involved in Quality performance of the laboratory. The leadership has taken the mantle and is steering quality improvement strategies, however in some laboratories, the leadership has neglected quality issues as 6.2% strongly disagreed. This shows that there is need to sensitize the leadership on importance of quality improvement to ensure that the quality of services offered cut across the region. It is important that the concerned leadership mobilize resource required in the laboratory as they play a key role in quality improvement. Prioritizing the customer needs was assessed and the findings were appealing as the laboratory managers are encouraging employees to prioritize customer needs and expectation. Most management teams are sharing the objectives with the employees. However, with the 6.2% who disagreed there is need to encourage the management to always disseminate their objectives as the employees are always hand on work hence play a vital role in quality issues. Sharing these aims with them will help the employed direct their efforts toward achieving them. Pursuing long term objectives helps the involved team remain focused and work towards achieving the set goals. Long term goals

also help in daily improvement of the quality of the services delivered as the focus is sustained towards the set mark.

5.2.2 Staff training and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Staff training was noted to be a factor influencing performance of the laboratory. Majority of respondents stated that training of managerial team is yet to be prioritized in the region hence there is ineffective leadership or old methods are employed hence there is need for training in order to incorporate the new skills and strengthen the existing ones. Continuous and regular trainings boast one's knowledge hence improving management skill's which means the quality of the services offered. The concerned stake holders should therefore consider offering continuous training to the management teams as if directly affects the services offered. Laboratory technical personnel are continuously trained and hence the outcome is evident in the services provided. However, some participants recorded that there were no trainings at all which depicts that there is a gap in some facilities which calls for bridging in order to improve the overall performance in the region. Continuous trainings ensure that the quality of services offered is maintained and is always up to the standard. Evaluation for training needs is important as it helps the stake holder to identify the demanding areas hence helping come up with a training that suits or rather addresses the prevailing issues. According to this study some stake holders have embraced this evaluation however there is need to consider the left our group (up to 19%) which has been left out. Not evaluating for training needs means that blind trainings are offered which may end up being ineffective as their content may not be addressing the personnel's needs.

Refresher trainings have picked up in majority of the facilities involved. On the other hand the 28.4 %(disagreed) number is alarming and therefore there is need to put up guidelines that will enhance this practice regularly. According to these findings it's clear that some institutions are really concerned about meeting the employee's needs while others have no priority in their satisfaction. Measuring whether the employee was contented with the training offered is very important as this helps in the determining whether the training was effective or not. The information given by the employee is also very crucial as it will help in establishing the kind of content that will be offered in the forthcoming trainings.

5.2.3 Team work and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

The findings show that in some institutions, team work is recognized while in others individuals work is recognized. Team work recognition is crucial as this encourages the employee to combine their efforts together in the focus of the determined goals. The findings show that laboratory solves problems by team work, this helps to determine the correct root cause of the problem and hence coming up with lasting solutions. Some institutions have adapted the interdepartmental team work while others are yet to, inter-departmental team work is important as it indirectly affects the overall quality laboratory performance and especially when there is outsourcing of resources from other departments.

5.2.4 Staff appraisals and performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

Staff appraisals was noted to be a factor influencing performance of the laboratory. Majority of respondents strongly agreed that majority of the institutions are conducting staff appraisals regularly. The institutions left out should also consider this practice as staff appraisals helps to assess the value of the services offered by the staff. Having regular staff appraisals ensures that this value is sustained. Majority said that laboratory staff motivation was based on performance based, motiving the staff on basis of performance boosts one's morale and also encourages the poorly performing staffs to do better. Majority of respondents strongly disagreed that management uses performance based strategy to compensate staff. This showed that the compensation of staff is not based on the work they do in majority of the institution. When staff are compensated based on their performance they tend to do better in their specified role which directly affects the final quality. When staffs are compensated based on what they do they become more vigilant in whatever they do and this means there will be improved quality as evidenced in the findings of this study.

5.2.5 Performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya

This study clearly indicates that the laboratory quality management system has reduced the turn-around time which in turn has improved the quality performance hence reducing the reducing the post-quality programs. There is streamlined guidelines through laboratory quality management system that have helped reduce the rate of sample rejection. Also the involved

personnel have well played their role in ensuring that the samples are properly collected and clients are directed accordingly. The quality of the laboratory results has greatly improved as majority of the clinicians are satisfied. However as 7.4% disagreed, there is need to assess the implementation of the LQMS to ensure that the guidelines are properly followed. Clinicians satisfaction is very important as they use the results provided to make decisions on what medications to offer to the clients. Quality results means quality treatment which is the overall goal of the facility at large. Following LQMS the quality of results offered have improved and this has also been reflected in external quality assessment results. non-conformities have really reduced and the QLMS has played its role in ensuring that this state is sustained. The finding indicates that in majority of institutions staff punctuality has improved however there is need to streamline protocols in the 6.2% that disagreed. Punctuality is very critical in the laboratory and this ensures that there enough and quality time to carry out the daily activities.

5.3 Conclusion of the study

This study sought to examine human factors influencing the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya. The leadership has taken the mantle and is steering quality improvement strategies, there is need to sensitize the leadership on importance of quality improvement to ensure that the quality of services offered cut across the region. It is important that the concerned leadership mobilize resources required in the laboratory as they play a key role in quality improvement. There is need to prioritize customer needs and expectation. the management should be encouraged to always disseminate their objectives as the employees. Sharing these aims with them will help the employed to direct their efforts toward achieving them. Pursuing long term objectives helps the involved team remain focused and work towards achieving the set goals. Long term goals also help in daily improvement of the quality of the services delivered as the focus is sustained towards the set mark.

