

**ORGANIZATIONAL BREACHES AND DRUGS INVENTORY
SECURITY MANAGEMENT IN HEALTH INSTITUTIONS,
NYERI COUNTY - KENYA**

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**A Thesis Submitted to the School of Business management and
Economics in Partial Fulfillment for the Award of Degree of Master
of Science in Supply Chain Management of Dedan Kimathi
University of Technology**

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DECLARATION

This thesis is my original work and has not been presented in any University/Institution for a degree or for consideration of any certification.

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DEDICATION

I dedicate this project to my wife Elizabeth Ndumi and Dedan Kimathi University of Technology and all able-bodied scholars who are my source of inspiration to fulfill my responsibility as a student.

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ABBREVIATIONS AND ACRONYMS

BPR	-	Business Process Reengineering Theory
CoK	-	Constitution of Kenya
FBO	-	Faith Based Organizations
GOK	-	Government of Kenya.
HSRS	-	Health Sector Reform secretariat
IMR	-	Infants Mortality Rate
IT	-	Information Technology
JIT	-	Just –In –Time
KDHS	-	Kenya Demographic Health Survey
KEMSA	-	Kenya Medical Supplies Authority
KHPF	-	Kenya Health Policy Framework.
MDGs	-	Millennium Development Goals
MOH	-	Ministry of Health.
MoPHS	-	Ministry of Public Health and Sanitation
MoMS	-	Ministry of Medical Services
MRC	-	Ministerial Reform Committee
MTPs	-	Medium Term Plans
NCPA	-	National Community Pharmacists Association
NGO	-	Non Governmental Organizations.
OWG	-	Open working group
PEPFAR	-	Presidential Emergency Plan for AIDS Relief
RoK	-	Republic of Kenya
PGH	-	Provincial General Hospital
SDGs	-	Sustainable Development Goals
SPSS	-	Statistical Package for Social Sciences
WERC	-	Warehousing Education and Research and council

ABSTRACT

The study analyzed the effects of organization breaches on drug inventory security management for the health institutions in Nyeri County Kenya. The study was guided by four specific objectives; to analyze the effect of organizational regulation, storage infrastructure, skills of the staff and internal environmental factors on drug inventory security management in health institutions, Nyeri County. Drugs in health institutions are mismanaged by handlers for personal interest when there are no proper ways of securing them. In recent years, the theft of medicines from hospitals worldwide has emerged as a booming criminal phenomenon which represents a serious threat to people's health. Descriptive design was adopted to cover the three general categories of Health Institutions. The target population was 357 permanent members of staff working in Public, Faith-Based and Private health institutions with bed capacity. A sample of 130 respondents was selected using stratified sampling method where close-ended questionnaires were used to collect the primary data. SPSS package Version 21 was used to process and analyze the data where the output was presented in the form of frequency distributions, means and standard deviations. A regression model was developed to establish the relationship between the independent variables and the dependent variable. The coefficients of the independent variable were: organizational regulations (X_1) 0.138, storage infrastructure (X_2) 0.389, skills of staff (X_3) 0.210 and internal environmental factors (X_4) 0.468 which were all positive. The findings revealed that internal factors had the greatest influence on the drugs inventory security management in hospitals and organizational regulations had the least effects. The regression model generated R^2 value of 0.616 meaning 61.6% of the drugs security management was significantly influenced by the four research variables. The P value from F-test statistics $F(4,120) = 16.335$ was significant at 05% level ($\text{sig. } F < 0.005$), confirming the model's fitness. The study variables had a positive relationship and all the P values were less than 5% hence statistically significant to make a conclusion on the population implying that the study variables had significant positive effect on the drugs security management. Further conclusion were that organizational regulation were not properly implemented due to corruption and inadequate resources while internal environmental factors was strongly affected by poor organizational culture. The study recommends that the management should be reviewing drugs related regulations annually, enhance storage facilities and eliminate the bad culture of diverting drugs through instituting tight procedures and systems.

CHAPTER ONE:

INTRODUCTION

1.1 Background of the Study

Each organization in the world stores goods, equipment's and other related stores which enable free flow of their activities. According to García-Alcaraz and Maldonado-Macías, (2016), organization must balance benefits and cost of inventory to ybe able to achieve its goal. Since Operations and production leads to inventory, Security of this inventories held by organizations need to be guarded to contributes to the sustainability of an enterprise and enhances the level of customer satisfaction as it is in health sector.

In recent years, the theft of medicines from Italian hospitals has emerged as a booming criminal phenomenon (Trans Crime, 2016). This issue represents a serious threat to people's health, the national budget, companies' revenues and legal competition. In Italy, thefts of medicines caused a total economic loss of more than 22 million Euros which translate to be Ksh 2.8billion (Trans Crime, 2016). The report stated that the figure is likely to be underestimated due to underreporting of smaller-scale thefts, and managers' propensity to address crimes internally for avoiding reputational damages

In reference to "Warehousing Education and Research Councils (WERC) and supply chain vision, 2007 (Tajima, 2007). Storage and inventory control plays a crucial role in boosting security of inventory using best practice attributes of; Location management, product data and special requirement, inventory control system, Transaction processing, Cycle count and Inventory strategy. The vision aims at reducing all possible fields of allowing multi-practices. Preserving of goods for

continuous consumption, utilisation and for future use is a pervasive human desire. Holding goods from the time of production or from when they are received to the time of consumption allows steady flow of goods to the market (Carmody, Townsend and Schwartz, 2013).

While the benefits of securing warehousing stocks were many and were known by all the stakeholders, the security of such inventories was never guaranteed in many organizations (Kausar, Afzal, Brajesh, Rizwan, Pranav and Vimal, 2014). Security of inventories held in warehouses owned by health institutions is normally challenged by occurrences of theft, fire outbreak, drug diversion, breakage and mishandling of items, pilferage as well as deterioration of products due to negligence or lack of due care. According to the deterministic inventory and stochastic inventory models, all inventories have an element of un-certainty and the study is aiming to reduce the level to lowest if not zero. The threat of theft is perhaps the most disturbing feature of inventories held in various public health institutions due to personal gains. Theft by the staff operating in those institutions is one of the leading security challenges in public health facilities. Working on environment that gives staff personal accountability will completely reduce breaches and can be well covered by fully looking into institutional regulations, storage infrastructure, skills of employees and environmental factors. Rarely do we receive reports of open robberies, fire outbreaks and Breakage where drugs or other assets are stolen (Fathalla, and Maggy, 2013).

In Africa, where rampant cases of corruption and other malpractices are common, sufficient supporting documentation should be maintained for pharmacy purchases evidencing drugs received match the type and quantity reflected on the vendor invoice. Data analytics can also be used to compare the price on the vendor invoices to the negotiated or contracted drug purchase price. Sakhuja, Bajaj and Singla (2012)

while testing the stability of pharmaceutical products, found out that stability testing is a complex set of procedures involving considerable cost, time consumption and scientific expertise in order to build in quality, efficiency safety in drugs.

According to Mwita, Tunzo, Jande and Hamasaki (2017) in Tanzania there were problems of un-accounted medicine stock and frequent stock-outs, Factors which were contributing to these stocks problems included poor inventory management and lack of skilled staff. This problem led to high mortality rate in the country forcing the government reshuffle and sacking of senior officials. To mitigate these problems, drugs received and stored in a pharmacy should be placed into inventory through a number of avenues, such as reconciling drugs received to drugs ordered to ensure that discrepancies between quantity and drug type do not exist. Drug storage can include the use of automated dispensing devices where drugs are directly scanned and input into the pharmacy management system according to the type of substance, allowing for automatic tracking and inventory counts. Keitany, Mwaura and Odhiambo (2015) observed that, controlled substances require additional storage security to prevent any unauthorized access and must be received by authorized personnel with a purchaser's copy completed and acknowledged by the pharmacist.

In 1994, the Government of Kenya (GOK) approved the Kenya Health Policy Framework (KHPF) as a blueprint for developing and managing health services. It spells out the long-term strategic imperatives and the agenda for Kenya's health sector. To operationalize the document, the Ministry of Health (MOH, 2014) through programme "taking the Kenya Essential package for Health to community" developed the Kenya Health Policy Framework Implementation Action Plan and established the Health Sector Reform Secretariat (HSRS) in 1996 under a Ministerial Reform Committee (MRC) in 1997 to spearhead and oversee the implementation

process. The above policy initiatives aimed at responding to the following constraints: decline in Health sector expenditure, inefficient utilisation of resources, centralized decision making, inequitable management information systems, outdated health laws, inadequate management skills at the district level, worsening poverty levels, increasing burden of disease, and rapid population growth. In Kenya, public tenders can be found in different sectors and at different levels, that is, Kenya Medical Supplies Authority (KEMSA), which is the largest source of public procurement in Kenya (MOH, 2014).

According to National Community Pharmacists Association (NCPA) 2008 “Efficient inventory management is essential to the profitability of pharmacy” Without adequate pharmacy inventory management practices hospitals run the risk of not being able to provide patients with the most appropriate medication when it is most needed. A study conducted in Taita Taveta County concluded that logistic skills level of personnel involved in medicine supply in the hospitals studied was poor and the inventories of medicines in the public hospitals were not well managed (Kaloli, Paczkoski, Mburuku, Pinho and Galea, 2015). Effective drugs control mechanisms provide a basis for consistent quality, better financial performance and improved regulatory compliance when implemented appropriately and adhered to during day-to-day operations in managing inventories held in hospitals.

Leading practices and internal controls pertaining to procurement, record maintenance, tracking systems, traceability, storage, disposal and segregation of duties should be in place in all medical centres. Total cost of ownership is an assessment of all costs involved with an item over its useful life; Drug costs make up an increasing percentage of healthcare expenses, so proper management of drug procured is essential for addressing cost and promoting patient safety and quality care

(Hermida and Robalino, 2013). To ensure pharmacy procurement activities are operating appropriately, management should develop formal procurement procedures specifically to deal with health department purchases (Public Procurement and Disposal Act, 2005). These procedures should be reviewed regularly and updated as necessary to reflect changes in regulations and operations. Regulations should be designed to promote safety and efficacy for drug purchases, in addition to cost management techniques, strong controls around drug procurement, hospital pharmacy management must properly monitor the processing and payment of drug vendor invoices to ensure that products ordered were correctly received and invoiced (Albarune and Habib, 2015).

According to Nyeri County Government Business permit control department and office of Director of medicine (2016), there are three broad categories of health institutions that is Public, private and Faith-based. The largest public health facility being Nyeri Teaching and referral Hospital (level-v) that currently handles an average of 1000 patients per day, Mathari Catholic Church based hospital is another largest medical facility handling an average of 500 patients per day and a well-known private hospital by the name Outspan Hospital handling about 400 daily. Other public health centres are found in the neighboring market centers such as Karatina, Othaya, Chaka, Ihururu, Mweiga and Kiganjo (Kenya Demographic Health Survey-KDHS, 2016). The budget allocation to the health sector, Ministry of Medical Services (MoMS) and Ministry of Public Health and Sanitation (MoPHS) for the year 2016/17 accumulated to a total of KSh 41.5 billion of government resources which represents 6.5% of the total estimated government budget and 1.5% of the Gross Domestic Product (GDP) (KDHS, 2016) of these Ksh 8.7 billion goes to the purchase of essential medicine for

the public hospitals, If these medicine are not well managed, then it is likely to affect the health of millions of Kenyans.

In each organization or institutions there are laid down procedures, polies, rules and regulations to enable them to work effectively. When the procedures are not well crafted, or un-adhered to, they lead to poor performance or insecurity of the organization to go to its full life. In most cases the insecurity is contributed by poor policies, poor structures, unskilled labour, organizational culture, noums, internal and external environment among others

Health institutions are facilities made purposely to handle outpatient and inpatient with intention to cure deceases. Drug inventory are key recourses found in these institution need to be well managed to avoid overstocking and lack space of drugs when needed. In Nyeri County, these health institutions are many and they are not effectively managed as reflected by case study conducted by Centre for Health Solutions (CHS-Kenya, 2013) at Nyeri Provincial Hospital on effectiveness of staff with support of president Emergency Plan for AIDS Relief (PEPFAR). This established that shortage of staff and training contributed to low quality of service experienced at the hospital.

1.1.1 Organizational Breaches

Organizations are groupings that enable people to deliver to the goal and takes many forms like Health institutions, companies, Industries among others. This organizations suffers some factors or breaches which make them not to deliver to it expectations. The study picked four of the breaches for the study as follows Organizational Regulations, storage infrastructures, kills of staff and Internal environmental factors

1.1.2 Drug Inventory Security Management

Drugs inventories are mostly affected by stealing and diversion by handlers due to high demand from needy customer and when tidy security is not maintained, then chances of diverting them to personal interest are high. Therefore drug inventory security management carrier core duty is safe guard the drugs from Stock theft.

1.2 Statement of the Problem

Drugs in health institutions are mismanaged by handlers for personal interest when there are no proper ways of securing them. Documentation of factors believed to be critical organizational breaches that causes ineffectiveness in pharmaceutical sections can be reduce to zero. Drug inventory is of high financial value and temptations to divert them for private gain are high. The security of drug inventories may be compromised by both employees and outsiders either separately or through collusion.

In recent years, the theft of medicines from hospitals worldwide has emerged as a booming criminal phenomenon. This issue represents a serious threat to people's health, the national budget, organizations revenues and legal competition. Health is one of the components of Sustainable Development Goals (SDGs) which Kenya hopes to achieve together with other global countries. Also the objective of Kenya Vision 2030 in the health sector is to provide an equitable and affordable healthcare system of the highest possible quality. Thus, this study sought to analyze organizational breaches faced by health institutions in drug inventory. Specifically, the research explored effects of organizational regulations, storage infrastructure, skills of staff and internal environmental factors on drug inventory security management in Nyeri County, Kenya.

1.3 Objectives of the Study

1.3.1 General Objectives

The study analyzed organizational breaches and drugs inventory security management in health institutions, Nyeri County Kenya.

1.3.2 Specific Objectives

The study was guided by the following specific objectives as outlined below;

- (i) To analyze the effect of organizational regulations on drugs inventory security management in health institutions Nyeri County
- (ii) To assess the effects of storage infrastructure on drugs inventory security management in health institutions Nyeri County
- (iii) To evaluate the effects of skills of the staff on drugs inventory security management in health institutions Nyeri County
- (iv) To explore the effects of internal environmental factors on drugs inventory security management in health institutions, Nyeri County.

1.4 Research Hypotheses

The study examined the following hypothesis derived from the objectives of the study;

- (i) Ho₁: Organizational regulations have no significant influence on Drugs inventory security management.
- (ii) Ho₂: Storage infrastructures have no significant influence on drugs inventory security management.
- (iii) Ho₃: Staff skills have no significant influence on drugs security management.

(iv) Ho₄: Internal environmental factors have no significant influence on drugs inventory security management.

1.5 Significance of the study

Kenya's overall development framework 'Kenya Vision 2030' (Republic of Kenya, 2013b) has benefited by adopting the recommendation on line with social pillar, health sector of providing Efficient and high-quality health care, lowering Infant and maternal mortality, Provision of robust health infrastructure and improved health service delivery, which is a long-term policy that aims to create a globally competitive and prosperous country with a high quality of life by 2030. The Vision aims at transforming Kenya into a newly-industrialized, middle income country, providing a high quality of life to all its citizens in a clean and secure environment. Kenya Vision 2030 has achieved this aspect of security, whether related to health inventories or not, by adopting study recommendation, giving clear guideline to map the vision goals

In addition, the findings and conclusions has complemented the aspirations of enhanced health sector as envisaged in the Sustainable Development Goals of Ensuring healthy lives and promote well-being for all at all times, who's one of the stipulated challenges in attaining the goal is shortage of essential medicines and medical supplies. It follows, therefore, that any step undertaken to address leakages and theft of drugs in hospital would go a long way in promoting the general welfare of our society (Ministry of Planning and National Development, 2008).

Erhun, Babaloha and Erhun (2014) observed that weak legislative and institutional laws were contributory factors to poor drug inventory security management. Thus, the study has assisted in reviewing existing drug inventory management policies. The members of the public specifically residents of Nyeri county has benefited from the

research output focusing on security of inventories in the health institutions by availability of drugs in their hospitals. This has further helped Government achieve the social pillar projected in Kenya vision 2030. Researchers will benefit from the research which serves as a baseline for future researchers on drug inventory security management and related topics.

1.6 Limitations of the Study

The research was limited to permanent employees of all ten Health institution in Nyeri County with bed capacity. Research was limited to Conceptualized Organizational factors of Organizational Regulations, Storage infrastructure, Skills of Employees and Internal environmental factors

1.7 Scope of the Study

The study has covered the biggest health institutions in term of bed capacity in each category operating within the Nyeri County, which are Nyeri Teaching and Referral hospital, Mathari mission and Outspan hospital. These Institutions have the largest bed capacity in each of their respective categories. Nyeri county was picked because is one with oldest health facilities which were built during colonial era (Van Zwanenberg, 1975). The target population was all the employees and administrators of the targeted health Centre's.

1.8 Operational Definition of Terms

Drug inventory:	Complete list of medical items kept in a place (Kenya National Drug policy, 1994).
Drug Inventory Security management:	Activities undertaken to ensure drugs inventories are properly utilized (As used in the study)
Drug storage:	Any facility/equipment used to keep safe medical inventories (Kenya National Drug Policy, 1994).
Health Institutions:	Medical facilities meant to provide outpatient and inpatient (Health Act, 2012).
Internal environmental factors:	Employees, structures, stores, and management of an organization (As used in the study).
Inventory:	Drugs kept at the hospital store
Medical inventory:	Complete list of all medicines and equipment in a pharmacy
Organizational Breaches:	Factors those courses in efficiencies in performance (As used in the study).
Organizational Regulation:	Rule, by-laws and Procedures agreed upon by management to guide operation of specific institution (Public Procurement and Disposal act, 2005).
Security management:	Steps leading to effective and efficient management

Staff skill: Professional qualification of an employee (Dixon,et al, 2010).

Storage infrastructure: Arrangements in a storage facility to enable workflow (Public Procurement and Disposal act 2005).

CHAPTER TWO:

LITERATURE REVIEW

2.1 Introduction

Health sector, without adequate pharmacy inventory management practices, hospitals run the risk of not being able to provide patients with the most appropriate medication when it is most needed. Effective drugs control mechanisms provide a basis for consistent quality, better financial performance and improved regulatory compliance when implemented appropriately and adhered to during day-to-day operations in managing inventories held in hospital, (Shiau, Li and Zheng, 2012).

Addressing drugs inventory security management can enable hospitals to improve their service performance, adhere to regulatory requirements and reduce risks relating to drugs breaches. By restricting access to inventory, hospitals can reduce the risk of theft, ensure only appropriate personnel are able to perform inventory transactions and demonstrate compliance with regulatory standards. The proper use of pharmaceuticals in achieving positive patient outcomes is essential. When coupled with proper inventory management, hospitals can reduce the risk for regulatory non-compliance and derive further financial benefits from an integral hospital function.

In Kenya, public health hospitals are supplied drugs by Kenya Medical Supplies Agency (KEMSA). Non-governmental actors such as NGOs, FBOs, public health agencies and donor funded agencies all follow their own procurement processes either governed by their funding organization or their own ethics. The largest private procurement partner in the health sector is MEDS and second largest procuring entity in Kenya after KEMSA. They supply to not- for- profit organizations and are slowly letting in the lower level of private healthcare providers.

Oliha (2014) conducted a study to investigate drug abuse among university undergraduate in university of Benin Edu state of Nigeria. The researcher considered three variables first to investigate the level of awareness of the consequences of the long effect of the abuse of drugs, secondly to determine which gender abuse drugs more and lastly to determine the effect of drug abuse on academic performance. A sample of 200 adolescent undergraduate from the university, 100 male and 100 females aged between 16 and 20 years. Finding were that drug abuse in adolescence constitutes one of the deadly menace, drug abuse was identified as social vice that must be eradicated, need for counseling to overcome the problem and need to introduce Parent-Teacher Association to allow all stakeholders to be involved. The study is much relevant to this study in that it highlights the effect of drug inventories in the wrong hands possible due to poor rules.

Mbuvi, Mwenda & Wachira (2016), conducted research on effects of Drugs & Substance abuse on Mugging among youths in Kosoro area- Mathare, Nairobi County. It exposed the effects of prescribed drugs dependency on mugging. Findings were that 70% of youths depend on prescriptive drugs. The study shows that measures are important to tighten security to eliminate access to drugs by youths. Holman (2016) claimed that most of regulations are based on assumption and recommended that, management should develop formal procurement procedures based on present and past experience to be followed.

Public Procurement and Disposal Act PPDA (2005) gives procedure of dealing with goods, equipment, drugs among other stores received and stored in public institution. When drugs are received, before placing them into inventory, pharmacy personnel should perform appropriate receipt procedures, such as reconciling drugs received to drugs ordered, to ensure that discrepancies between quantity and drug type do not

exist. Once the drugs received have been verified, they should be physically maintained in secure storage areas or active dispensing areas of the pharmacy.

Godeliver, Kagashe, & Terevael (2012) Department of Pharmaceutics, School of Pharmacy, Muhimbili University of Health and Allied Sciences, Dar es Salaam, Tanzania, Dar es Salaam Business School, Mzumbe University, conducted a study in Tanzania. The objective was to determine medicine stock out and inventory management problems in public hospitals in Tanzania: a case of Dares salaam region hospitals. Study therefore assessed the logistic skill levels of personnel involved in medicines supply as well as inventory management of medicines in public hospitals in Dares Salaam region. Results show that logistic skill level was poor and inventories were not well managed. Lack of funds and poor logistic skills contributed to stock outs, this shows, the supply of medicines needs to be managed efficiently in order to prevent all types of wastage including overstocking, pilferage and expiry. This wastage may influence the quality of health care provided to patients.

2.2 Theoretical Framework

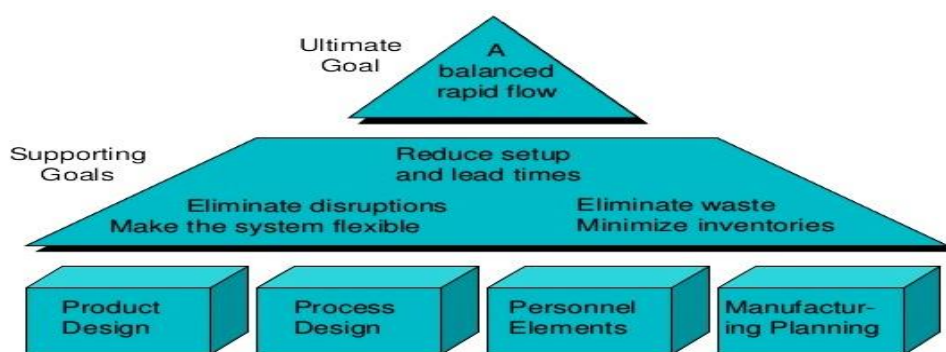
In this section, researcher has presented theories and model done by other scholars which are related to the area of study. The theories was linked its parameters to the study and give researcher insight on how to go about the green area. .

2.2.1 Just-in-Time Theory (JIT)

The Just-In-Time (JIT) manufacturing also known as Just-In-Time Production theory was developed by Toyota Motor Company in Japan years 1950 to 1970 by Taiichi Ohno. It takes a name from the idea of replenishing inventory buffers just when they are needed and not before or after. It is considered as a transforming system from wasteful form of handling materials to an efficient and competitive system. JIT

applies primarily to repetitive processes in which the same components are produced over and over again. The philosophy is credited with requesting products only at the rate that the customer wants. JIT seeks to eliminate all types of waste, including carrying excessive levels of inventory and long lead times.

JIT theory started at Japan as a result of the pioneer Ohno trying to find solution to lack of enough inventory and space in their county japan to store the entire required inventory. The theory states that, during Japan’s Post-World War II rebuilding of industry. First Japan’s lack of cash made it difficult for industry to finance the big batch, large inventory production method common elsewhere and secondly Japan’s lack space to build big factories loaded with inventories. To solve the mess, they leaned out their processes by building small factories in which the only material houses in the factory were those currently being used. By these, inventory was kept low, work-in –progress and generally cost went down. The JIT theory is composed of three tiers that is Normal process, Supporting goals and Ultimate goals



Source: JIT Structures

Figure 2.1 JIT manufacturing building blocks

When looking at Normal processes, each department has its process which needs to be reduced, merged or eliminated to reduces destruction, cost, time, and eliminate waste

hence minimized inventories. It takes place in product design, process design, personnel elements and manufacturing planning. If organization effectively manages this processes to the later, then flow of JIT production is assured

JIT system to go its full process needs to be scrutinized by supporting goals to flexibility, lead-time reduction and wastes minimizations. These are achieved by reducing setups and lead-time by resetting facilities to reduce flow; Systems are made flexible to accommodate all sorts of operations. These level compresses normal processes in level I by way of eliminating disruptions, and minimizing inventory after the two tiers have been effectively undertaken, final level of Ultimate goals is achieved. The level can be also called J.I.T. level of production where every activity is assumed to be at optimal level in cost, quality, Quantity, time and satisfaction of consumers. Thus, the fruits of success are acknowledged at this level.