The research findings show that there is need for training for both managerial staff and technical staff. Evaluation for training needs is important as it helps the stake holder to identify the demanding areas hence helping come up with a training that suits or rather addresses the prevailing issues. There is need to put a policy/guidelines on training in any institution Team work recognition is crucial as this encourages the employee to combine their efforts together in the focus of the determined goals. The findings show that laboratory solves problems by team work, this helps to determine the correct root cause of the problem and hence coming up

with lasting solutions. Inter-departmental team work is important as it indirectly affects the overall quality laboratory performance and especially when there is outsourcing of resources from other departments. Staff appraisals should be conducted on defined period, staff motivation should be based on performance.

The study concluded that staff training and staff appraisal influences significantly the performance of selected medical laboratory Projects managed by Centre for Disease control in Central Kenya.

5.4 Recommendations

Taking the limitations and delimitation of the study, the researcher makes the following recommendations;

The study recommends more emphasize on top leadership involvement in relation to maintenance of goals achieved in the laboratories.

It also recommends that laboratory performance analysis/ management reviews be carried out on defined periods in order to ensure sustainability of laboratory quality performance.

Access to resources by laboratory team should be aligned to laboratory goals and objectives this ensures that the right resources are pursed and not just any resource that may not be beneficial to the laboratory this is achieved through proper procurement of resources.

The researcher recommends that all employees should be trained on matters concerning laboratory quality performance.

Each laboratory should put into place policies and procedure that guides its operations and all these policies and procedures should be disseminated to all stakeholders.

The study recommends the execution of policy /procedures implementation from the project strategic level since top leadership becomes the determinant of the overall team behavior which is a major factor in laboratory performance and sustainability.

5.5 Suggestions for further Research

On the basis of what has been found out from this study, the researcher recommends that similar studies to be conducted in all other laboratories implementing Quality Management Systems in Kenya. A study should be carried out to determine the reasons why there is a high rate of staff turnover in laboratories that have achieved ISO accreditation.

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APPENDICES

Appendix I: Questionnaire

STUDY QUESTIONNAIRE

INFLUENCE OF HUMAN FACTORS ON PERFORMANCE OF SELECTED MEDICAL LABORATORIES

A CASE STUDY OF CENTRAL KENYA

Interviewer's name:……. Date: __ __/__ __ __/__ __ Time:__ __:__ __ AM:PM

Outcome:	1. Completed	2. Declined	3. Other (mention)

For each section, kindly respond to all items using a tick [ ]

This questionnaire is designed to gather research information regarding quality of performance in medical laboratories in Kenya The questionnaire has nine sections.

SECTION A: LABORATORY PROFILE

Q1. Laboratory name _____

Q2. Type of Laboratory

Public	1
Hospital	2
Private	3

Research	4
Other	5

SECTION B: LABORATORY STAFF PROFILE

Q3. Professional Qualification

Laboratory manager	1
Quality Assurance Officer	2
Hospital medical superintendent	3

Q4. Level of formal education

Certificate	1
Diploma	2
Higher diploma	3
Bachelor's degree	4
Master's degree	5
Doctorate degree	6

Q5. Work Experience in the current facility

< 1 year	1

1-2 years	2
6-10 years	3
6-10 years	4
>10 years	5

SECTION C: TOP LEADERSHIP COMMITMENT IN LABORATORY PERFORMANCE

4.1 Specify to what extent to which top management commitment is practiced in your facility

Use the scale where 1= strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree

	Factor	**1**	**2**	**3**	**4**	**5**
1	Laboratory management is actively involved in quality improvement					
2	Management provides the necessary resources to carry out activities efficiently					
3	Laboratory management encourages employees to consider customer needs and expectations					
4	Management quality objectives are disseminated to all employees					
5	Top management pursues long-term objectives					

SECTION D: STAFF TRAINING AND LABORATORY PERFORMANCE

5.1 To what extent do you agree with the following?

Use the scale where 1= strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree

	Factor	**1**	**2**	**3**	**4**	**5**
1	Continuous training is provided for the managerial personnel					
2	Continuous training is provided for the non-managerial personnel					
3	Training needs are always evaluated					
4	Refresher training programs have been established					
5	The institution measures employee satisfaction with training received					

SECTION E: TEAMWORK AND LABORATORY PERFORMANCE

6.1 To what extent is teamwork implemented

Use the scale where 1= strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree

	Factor	**1**	**2**	**3**	**4**	**5**
1	Teamwork recognition is favored over individual recognition					
2	Our laboratory usually solves problems by teamwork					
3	Inter-departmental work teams and groups are usually used					

SECTION F: STAFF APPRAISALS AND LABORATORY PERFORMANCE

7.1 To what extent does recognition and award influence quality performance?

Use the scale where 1= strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree

	Factor	**1**	**2**	**3**	**4**	**5**
1	Staff appraisals are regularly conducted					
2	Laboratory staff is motivated by a performance-based staff appraisals					
3	Management uses a performance-based strategy to compensate staff					
4	A performance-based approach contributes to improved quality performance					

SECTION G: LABORATORY PERFORMANCE

8.1 Specify to what extent the following quality performance measures are true.

Use the scale where 1= strongly disagree, 2= disagree, 3= moderate 4= agree and 5= strongly agree

	Factor	**1**	**2**	**3**	**4**	**5**
1	The turn-around times have greatly reduced post-quality program					
2	The rate of sample rejection has significantly declined					
3	Clinicians satisfaction rates with lab results have improved					

4	External quality assessment results have improved					
5	Nonconformities of laboratory examinations have reduced					
6	Punctuality of laboratory staff has improved					

Thank you for your Participation