The JIT Theory is linked to this research study in its objectives of finding solution to effective and efficient way of approaches to security of drug inventory. The theory looked into way of carrying out business operation regardless of constrain of cash, space and inventory. This is in line with the research demand of health institution to carry its operations despite challenges of organization regulations, storage infrastructure, skills of staff and internal environmental factors.

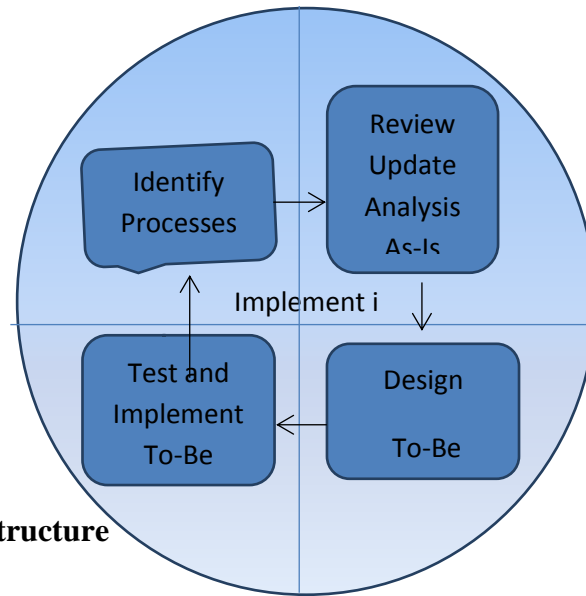
2.2.2 Business Process Reengineering (BPR) Theory

The Business Process Reengineering (BPR) theory was developed by Hammer (2003) as a dramatic change in the way organization was arranged. It is a fundamental rethinking and radical process to achieve dramatic improvements in organizations. The radical change is the overhaul of organizations structures, management systems, employee responsibilities, skills development and use of information technology. It is

normally seen as radical reshaping of existing business processes linked with the application of IT technology to map and remodel internal processes and systems so that they are less complex and easier to operate. BPR is essentially an attack on the functional management structures within organizations and is focused on waste removal and the focus on value adding activities. It was defined specifically as a fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in cost, quality, speed and service. It combines a strategy of promoting business innovation with a strategy of making major improvements to business processes so that a business can become a much stronger and more successful competitor in the market place.

Hammer (2003) sighted that BPR requires undergoing seven common steps for it to be successful. These steps include; begin with organizational change process, build the reengineering process, identify BPR opportunities, understand the existing process, reengineer the process, blueprint the new business system and perform the transformation. It is worth noting that making radical changes to business processes to improve efficiency and effectiveness is not an easy task. BPR removes inefficiencies which slows down performance and detracts employees from focusing on their goals. In conclusion, BPR can be applied across multiple functions within an organization. With the support of the management, it can leverage the information technologies to overhaul the service delivery and dramatically improve work processes.

Hammer & Champy, (2003s) Davenport, (1990s) Business Process reengineering is also treated as cycle operation of organization which involves four steps that is Identify processes, Review update Analysis as-is, Design To-Be and Test and Implement To-Be. The steps are applied in three phases namely, process consulting phase, change management phase and project management phase.



Source: BPR Structure

Figure 2.2 Business Process Reengineering Cycle

Business process reengineering takes four key levels, that is identify process, this is where identified alternatives process to improve current operation structures are listed. Mostly covers logistic, raw material and human services. Immediately the alternatives are identified, the second level is taken. Review update analysis as-is, this is considering each process alternative in relation to its advantages and disadvantages and come up with best option to adopt. Mostly requires expert contributions

Design To-Be, is final pioneer selected structure and strategy which is in line with accepted alternative and initiate it to be implemented. Pioneer gauges the design by Testing& Implement design To-Be which is the last step of the reengineering cycle where the design.

Adopted in step three is tested as it is and fully adopted and if found otherwise, another alternative is considered or modified. The step entails full supply of Materials, Human resource, finances and supporting services to the management.

This theory entails process of advancing present operation framework to a more advanced approach to maximize profit and reduce lead time and increase quality. It's linked to this study because the study made recommendations that ensure security of entire medical store in health institution as it is with the theory. Again the study have strongly linked this study for focused on internal environment

2.3 Empirical Literature Review

2.3.1 Organizational Regulations and drug inventory security management

One of the most important institutional regulatory documents is a policy. Mansfield (2010), journal report entitled building competency models, defined a policy as a formal regulation or rules which guide making decisions and achieve rational outcomes.

Erhun, Babaloha, and Erhun (2014) conducted a study on Drug regulation and control in Nigeria; a total of 345 healthcare workers were interviewed using both open and closed questionnaires. The researchers used drug safety regulations and institutional regulations on drug inventory as their variables. Study aimed at establishing factors that contributed to the loss and mismanagement associated with drug inventories. 78% of respondents reported that there were loopholes in the rules governing the drug inventory security management. Sixty two percent, reported that the access to the drug inventory was not restricted making it vulnerable to abuse

Gupta, Jain and Garga (2014) conducted a similar study in South Africa "role of policies in steering accountability of drugs in hospitals". The main objective of the study was to establish the role of policies in strengthening management of drugs in hospitals, a sample of 14 hospitals was used. The researchers used drug safety regulations and policies on drug inventory as their independent variables. The

researchers found out, that set of essential policies were required in organizations to provide guidance and as reference points. It was noted out that operating under well-crafted policies goes a long way in steering upwards the prosperity and governance of organizations.

2.3.2 Storage Infrastructure and drug inventory security management

Storage infrastructure entails the logistics and facilitation that makes possible the optimized flow and positioning of materials, information and all resources of an organization. Mishra, Amity, Noida, Pandey Noida, (2015) India conducted a study on analysis of drugs in hospital pharmacy by inventory management in India. The objective was to determine factors affecting drug storage management. They used ventilation, sanitation and temperature as their variables. A total of 104 inventory healthcare workers were randomly selected in this descriptive study. The results showed that 87.5% felt that poor ventilation was the factor affecting drug storage, 82.7% felt that poor regulation of temperature was a factor while 62.2% said that poor storage facilities was to blame. The study concluded that special attention should be focused on improving the quality of drug storage facilities which includes improving on ventilation and regulation mechanisms for temperature,

Ngai-Hang, Leung, Ana, Prashant, Gallien, (2016) conducted a study on the impact of inventory management on stock-outs and potency of essential drugs in sub-saharan Africa in Zambia. They used segregation, accountability as the independent variables and fifteen institutions of health were covered, observation were that lack of skilled workers and proper accountability mechanism was to blame for poor handling and loss of drugs. It was noted that 58% of the staff involved in drug supply chain and storage were either unskilled or unqualified. Hence the potency of most drugs was interfered with by poor moisture control and poor sanitation

2.3.3. Skills of the Staff and drug inventory security management

Keitany, Mwaura and Mary (2015) conducted a study in Nyanza on Drug Storage and maintenance. The objective of the study was to determine the factors affecting drug storage and maintenance in Nyanza hospitals. They used experience, level of education, motivation and technological training as their independent variables. The study was conducted in selected areas and health facilities. In all the regions, interviews were conducted with health workers, key informants (National MoH staff, programme heads, medical superintendents, hospital administrators and hospital board members among others), existing clients, other stakeholders (excluding the MoH) and community members. Findings indicated that the hospital management was less effective in the maintaining accountability of drugs in the facilities. The researchers also concluded that most staff involved in drug storage had insufficient academic qualifications and experience.

Battini, Hassini, Manthou, and Azzi (2016) conducted a research on effectiveness of drug storage facilities in Ghana. They used experience, qualification, motivation and technological training as their independent variables. A total of 26 facilities were analyzed, the study concluded poor sanitation and lack of skilled staff were major factor affecting drug storage

2.3.4 Internal environmental factors and Drug inventory security management

Environment may be thought of as all the factors inside and outside of management control which can affect the performance of a business and the success of its strategies. An organization's internal environment is composed of the elements within the organization, including current employees, management, and especially corporate culture, which defines employee behavior. Although some elements affect the organization as a whole, others affect only the manager.

Hulton, Matthews and Stones (2007) conducted a research on improving drug inventory control. The objective of this study was to analyze the current process of drug inventory control and to find possibility for improvement. The researchers used institutional policies and macro environments their independent variables. The study was conducted by using qualitative research method. Relevant information was collected from both primary and secondary sources. Different inventory methods were presented and explained. Therefore, utilization of inventory methods should be decided based on their suitability. The researchers concluded that institutional policies and the state of existing macro environment had a great impact on drug inventory security management. The study can propose the possibilities to improve drug inventory security management in the hospital pharmacy.

Zakic, Jovanovic and Stamatovic (2008) conducted a study on External and internal factors affecting the product and business process innovation. The objective was to determine the effects of internal and external factors on the institutions. They used incentives, institutional culture and technology as their independent variables. An explorative study design was used. The researchers found out that there are a set of poor institutional cultures and lack of incentives impact negatively on the performance of an institution.

2.4 Conceptual framework

Below is a conceptual framework for the study relating to the factors influencing security of inventories held by health institutions.

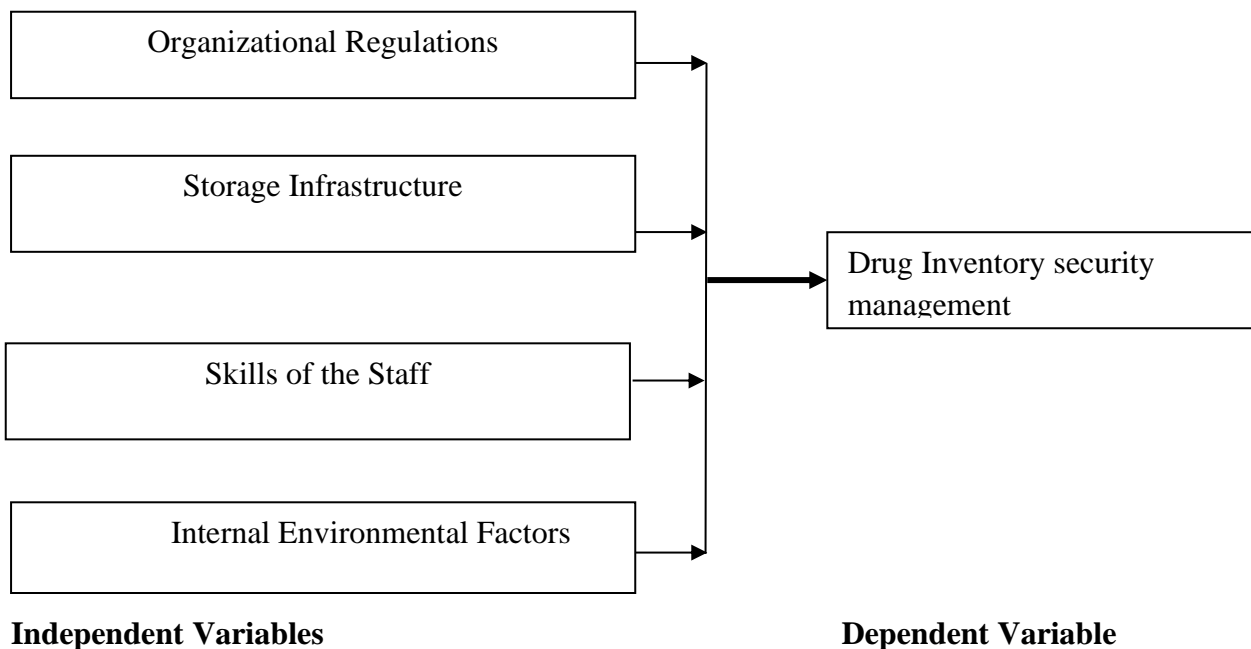


Figure 2.3 Conceptual Framework

Regulation provides boundaries and framework under which employees and the management operate (Gupta, Gupta and Garaga, 2014). Regulations on security of organizational assets may provide rules and practices that must be operationalized to enhance security of inventories. Illegal diversion of drugs is a major issue for pharmacy operations. This risk can be greatly mitigated by the appropriate segregation of duties within the drug procurement process. As in the procurement of any asset, a single employee with complete control over the procurement process may be in a position where committing and concealing medication errors or fraud is possible

The individual responsible for ordering and purchasing drugs should not be the same as the person receiving and stocking a pharmacy's inventory. This should be true for

all drugs, especially controlled substances. The potential for drug diversion increases when the responsibility for purchasing and receiving is owned by just one person (Berge, Dillon, Sikink, Taylor and Lanier, 2012) without the necessary oversight or checks and balances in place. Therefore, pharmacies must have a drug diversion policy and procedure in place, which includes documentation of duty segregation

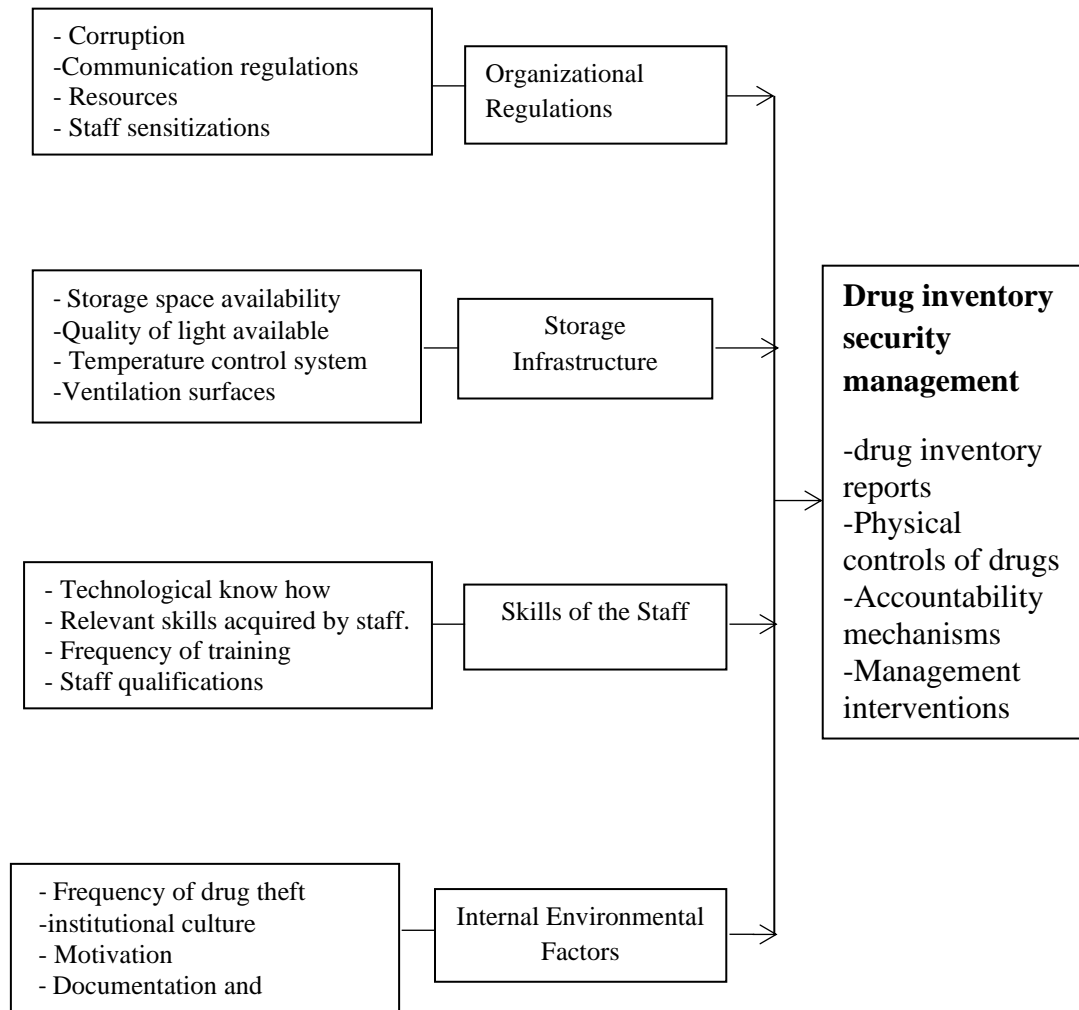
Storage infrastructure includes all the facilities that are used to hold and preserve inventories and other assets. As organizations operate, in put flows in and are issued to the users following the prescribed procedures. If the storage infrastructure is well established, well-guarded and mechanisms are in place to enhance security of inventories, then the threats of theft or damage or any other loss are minimal (Keitany, Mwaura and Odhiambo, 2015).

Skills are one of the most important assets an institutional may have. Skills are with the staff and when they are prudently implemented, all system performs well and productivity goes up (Curnie, 2015). Without skills means threats of losses, disruptions, misuse and inefficiencies. Staffs with skills are useful in ensuring that proper mechanisms are in place to enhance security of inventories.

Environment: The surrounding within which anything exists and is made up of land, water, atmosphere, micro-organisms, plants and Animal (NEMA act, 1998). Internal environment: Means all the factor of organizations that is controlled by the management and includes employees, facilities, land scape and regulations (Flako-Zaritsky, Almogi-Labin, Schilman, Rosenfeld and Benjamini, (2011). The environmental surrounding where inventories are held determines whether they are secure or not. It may be easy to remove them, re-route them or provide open opportunities to consider stealing them.

2.5 Operational Framework

The operational framework illustrates a linkage between the dependent variable, independent variables and the parameters used in this study.



Parameters

Independent Variable

Dependent Variable

Figure 2.4 Operationalization of Variables

2.5.1 Organization regulation variable

The variable was measured in relation on how corruption was a threat to the implementation of drug inventory management, whether there was communication regulations, and adequacy of resources and staff sensitization on drug inventory security management

2.5.2 Storage infrastructure

To be able to measure the storage infrastructure to dependent variable, storage space availability was considered to determine the right spacing required, extend of light quality and quantity was considered to determine the right amount of light deeded. Temperature control systems available to ensure potency and condemnation of drug inventory did not occur and finally ventilations surfaces available were checked for adequacy.

2.5.3 Skills of staff

Researcher has considered the variable in relation to whether staff had technological knowhow, level of skills acquired by staffs, frequency of training and staff qualification on drug inventory security management

2.5.4 Internal environmental factors

The variable was measured and justified using frequency of drug theft by inmate, institutional culture, employee motivation and whether the institution documents their event for accountability. On drug inventory security management

2.5.5 Drug inventory security management

Stock theft report, physical controls, accountability mechanism and management interventions has been indicators to measure drug inventory security management operations. The measures has revealed effectiveness of management

2.6 Analysis of Variables

Table 2.1 Analysis of Variables

Variables	Sources	Objectives	Finding	Parameter
Organizational Regulation	Erhun, Babaloha, and Erhun (2014)	Drug regulation and Management in drug inventories	Implementation and enforcement of the drugs laws were deficient	<ul style="list-style-type: none"> - Drug safety regulation - Institutional regulations
	R Gupta, KK Gupta, Jain and Gorga (2014)	role of policies in strengthening management of drugs in hospitals	Set of essential policies were required to guide referencing of drug management	<ul style="list-style-type: none"> - No of regulations - No of approved policies
Storage infrastructure	Mishra, Pandey (2015)	To determine factors affecting drug storage management.	Special attention should be focused on improving the quality of drug storage facilities which includes improving on ventilation and regulation mechanisms for temperature,	Temperature, ventilation light, Segregation
	Ngai-Hang Ana Chen, Prashant Yadav, Jérémie Gallien, (2016)	Impact of inventory management on stock-outs of essential drugs in sub-Saharan Africa	The potency of most drugs is interfered with by poor moisture control and poor sanitation	<ul style="list-style-type: none"> -Sanitation -Moisture -Humidity.
Skills of staff	Keitany ,Mwaura and Mary O (2015)	factors affecting drug storage and maintenance in Nyanza hospitals	The hospital management were less effective in the maintaining accountability of drugs in the facilities, and most staff involved in drug storage had Insufficient academic qualifications and experience.	<ul style="list-style-type: none"> -Skills, Qualifications Technological information
	D Battini, E Hassini, V Manthou, A Azzi	Effectiveness of drug storage	Drug storage inventories lack skilled staff, and also training	<ul style="list-style-type: none"> -Cross-cultural training -Technological

	(2016)	facilities	on technology and motivation	&informational training -Motivation of employees
Internal environmental Factor	Hendriks, Armbruster, Laumanns(2014)	improving drug inventory control	Internal environment factors influence sustainability	- Macro-environment -employee behavior -Motivation
	Nebojša zakić, Ana jovanović, Milan stamatović(2008)	To determine the effects of internal and external factors on institutions.	Internal environment affects performance by affecting the management strategies	-Globalization -Technology --Incentive -Institutional culture

CHAPTER THREE:

RESEARCH METHODOLOGY

3.1 Introduction

The study analyzed organizational breaches on drug inventory security management held by health institutions in Nyeri County Kenya. This chapter therefore explored the research design, target population, sampling design, data collection, data analysis and limitations.

3.2 Research Design

A descriptive research design was used to analysis the study data that relates to relationship between organizational breaches and drugs inventory security management in health institutions, Nyeri County Kenya, and viable conclusion and determination made in this relationship. Descriptive research is a description of the state of affairs as it exists (Kombo, & Tromp, 2006). It is cross sectional since it has studied individuals at one point in time and major advantage of this research was that data was collected in many different kinds of people in a relatively short period of time (Mugenda & Mugenda, 2003).

3.3 Target Population

Borg and Gall (1983) described target population as a universal set of study of all members of real or hypothetical set of people, events or objects to which an investigator wishes to generalize the result. All employees of all ten (10) Health

institutions (Hospitals) in Nyeri County with bed capacity were considered as target population because they have developed administrative structures. Mugenda and Mugenda (2003) explained that the target population should have observable characteristics to which the study intends to generalize the result of the study. Kenya Demographic Health Survey (KDHS 2016) states that in Nyeri county, there a total of 447 registered health facilities of which ten have a bed capacity (table 3.1).

Table 3.1 Hospitals with bed capacity in Nyeri County

Category	Health Institution	No of staff	Bed capacity
Public Hospital	Nyeri Teaching and Referral	64	438
	Othaya Hospital	53	210
	Karatina Hospital	40	186
	Mukurweini Hospital	33	80
	Mt Kenya Hospital	20	30
	Total	210	944
Faith-based	Mathari Hospital	42	178
	Tumu-Tumu Hospitals	34	70
	Mary Immaculate Mweiga	26	56
	Total	102	304
Private Hospital	Outspan Hospital	24	120
	Jamii Hospital Karatina	21	75
	Total	45	195
	Grand Total	357	1443

Source: KDHS (2016)

3.4 Sampling Technique

Kothari (2007) states that stratified sampling is a probability method used to scale down universe from which sample is drawn and is used when population has different homogeneous groupings or upon combination of more criteria like sex, caste and level of education. The stratified sampling method was chosen as the most appropriate technique to arrive at category of the health institution that is Public, Faith-Based and private, while purposive sampling technique was used to pick the institutions with largest number of bed capacity and staff per category. Stratified techniques minimizes

the biasness in the research and it gives all the respondents equal chances of being covered by a study and all the categories are proportionately represented in the sample size (Kothari, 2007). All 130 permanent employees were included as respondents of the research.

Table 3.2 Sample size

Health Institution	Category	No. of permanent employees	Bed Capacity
Nyeri Teaching and Referral Hospital	Public	64	438
Mathari Hospital	Faith-Based	42	178
Outspan Hospital	Private	24	120
Total		130	736

3.5 Data Collection Instrument and Procedure

In the study, closed ended questionnaires were used to collect data from the respondents. Questionnaire had six sections, section A was containing items pertaining respondents profile and section B-E was having items relating to the study area that is objective by objective, presented in a likert scale format and Section F contains items on dependent variable presented in a likert scale. Questionnaire is a set of questions that are given to people in order to collect facts or opinions about a given area, Questionnaires were easily administered and convenient to both the researcher and to the respondents (Hair, Barr & William, 2010). Questions were closed ended (structured) which means the respondents would easily chose from the options given. Permission was sought from the respective human resource officers where their assistance were needed in the process of issuing and collecting duly completed questionnaires. Questionnaires were dropped to respondent and later collected duly filled.

3.6 Pilot study

Pilot study was a data collection approach conducted to ascertain consistence of the questionnaire to collect right data and test understanding of the questions by respondents. Twenty-one employees of Nyambene sub- county Hospital in Meru County were used in the pilot study, after the study, the questionnaire was revised. As follows;

Table 3.3 pilot instrument.

S/No	Question	Particulars
5	Original	Corruption is a threat to the organizational regulations available
	Revised	Corruption is a threat to the implementing drug inventory security management regulation
20	Original	There is adequate accountability of drugs in the institution through documentation
	Revised	Staff are held responsible for documentation of drug inventory

3.6.1 Reliability Instrument

In research studies, reliability is taken to mean the consistency of a measuring instrument. It is the extent to which the measurement of a test remains consistent over repeated tests of the same subject under identical conditions. In this study, reliability was enhanced by preparing the questionnaires concisely, piloting them, revising the questions as well as seeking technical advice from other researchers. This consequently improved the quality and consistency of the measuring tool (Hair, Barr and William, 2010). According to Allen (2004) a reliability coefficient of 0.95 or higher is considered acceptable.

3.6.2 Validity Instrument

According to Kothari (2007) validity is the degree to which a test measures what it was designed to measure. The internal validity is the degree to which conclusions about the causes of relations are likely to be true. External validity concerns the extent to which generalizations from the sample studied can be generated from the target population. In this study, internal validity was enhanced through selecting a standard correlation model which was generated statistically through the SPSS package. Similarly, validity was enhanced by administering questionnaire specifically to senior members of staff. Any assistance required was sought from the staff of the respective human resources.

More so there are other different types of validity. The face validity describes the extent to which the measure used is reasonably capable of what is due to measure. The convergent validity describes the extent to which the measurement used can bring similar results if used elsewhere. The divergent validity describes the extent to which one construct is distinguished from another. Specifically, there are three types of validity for qualitative research.

Descriptive validity is associated with degree to their actual description of the result are true, theoretical validity refers to how adequate the theory suggested, such as whether the theory really support the study subject. Generalizable validity is the extent to which the result of a study can be generalized. In this study, all the three- validity measure were taken into consideration and hence taken into consideration and hence they were applied. This means that theories and themes from other studies were well supported by the findings of the study.

3.7 Data Analysis Method

Data analysis entails a process of applying logical and statistical technique to summaries, analyze and process a given data. Descriptive statistic was used for it determines the frequency with which an event occurs or relationship between variables (Glesne, 2015). The descriptive statistics is a univariate analysis which consists of frequency tables, diagrams measure of central tending and measure of dispersion. Mean score were computed for likert type of question. The collected data was used to analyze the key variables of organization breaches that may influence security of inventories held by health institutions. The researcher cross checked the raw data for legibility, consistency, completeness and uniformity. Data analysis was done using Statistical Package for Social Sciences (SPSS) version 21 Software System

Inferential statistic was used to analysis the data that relates to multiple regression analysis to test the strength and relationship between independent variables and dependent variable. The study tested significance of independent variables to the dependent variables at 95% confidence interval and 5% (0.05) level of significance. The analysis led to the development of a regression model, Pearson correlation and the corresponding coefficients for the independent variables.

Regression analysis was used to examine the relationship between the four factors and the dependent variable.. This method adopted ordinals least square (OLS) method of estimation in examining that relationship. The method allowed for derivation of a regression line of best fit while keeping the error term at a of minimum. As a pretest requirement, the following assumptions of linear regression were checked to ascertain that the dependent variable was measure on a continuous scale.

Assumption one was that the dependent variable was measured on a continuous scale using likert scale where 5= strongly agree, 4= agree, 3= Neutral, 2 =disagree and 1 = strongly disagreed. This meant that the first assumption was met.

Assumption two was that two or more-independent variable are continuous or categorical. These variables were measured on a five point likert scale (that is; 5 to 1) where 5= strongly agree. Hence the second assumption was not violated.

Assumption three of linearity tested the relationship between the independent variable and dependent variable. The use of a scatter plot for determining that relationship implies that assumption of linearity was upheld.

Assumption four was that the error term (ϵ) in the regression equation are normally and identically independently distributed with a mean of zero and a constant variance (homoscedasticity). This refers to the assumption that the dependent variable exhibits similar amount of variance across the range of values for an independent variable. The study further tested management is homogenous along the organizational breaches dimensions. The concentration for the variance of the error term along the line of best fit meant that the error term variance in the dependent variance was constant along the independent factors dimensions. Hence the data did not violate heteroscedasticity, and instead was homoscedastic.

Assumption five was test of, multicollinearity. It occurs when any single independent variable is high correlated (r greater than 0.9) with a set of other independent variable. In this study, tolerance (variance inflation factor – VIF) was used to identify multicollinearity. Tolerance is a measure of collinearity reported as $1-R^2$. A small tolerance value indicates that the variable under consideration is almost a perfect linear combination of the independent variable already in the equalization and that is

should not be added to the regression equation. If the tolerance value is very small (less than 0.10) it indicates that the multiple correlation with other variables is high, suggesting the possibility of multicollinearity (Tabachnick and Fidell, 2007). None of the tolerance values was less than 0.1 and hence the data set did not violate multicollinearity based on tolerance.

To test the correlation between the bivariate factors, Pearson correlation was used to determine the level of significance of the relationships. The relationship was tested at 5 percent level of significance in a one-tailed test. It was established that none of the independent variables were highly correlated, because in all the bivariate relations there was no r value greater than or equal to 0.9 hence the assumption of multicollinearity was not violated.

The regression model as shown below was applied,

$$Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + e; \text{ where}$$

Y = Drug inventory security management

b_0 = Constant factor, rate irrespective of any other.

b_1, b_2, b_3, b_4 = Coefficient of regression for every independent variable

X_1 = Organizational regulations

X_2 = Storage infrastructure (strong/weak)

X_3 = Skills of staff

X_4 = Internal environmental factors

e = is the error term that represents all factors that are not included in the model.

The regression model was based on the following assumptions:

Firstly, linearity which defines the dependent variable as a linear function of the predictor (independent) variable (Darlington, 1968). Multiple regressions can accurately estimate the relationship between dependent and independent variables when the relationship is linear in nature (Osborne and Waters, 2002). If linearity is violated all the estimates of the regression including regression coefficients, standard errors, and test of statistical significance may be biased (Keith, 2006).

Secondly, independence of error which refers to the assumption that errors are independent of one another, implying that subjects are responding independently (Stevens, 2012). When independence of errors is violated, standard scores and significance test will not be accurate and there is increased risk of type 1 error.

Thirdly, homoscedasticity refers to equal variances of errors across all levels of the independent variables. This means assumption that errors are spread out consistently between the variables, when heteroscedasticity is marked it can lead to distortion of the finding and weaken the overall analysis and statistical power of the analysis. Homoscedasticity can be checked by visual examination of a plot of the standardized residual by regression standardized predicted value.

Fourth is normality multiple regressions assume that variables have normal distribution (Darlington, 1968). This means that errors are normally distributed and that a plot of the value of the residuals will approximate a normal curve. The assumption is based on the shape of normal distribution. Lastly collinearity which refers to the assumption that independent variables are uncorrelated (Keith, 2006). The researcher is able to interpret regression coefficient as the effect of the independent variables on the dependent variables. When collinearity is low, it means that we can make inferences about the causes and effects of variables reliably.

3.8 Ethical consideration

According to Neuman and Wiegand (2000) respondents and any person involved should be informed the purpose of study to open up their minds. Authority to carry out this research was sought from University. Ethical approval and clearance was sought from Dedan Kimathi University ethical review committee. Research permit was sought from National commission for science and technology (NACOSTI). Authority to carry out the research was sought from the county administration and the hospital administrations. Participants were given a written informed consent to participate in the study and confidentiality was maintained. Further the respondents were told the purpose of the study to make them free to give information and informed decisions. Feedback was given to the relevant authorities after the completion of the study.

3.9 Summary of chapter

This chapter systematically analyzed the data. Descriptive Research design was used to enable researcher collect right data in relatively short time. Target population of 357 employee of health institutions with bed capacity in Nyeri County were sampled using stratification and purposive sampling technique to a sample size of 130 respondents. Questionnaire was used to collect data and final data was analyzed using Correlation, regression and SPSS version 21.

CHAPTER FOUR:

PRESENTATION OF FINDINGS, ANALYSIS AND INTERPRETATIONS

4.1 Introduction

This chapter present the findings obtained from the data collected and analyzed. The chapter began with the result of the sampling, which illustrates the details of the respondent. The demographical data is shown in the respondent's profile section A, section B to E gives finding objectives by objectives while section F gives feedback on indicators of Drug inventory security management and Hypothesis were tested and result summarized. Normality tests were performed to ensure the sample abnormality, for each item and variable. Multiple regression analysis was presented to indicate the relationship between the independent and dependent variables

4.2 Reliability Analysis

Reliability analysis was conducted to measure the internal validity and consistency of the items used for each variable in the study instrument. Hair et al. (2008) suggested that Cronbach Alpha of more than 0.70 indicates that the items are homogeneous and measuring the same construct. The data output below, it was observed that Cronbach Alpha coefficients were sufficiently strong to measure the relationships needed for this study.

Cronbach Alpha was calculated to test for reliability. The alpha can take any value from zero (no internal consistency) to one complete internal consistency) where 0.7 was the acceptable limit. George and Mallery (2010) provide the following roles of

thumb > 0.9 – excellent, >0.8- good, > 0.7- acceptable, >0.6 questionable, 0.5 – poor and <0.5 unacceptable.

Table 4.1 Reliability Analysis

Cronbach Alpha coefficients		
Variable	Number of items (questions)	Cronbach Alpha
Influence of organizational Regulations	4	0.744
Influence of storage infrastructure	4	0.706
Influence of staff skills	4	0.712
Influence of environmental factors	4	0.845

4.3 Demographic Result

This section has covered section A of research question which entails characteristics of respondent and major areas covered were Gender of respondent, age brackets, department of work and academic qualifications.

4.3.1 Responses rate

Out of the one hundred and thirty (130) administered questionnaires, one hundred and twenty (120) were received duly completed by the respondents. This constituted 92.3% response rate which was considered to be good enough to process the data. Implication that the result of the study is based on probability and acceptable limits.

4.3.2 Gender Finding

The results from the respondents indicated that males were 68 while female were 52, male respondents outnumbered the female respondent accounting for 56.7% while the

female constituted 43.3%. The implication of the above gender distribution was that more male were involved in drug inventory security management compared to females.

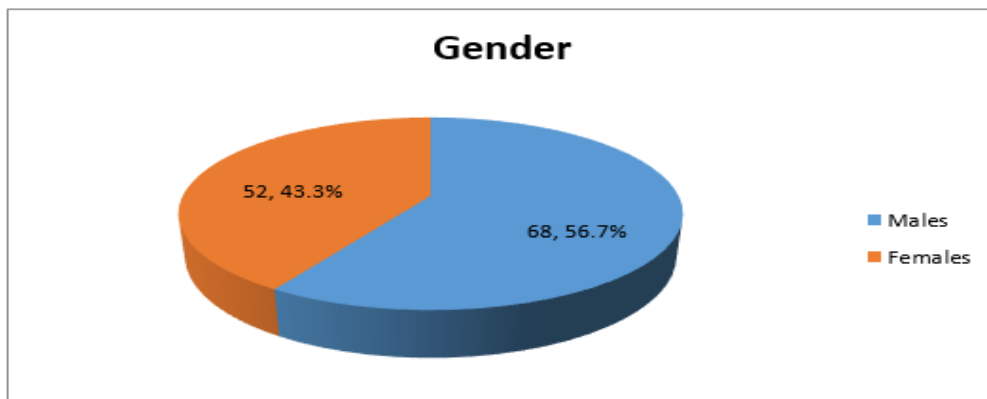


Figure 4.1 Respondents' Gender

4.3.3 Age Bracket

Out of the one hundred and twenty (120) respondents, fourteen (14) aged below 25 years, thirty (30) aged between 26- 35years, forty-eight (48) of them aged between 36-49 years while twenty eight (28) of them aged above 50years. The analysis was also being represented in percentage as 11%, 25% 40% and 24% respectively. The study found that majority of those who handle drugs inventory security management were those in the age bracket from 36 to 49 years. Hence need to retrain of staffs.

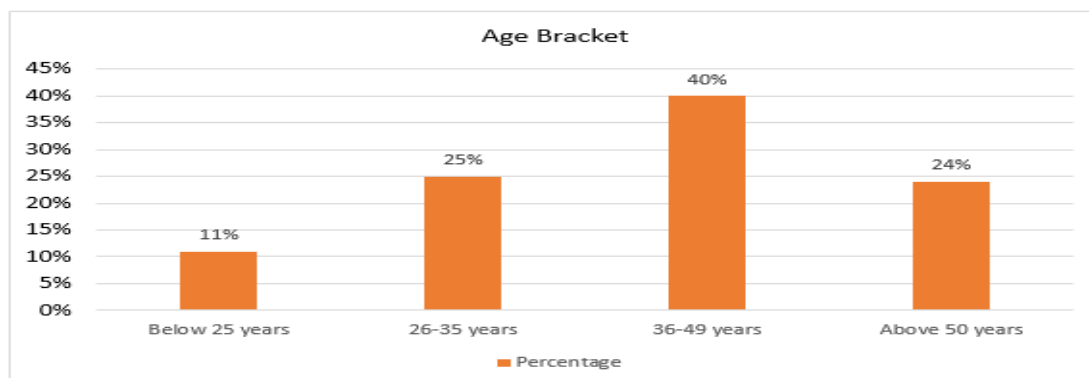


Figure 4.2 Age bracket

4.3.4 Department of work

To understand quality of information collected from workers, department in which respondent's work were examined. Results from respondents indicated that fifteen 15% (18 out of 120) were managers, fifty-one 51% (62 out of 120) were Doctors and Nurses, twenty-five 25% (29 out of 120) were Pharmacist and Nine 9% (11 out of 120) secretaries as shown. This study implies that most of drugs are handled by Doctors, Nurses and Pharmacist hence need to enhance accountability on them to mitigate drug inventory security challenges.

Table 4.2 Department of work

Departments	Responses	Percentage
Administration(Management)	18	15%
Doctors & Nurses	62	51%
Pharmacy	29	25%
Support team	11	9%
Total	120	100%

4.2.5. Level of Education

Providing essential service in the health sector requires the staff to have skills, competence and experience. In this study, the level of education was examined where three categories were presented to the respondent. The outcome of this aspect was present in the figure below and implied that majority of those who handle drugs had diplomas and certificates qualifications.

Table 4.3 Level of Education

Education level	Frequency	Percentage
Graduates & above	18	15
Diploma	56	47
Certificate & above	46	38
Total	120	100%

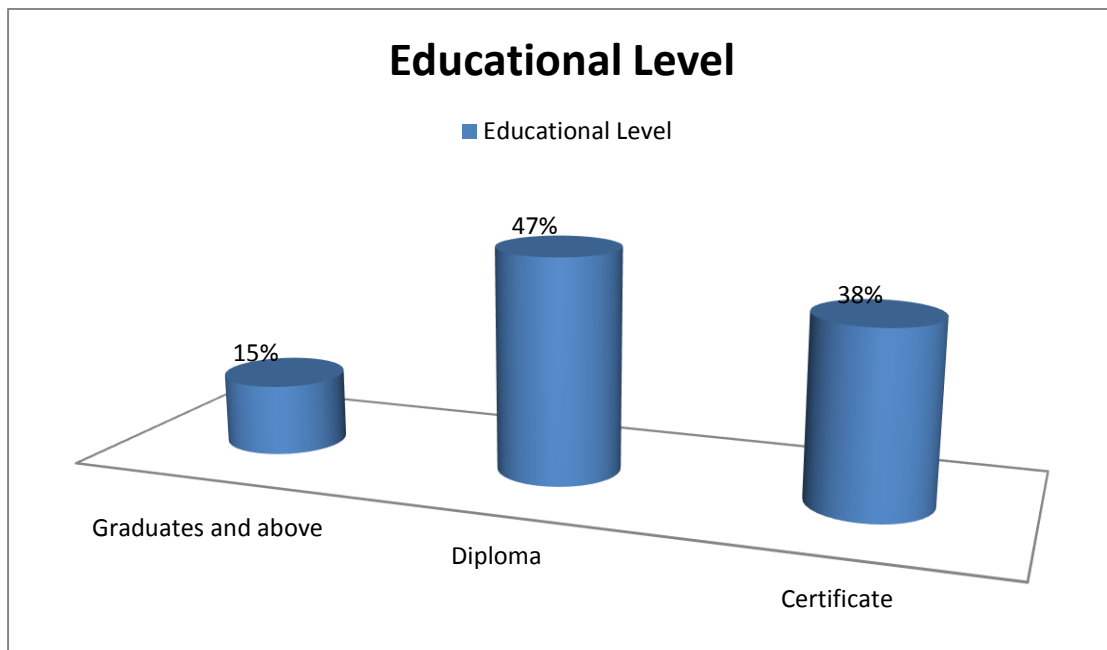


Figure 4.3 Level of Education

4.4 Descriptive Analyses and Discussions

In this study, the focus was on examining the Organizational breaches which faces drugs inventory security management in health institution. The respondent's opinions were sought regarding how organizational regulations, storage infrastructure, skills of the staff and how internal environmental factors influence drugs inventory security management. The detailed results of the study were summarized in the following sections where the tables provided the statistical analysis as captured from the

respondents. Likert scale rating as shown below has been used because was easy for the respondents to understand and tick right option.

Likert scale

5- Strongly Agree

4- Agree

3- Neutral

2- Disagree

1-Strongly Disagree

4.4.1 Organizational Regulations and Drugs Inventory Security management.

The respondents were asked to comment on how corruption in handling drugs was a threat to the prudent drug inventory management in the health sector. The study further sought to find out from the respondents if the health sector had effective communication regulation to keep all parties informed about the drug management in their respective health centres to keep all parties informed about the drug management in their respective health Centre. It was further examined whether health institution under the study had adequate resources to implement drug safety regulations. The aspect of staff sensitization on safety regulations and drug policy was examined and the results were summarized in the table below.

Tables 4.4 Organizational regulation and drug inventory security management

ASPECT OF DRUG REGULATIONS	UNIT	5	4	3	2	1	TOTAL
Corruption is a threat to implementing drug regulations	No	36	47	0	24	14	120
	%	30	38	0	20	12	100
The hospital has effective communication regulations on drug management	No	34	38	0	29	19	120
	%	28	32	0	24	16	100
The hospital has adequate resources to implement drugs management regulations	No	0	12	0	84	24	120
	%	0	10	0	70	20	100

The staff are often sensitized in drug policies to safeguard hospital drugs	No	60	36	0	18	6	120
	%	50	30	0	15	5	100

The result on table 4.4 show that 30% (36 out of 120) of the respondents strongly agreed that corruption was a threat to implementing drug regulations in hospitals. Similarly, 38 % (47 out of 120) agreed with the same proposition while 20% (24 out of 120) disagreed with another 12 % (14 out of 120) strongly disagreeing. On this aspect, there were no neutral respondents. Implicating corruption was serious problem On the effectiveness of communication regulations touching on security breaches, 28% (32 out of 120) strongly agreed that the hospitals had effective communication with another 32% (38 out of 120) agreeing on the same. On the contrary, 24 % (29 out of 120) of the respondents disagreed while the rest, 16% (19 out of 120) strongly disagreeing and there were no neutral responders on this issue, implying there was positive effect.

The table 4.4 further value that only 10 % (12 out of 120) of the respondents agreed that hospitals had adequate resources to implement drugs managements regulations however 70% (84 out of 120) disagreed that hospital had adequate resource while another 20% (24 out of 120) strongly disagree. There were no neutral respondents on this aspect of adequacy of resources to implement regulations on drugs management. This means that drug inventory management regulations are not implemented.

Lastly, the data in the same table 4.4 shows that half 50 % (60 out of 120) of the respondents strongly agreed sensitized on drug policies aimed at safeguarding the hospital drugs. In the same vein, 30% (36 out of 120) agreed on the same aspect of staff sensitization. However, 15% (18 out of 120) of the respondents disagreed while another 5% (6 out of 120) strongly disagreed that the hospital staff were often

sensitized on drugs management's policy hence Sensitization on drug policies was often.

According to the findings Corruption and lack of resources affects performance in health institution to greatest extend while communication regulation and sensitization on drugs policies had less effect hence organizational regulation was significant to the study. The same finding was also found by Erhun, Babaloha, and Erhun (2014) who conducted a study on Drug regulation and control in Nigeria. Where total of 345 healthcare workers were interviewed using drug safety regulations, and institutional regulations on drug inventory and established that at 78% of institutional regulations were the course. Again, such findings are similar to those found by Gupta et al (2014) where a sample of the 14 hospitals studies indicates that a set of policies and regulations were needed to guide the handling, storage and dispensing of drugs in all hospitals.

4.4.2 Storage Infrastructure and Drug Inventory Security Management

The study examined the influence of hospitals storage infrastructure on the prudent drug inventory security management. Storage infrastructure covers all facilities and systems for proper holding and preservation of drugs. Attention was given to the storage space for the hospital drugs to enhance their security. The facilities include the pharmacy sections which hold substantial drug stocks in all hospital. The adequacy of the storage space, lighting system, special cooling section, temperature control and ventilation were some of the major areas which were examined. Drugs are expensive, fragile and perishable products which demands special care and handling. A well developed and managed drug storage infrastructure would minimize organizational breaches that may face drug management system in hospitals.

Table 4.5 Storage Infrastructure and Drug Inventory Security Management

Aspects of drug storage infrastructure	Unit	5	4	3	2	1
The storage space for drugs affects drug inventory management	No	30	42	6	26	16
	%	25	35	5	22	13
The amount of lighting is adequate to safe guard drugs	No	72	42	6	0	0
	%	60	35	5	0	0
Temperature control systems are available	No	29	36	12	31	12
	%	24	30	10	26	10
The ventilations are adequate in the drug stores.		62	48	0	10	0
	%	52	40	0	8	0

As seen in table 4.5 above, 25% (30 out of 120) and 35% (42 out of 120) of the responders strongly agreed and agreed respectively that storage spaces for drugs in hospitals were adequate. On the other hand, only 5% (6 out of 120) were neutral on storage space while 22 % (26 out of 120) disagreed and other 13% (16 out of 120) of the respondents strongly disagreed the space was adequate to cater for all the drugs. Most of respondents accepted their hospitals drugs were affected by storage space

The aspect of lighting system were examined. Adequate light facilitates sorting, recording, handling, marking and reading the contents on the drugs packages. The table 4.5 shows that 60 % (72 out of 120) of the respondents strongly agreed the lighting system was adequate for proper drug inventory management another for proper drug inventory security management, another 35% (42 out of 120) of the respondents agreed, the lighting system were adequate in the hospital studies. Only a few respondents, 5 % (6 out of 120) were neutral that the lighting system on drug stores. This shows that most of hospital had enough light.

Table 4.5 further discloses that 24% (29 out of 120) and 30% (36 out of 120) of the respondents strongly agreed and agreed respectively, that adequate mechanisms were available in hospitals studied and importance of temperature control in drugs management. It was noted that 10% (12 out of 120) were undecided on temperature control systems while 26% (31 out of 120) disagreed and other, 10% (12 out of 120) strongly disagreed temperature control mechanisms operational in hospitals were adequate. Implying that temperatures control are not enough in all hospitals.

Table 4.5 further shows 52 % (62 out of 120) of the respondents strongly agreed that ventilations were adequate in the store rooms where drugs were held. Similarly, 40 % (48 out of 120) agreed, ventilations were adequate in the drug store. However only 8 % (10 out of 120) of the respondents were undecided ventilations were moderate. There were no other opinions on this aspect. Responses show ventilations were almost adequate.

The study therefore concluded that, Storage space and Temperature control systems negatively affected drug inventory security management while amount of light and size of ventilation were adequate. Hence storage infrastructure was significance. The result was echoed by research by Ngai-Hang, Leung, Ana, Prashant, Gallien, (2016) on the impact of inventory management on stock-outs and potency of essential drugs, which observed that lack of skilled workers and proper accountability mechanism was responsible for poor handling and loss of drugs at 58%.

4.4.3 Staff Skills and Drugs Inventory Management.

Skills of the staff play a key role in ensuring that proper handling and management of drugs is maintained. More than any other consumer products, drugs require extra caution and security because of the adverse consequence which may result when they

are mishandled. Above all any misuse or diversion of hospital drugs may result into undesirable outcomes. The study sought to find out whether the members of staff working in the pharmacy section had adequate technological know – how, most hospital operate computerized systems that shows the data and information on the status of drugs in stores. Technical skills are essential for proper handling of drugs at all stages from procurement to disbursement to the patients and the study further examined the aspect training on proper drug handling techniques. New and improved drugs may demand special care including storage and dosage management. It's critical that all the staff handling drugs should have relevant qualification and competences. The aspects of staff skills were studied and the results from the respondents were presented in the table below.

Table 4.6 staff skills and Drugs inventory managements

Aspect of staff skills	UNIT	5	4	3	2	1	TOTAL
Members of staff have adequate technological know-how on drug inventory management	No	41	48	0	24	7	120
	%	34	40	0	20	6	100
Staff have adequate skill for handling and managing drugs	No	48	60	0	12	0	120
	%	40	50	0	10	0	100
Members of staff are regularly trained on drug inventory security management	No	30	42	0	36	12	120
	%	25	35	0	30	10	100
Member of staff have relevant qualifications on drug inventory security management	No	48	60	0	0	0	120
	%	40	50	0	0	0	100

As seen from table 4.6, 34%(41 out of 120) of the respondents strongly agreed that members of staff handling drugs in hospitals have adequate technological know – how. Another 40 %(48 out of 120) agreed on the same although 20 %(24 out of 120) disagreed. The result also shows that 6 %(6 out of 120) strongly disagreed with that opinion. None of the respondents stated they did not know how to respond to this aspect. Although majority of staff were having necessary technology, need to improve level of knowledge on technological aspects is important.

In regard to the staff having adequate skill for handling drugs, 40%(48 out of 120) and 50%(60 out of 120) of the respondents, strongly agreed and agreed respectively, that the hospital staff had adequate skills required to prudently manage the drugs inventory. Only 10% (12 out of 120) disagreed with the two views implicating that staff had adequate skills.

The same table reveals some information on the training of the hospitals staff. The opinion of the respondents showed that 25 %(30 out of 120) strongly agreed that the hospital staff receives regular training on handling and management of drugs. Another

35 %(42 out of 120) agreed that the staff received regular training. On the contrary, 30 %(36 out of 120) disagreed with that proposal while another 10 %(12 out of 120) strongly disagreed on the same Implicating that staff were regularly trained on drug inventory security management.

Lastly the table 4.6 disclose that 40 %(48 out of 120) of the respondent strongly agreed that members of the hospital staff handling drugs had the relevant qualification in the same vein, 50%(60 out of 120) agreed that the hospital staff had the relevant technical qualification. However, 10%(12 out of 120) of the responders did not know the status of the staff qualification implicating members of staff had relevant qualifications.

All respondents agreed to a great extent that members ‘of staff in all health institution had adequate technological know-how, skills for handling and managing drug, staff are regularly trained and staff had relevant qualifications. On contrary, Keitany, Mwaura and Mary (2015) studied On Drug Storage and maintenance at Nyanza hospitals. Experience, level of education, motivation and technological training used as independent variables and concluded that most staff involved in drug storage had insufficient academic qualifications and experience.

4.4.4 Internal environment factor and drugs inventory management

Internal environment factors refer to the culture and the framework under which drugs are handled and managed in hospitals. Access to drugs meant to be prescribed to the patients can create opportunities for theft diversion and misuse unless strict measure and systems are put in place. In this study, the internal environment factor touches on issues of drug theft the culture of the hospital staff, staff motivation and documentation practices. The opinion of the respondents on the influence of internal

environment factors on drugs inventory security management is summarized in the table 4.7.

Table 4.7 Internal environment factors and drugs Inventory management

Internal environment factors	Unit	5	4	3	2	1	TOTAL
The drugs in hospitals are frequently stolen	No	36	43	0	29	12	120
	%	30	36	0	24	10	100
The culture of an institution encourages drugs diversion in hospitals	No.	41	50	0	19	10	120
	%	34	42	0	16	8	100
The hospital management motivates staff to encourage professional in drug management	No.	0	24	12	60	24	120
	%	0	20	10	50	20	100
Staff are held responsible for documentation of drug inventory	No	24	36	12	30	18	120
	%	20	30	10	25	15	100

Table 4.7 reveals that 30 %(36 out of 120) and 36%(43 out of 120) of the respondents strongly agreed and agreed, respectively, that drugs in hospitals are frequently stolen. Although no respondents failed to comment, 24 %(29 out of 120) disagreed while 10%(12 out of 120) strongly disagreed that drugs were frequently stolen in the hospitals covered in this study implicating that drugs are being stolen.

The same table captures the opinion of the respondents on the culture of diverting drugs in hospitals. It came out that 34%(41 out of 120) of the respondents strongly agreed that a culture of drugs mismanagement was a common feature in hospitals. Similarly, 42%(50 out of 120) agreed with the proposition although none indicated that they didn't know about this culture. On the contrary, 16 %(19 out of 120) of the respondents disagreed while the remainder 8%(10 out of 120) strongly disagreed on this aspect implicating organizational culture encouraged drug diversion.

On the practice of motivating staff to adhere to the best practices working in the health sector, the respondents revealed the following opinions. The table 4.3.4 shows

that only 20 % (24 out of 120) of the respondents agreed that the management motivated the staff. Those who didn't know anything to do with motivation of the staff were 10%. However, 50%(60 out of 120) and 20%(24 out of 120) of the respondents disagreed and strongly disagreed respectively on this aspect implanting that most of institution do not motivate their staff to encourage professionalism

Finally, the table discloses that 20% (24 out of 120) of the respondents strongly agreed that there was adequate accountability of drugs in hospitals. Another 30%(36 out of 120) agreed there were adequate accountability systems although 10%(12 out of 120) failed to comment on this aspect. On the other hand, 25%(30 out of 120) while 15%(18 out of 120) Disagreed and strongly disagreed respectively with the aspect meaning not all staff are held responsible for documentation of drug inventories.

Study found that drug inventory security management was negatively affected by internal environment factors by stealing of drugs, Organizational culture and lack of motivation to workers hence significant. On the same note, Zakic, Jovanovic, Stamatovic, (2008) conducted a study on effects of internal and external factors on the institutions using incentives, institutional culture and technology as their independent variables and found that set of poor institutional cultures and lack of incentives impact negatively on the performance of an institution.

4.4.5 Drug Inventory Security Management

Table 4.8 indicators of enhancing drugs inventory security management

Indicator	5	4	3	2	1	Total
Actions are taken on reports of drugs theft	19	38	18	30	14	120
	16%	32%	15%	25%	12%	100%
Presence of physical controls are in place	46	53	9	12	0	120
	38%	44%	8%	10%	0%	100%
Staff are made accountable for all the drugs used	24	36	12	31	17	120
	20%	30%	10%	26%	14%	100%
Rules on drugs security are often reviewed	10	33	24	41	12	120
	8%	28%	20%	34%	10%	100%

From the table 4.8 above, the respondent's perception of 'actions are taken on reports of drugs theft' as an indicator of enhancing drugs inventory security management were rated as strongly agree (16%), agree (32%), neutral (15%), disagree (25%) and strongly disagree at (12%). This perception was obtained after considering that the four factors studied were in place and operational, the implication of result is that drug inventory security management is partly compromised.

The opinion on presence of physical controls are in place as a measure of enhanced drugs inventory security management was rated as strongly agree (38%), agree (44%), neutral (8%), disagree (10%) and strongly disagree at (0%) implicating there was physical control in the institutions.

In relation to the hospital staff accounting for all drugs as a suitable measure of enhanced drugs inventory security management, the respondents stated that they strongly agreed (20%), agreed (30%), neutral (10%), disagreed (26%) and strongly

disagreed at (14%). Similarly, this perception was obtained after considering that the four factors studied were in place and operational.

Finally, the indicator of “rules on drugs security are often reviewed” as a suitable measure of enhanced drugs inventory security management, the respondents stated that they strongly agreed (8%), agreed (28%), Neutral (20%), disagreed (34%) and strongly disagreed at (10%).

The study found that action was taken against drug theft reports in all health institution and there was presence of supervisors to enhance security. Staffs were found to be made accountable of drug inventory entrusted to them but rules on drugs security were not regularly reviewed. Implying that the four indicators were good enough to determine dependent variable against predictor variables.

4.5 Inferential Statistics;

Is a data analysis process using statistics and it tried to reach to conclusion that extends beyond immediate data.

4.5.1 Correlation Analysis

The study evaluated influence of organizational breaches on drugs inventory security management in health institutions, Nyeri County. Breaches in the process of handling, storing and dispensing drugs depends on a number of factors such as regulations observed, storage infrastructure in hospitals, skills of the staff and the Internal environment at the hospitals. In this study, these factors were subjected to statistical data processing under correlation analysis. Correlation is computed to test the degree of relationship between two or more variables. There were four independent variables and one dependent variable. The focus was on how each of the independent variables correlated with the dependent variable. The higher the degree

of correlation, the higher was the level of influence on the dependent variable. The table below is an extract summary of the correlation analysis.

Table 4.9 Intercorrelations among the Variables of the Study

Variable (Spearman correlation coefficient)	1	2	3	4	5	6	7	8	9	10	11	12	13
1 <i>-Rating indicator on drugs security</i> <i>p-values for the variable</i>	1.000	0.451	0.382	0.206	0.212	0.113	0.275	0.296	0.277	0.402	0.417	0.430	0.364
		0.03	0.01	0.04	0.02	0.06	0.08	0.04	0.03	0.07	0.03	0.03	0.04
2 Corruption in hospitals is a threat to		1.000	0.283	0.197	0.420	0.353	0.104	0.461	0.179	0.236	0.247	0.788	0.125
3 Hospitals have adequate resources			1.000	0.332	0.375	0.423	0.368	0.218	0.389	0.437	0.018	0.368	0.194
4 Staff members are sensitized on drug				1.000	0.216	0.388	0.448	0.231	0.196	0.161	0.316	0.431	0.147
5 Storage space for drugs are adequate					1.000	0.309	0.434	0.313	0.562	0.454	0.612	0.398	0.432
6 Temperature controls measures exist						1.000	0.456	0.478	0.302	0.418	0.017	0.256	0.018
7 Ventilations in drug store are in place							1.000	0.128	0.463	0.342	0.012	0.149	0.017
8 Staff have adequate technology on drugs								1.000	0.385	0.491	0.232	0.014	0.455
9 Staff are regularly trained on drug mgt									1.000	0.337	0.314	0.340	0.561
10 Staff have relevant qualifications										1.000	0.018	0.0361	0.234
11 Drugs are frequently stolen in hospitals											1.000	0.740	0.013
12 Culture of drugs misuse is prevalent												1.000	0.139
13 Adequate accountability measures exist													1.000

Note: The p-values for each independent variable is shown using one-tailed test. This is compared with the alpha value of $p = 0.05$

Note: Existence of p-values greater than 0.05 shows that the relationship between the variables was not significant.

Note: Only the 1st row with p-values is important for interpreting the significant correlations between independent and dependent variables.

Note. There was no multicollinearity in the data because no value among the predictor variables was above $p=0.9$

As indicated in the table 4.8 above, all the examined parameters were subjected to the correlation analysis computation. The first row reveals the correlation between drugs inventory security management and the various factors studied in hospitals. For example, 0.451 on the first row shows that 45.1% of the drugs inventory security management is influenced by or explained by corruption threat factor. As can be seen, all the shown p-values in row one had values which are compared with the alpha value of 0.05. Three factors (temperature controls, ventilations in place and staff qualifications) had p-values being greater than 0.05 i.e. 0.06, 0.08 and 0.07 respectively. This means that all other factors had significant influence on drugs security management.

On the other hand, relationship among the predictor variables was examined. It was observed that corruption threat and culture of drug misuse were the most highly positively related (0.788) in row two compared to any other two variables. This was followed by a strong positive relationship between drugs frequently stolen and the culture of drug misuse in hospitals (0.740). The least form of positive relationship was between drug are frequently stolen in hospitals and existence of adequate accountability measures (0.013) in row 11.

4.6 Results of Multiple Regression Analysis

The research examined effects of Organizational Breaches on drug inventory security management. The specific objectives studied were entered in the working model as independent variables where the dependent variable was drug inventory security management. The results of the regression analysis were summarized below.

Table 4.10 Summary of Model: Predictor Vs Criterion Variables

Variable s	R	R- Square	Adjusted R-square	Std Error	Change Statistics			P-Value
<i>I</i>	0.785	0.616	0.621	5.024	343	2	86	0.000

From the above table 4.10, R square is an index of variability in the dependent variable accounted for by the predictor variables. In the table 4.10, 0.616 means that 61.6% of the drugs inventory security management rating is accounted for by the four independent variables. The Adjusted R-square means a modified and better correlation measure e.g. 0.621 means that 62.1% of the dependent variable is accounted for by the four independent variables. The adjustment removes the overestimation of the variance resulting from using samples instead of the entire population. The Standard error is the indication of how much variability there is around the calculated regression line. The p-values indicate whether the model was significant or not. Any figure less than $\alpha = 0.05$ means there was significant relationship between the two set of variables.

Table 4.11 Analysis of Variables of Predictors and Drug inventory Security Management

	Sum of Squares	Degree of freedom	Mean Square	F	Sign.
Regression	0.221	4	0.221	16.335	.000
Residual	0.285	115	0.007		
Total	0.506	119			

The results presented in the table 4.11 show that influence of organizational breaches on drugs security management was significant (R square = 0.616, F = 16.335, P < 0.05). The study shows

that 61.6% of the variations in drug inventory security management was explained by variations in organizational breaches. The β was also statistically significant ($\beta = 4.038$, $t = 2.362$, $p < 0.05$).

The hypothesis that organizational breaches influence drugs inventory security management was therefore confirmed. This is because there was a statistical significant influence of the breaches on drugs inventory security management.

Table 4.12 Regression of Coefficient

Model	Unstandardized Coefficient		Standard Coefficients	T	Sig.
	B	Std Error			
Constant	4.038	0.343	-	2.362	0.03
Organizational regulations (X4)	0.138	0.085	0.138	1.385	0.000
Storage infrastructure (X2)	0.389	0.362	0.389	1.421	0.000
Staff skills (X3)	0.210	0.517	0.210	1.250	0.000
Internal environment factors (X1)	0.468	0.348	0.468	1.456	0.000

4.6.2 Interpretation of Coefficients

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + e$$

Y: is the dependent variable (rating of drugs inventory security management e.g. strongly agree).

B_0 is a constant (rating of drugs inventory security management irrespective of the factors studied in terms of rating i.e. 4.038). The $B_1B_2B_3 B_4$ are coefficients generated and attached to the four factors examined. Value of X_1 was rating of the influence of organizational regulations

on security of drugs in hospitals (0.138). Value of X_2 relates to the rating of the influence of storage infrastructure on security of drugs in hospitals (0.389). And X_3 stands for the rating of the influence of staff skills on security of drugs in hospitals (0.210). Value of X_4 means the rating on the influence of workplace environment on security of drugs in hospitals (0.468).

Final equation model becomes;

$$Y = 4.038 + 0.468X_1 + 0.389X_2 + 0.210X_3 + 0.138X_4 + e$$

The rating of drugs inventory security management status irrespective of the four factors under review was 4.038 on average for the hospitals. This implies that most staff in hospitals agrees that there are breaches on the drugs inventory security. The rating entailed 5 as strongly agree and 1 as strongly disagrees. The coefficients for the four factors X_1 , X_2 , X_3 and X_4 show the amount of increase in y variable contributed by each of the four factors studied. Result of the model reveals that internal environmental factors with coefficient value of 0.468 contributed the highest drug insecurity followed closely by Storage infrastructure with a coefficient value of 0.389 while skills of staff had coefficient of 0.210 and lastly Organizational Regulation took coefficient of 0.138.

4.7 Testing Hypothesis

Inferential statistics are designed to help a researcher determine the validity of a null hypothesis.

It is used to detect the differences in the data that are inconsistent with the null hypothesis.

Rejection of the null hypothesis implies that the independent variable affects the dependent variable. Failure to reject the null hypothesis may lead a researcher to abandon a potentially fruitful line of research. Consequently, one wants to be reasonably sure that failure to reject the null hypothesis was not caused by lack of power (alpha) in a statistical test. Hypothesis testing

was undertaken where an alpha of 0.05 was used using one-tail test. Using one tailed test is easier to reject the null hypothesis than with two tailed test. The use of SPSS version 21 system was used to test the significance of the variables using the p-value test. The p-values were used to test whether to accept or reject the null hypothesis. The general rule was that if the p-values were less than 0.05, then the null hypothesis was rejected and hence the alternative hypothesis was accepted. This implied that there was significant influence of the predictor variables on the dependent variable.

Hypothesis Ho1: Effect of organizational regulations was found to have significant positive influence on the drugs inventory security management in hospitals. The study found that the p-value for this factor was 0.000 this means that this factor was significant because the figure was less than the alpha value of $p = 0.05$; (at 95% level of confidence). Hence effects of organizational regulations have significant influence on the drugs inventory security management. Hence the null hypothesis rejected, In particular, the parameters used to measure this aspect corruption threats, communication regulations, adequacy of resources as well as sensitizations on drug policies.

The predicted models relating organizational regulations and drugs inventory security management was presented in a simple linear regression model; as $y = b_0 + b_1 x_1 + e$

In this equation,

b_0 = the estimates of the intercept, e = the error tern and b_1 =was the beta value associates with organization regulations and X_1 = Organizational regulations Y = drugs security management. The relationship between these two variables was presented by the hypotheses one as:

H₀₁: organizational regulations have no significant influence on drugs inventory security management.

The composite construct of regulations (corruption, communication, resources, and sensitization) was regressed against drugs inventory security management. The model summary associate with this relationship is shown in the tables

Table 4.13 model summary of organization regulations and drug inventory security management

Model	R	R ²	Adjusted R ²	Std Error	Change statistics				
					R ²	F Change	d.f.1	d.f.2	F. Change
1	.748	.559	.559	.6279	.559	841.572	1	542	.000

- a. : Predictors (constant) , Organization regulations
- b. :Dependent variable – drugs inventory security management

Source: primary data, 2017

The table above shows the model had $R^2 = 0.559$ which meant that regulations explained 55.9% of the variations in drugs inventory security management, leaving 44.1%, therefore, provide a moderate fit in explaining variation in drugs inventory security management

Table 4.14 Analysis of Variance of Organizational regulations and drugs security management

Model	Sum Of Squares	d.f	Mean Square	F	Sig
Regression	371.287	1	371.287	841.572	0.000

Residue	292.591	342	0.394		
Total	663.878	343			

The above table shown the model with a F – values (1,342) = 841.572 , p-value= 0.000 This meant that the model was significant α 0.05. Level, in explaining the linear relationship between organizational regulation and drugs inventory security management.

Hypothesis Ho2: Drugs storage infrastructure was also found to have significant positive influence on drugs security management in hospitals. The study found that the p-value for this factor was 0.0000 which was compared with the alpha of 0.05. This implies that the factor was significant in influencing drugs inventory security management. The indicators used to test the extent to which storage infrastructure influenced drugs security management included storage space, quantity of light, temperature control and ventilation facilities. The predicted model relating storage infrastructure and drugs inventory security management was predicted as: $y = b_0 + b_2 x_2 + e$. In addition, the study tested the hypothesis two as follows.

Ho2: storage infrastructure has no significant influence on drugs inventory security management

Table 4.15 model summary of storage infrastructure on drugs inventory security management.

Model	R	R ²	Adjusted R ²	Std Error	Change statistics				
					R changes	F change	d.f. 1	d.f. 2	F
1	.679	.461	.461	.69412	.462	635.915	1	542	.000

From the above table, a linear regression analysis output shows that the R square value was 0.462. This meant that storage infrastructure could explain 46.2 percent of the variations in drug

inventory security management, leaving 53.8 percent of the variations unexplained. This shows that storage infrastructure had a weak influence over drugs inventory security management

Table 4.16 Analysis of variables of storage infrastructure and drugs inventory security management

Model	Sum of squares	d.f	Mean square	F	Sig
Regression	306.386	1	306.383	635.915	0.000
Residual	357.495	342	0.482		
Totals	663.878	343			

a: dependent variable – drug inventory security management

b. predictor- storage infrastructure

From the above table 4.16, it was observed that the coefficient model was significant with p value of 0.00 from this analysis, the null hypothesis was rejected at α 0.05 level and therefore there was a significant relationship between storage infrastructures significantly influencing the drugs inventory security management.

Hypothesis Ho3: The study found skills of the staff had positive significant influence on drugs security management in hospitals. The computed p-value for this factor three was 0.0000 which was less than the alpha value. Hence it was established that staff skills has significant influence on drugs inventory security management.

The predicted model relating skill of staff and drugs inventory security management assumed the following equation

$$Y = b_0 + b_3 X_3 + e$$

For the hypothesis, it was stated as follows

Ho3: skills of staff have no significant influence on drugs inventory security management

Table 4.17 model summary of skills of staff and drug inventory security management

Model	R	R ²	Adjusted R ²	Std Error	Change statistics				
					R ²	f-change	d.f.1	d.f.2	F
1	.667	.446	.446	.70434	.446	596.214	1	542	.00

From the above table, R – square was 0.446 meaning that 44.6 percent of the variations in drugs inventory security management was explained by the influence of skills of staff. This leaves 55.4 percent of the variation unexplained. This was interpreted to mean model three provides a weak fit.

Table 4.18 Analysis of variables skill of staff on drug inventory security management

Model	Sum of square	d.f	Mean square	F	Sig
Regression	295.777	1	295.77	596.214	0.000
Residual	368.101	342	0.496		
Total	663.878	343			

- a. Predictor : skills of staff
- b. B: dependent variable :Drug inventory security management

As observed from the above table, the model had f –value (1.342) = 596.214 and the p – value was 0.000. This meant that the model was statistically significant at $\alpha = 0.05$ level in explaining the simple linear relationship between skills of staff and drugs inventory security management. The null hypotheses was rejected, remains there was a significant relationship between the skills of staff and drugs security management

Hypothesis four Ho4, It was established that internal environment factors also had positive influence on drugs inventory security management in the studied hospitals. The p-value for this factor was 0.000 which was less than the alpha value. Hence it was conclusively established that internal environment factors had significant influence on the drugs inventory security management.

The predicated model relating to internal environment factors and drug inventory security management assumed the following equation

$$Y = b_0 + b_4 x_4 + e$$

The above equation was presented by the following hypothesis as follows:-\

Ho4: internal environmental factor has no significant influent on drugs inventory security management

Table 4:19 Model summary of internal environmental factors and drug inventory security management

Model	R	R ²	Adjusted R ²	Std error	Change statistic]	F	DF	DF2	F
					R ²	F	d.f.1	d.f.2	F
1	.561	.315	.314	.78279	.315	341.411	1	542	.000

From the above table, R-square was 0.315. This meant that internal environmental factor explained only 31.5 percent of the variations in drugs inventory security management in a linear relationship between the two leaving out 68.46% of the variations unexplained. This was interpreted to mean model four provided a weak fit.

Table 4.20 Analysis of variance of internal environmental factors

Model	Sum of square	d.f.	Mean square	F	Sig
Regression	209.205	1	209.205	341.411	.000
Residual	454.673	342	0.613		
Total	663.878	343			

From the above table, the F- value (1,342) = 341.411 and the p-value was 000 this meant that model four was statistically significant α 0.05 level in explaining the linear relationship between internal environment and drugs inventory security management

The null hypothesis under model four had a significant p- value of 0.000 and therefore the null hypothesis was rejected this meant there was a significant relationship between internal factors and drugs inventory security management

4.8 Summary of Hypothesis tested

Table 4.21 summary of hypothesis and test results.

Research objectives	Hypotheses	Results
Objectives 1 To analysis the effects of organizational regulations on drugs inventory security management	Hypothesis 1 Organizational regulations has no significant influence on drugs inventory security management	Rejected
Objective 2 To assess the effect of storage infrastructure on drugs inventor security management	Hypothesis 2 storage infrastructure has no significant influence on drugs inventory security management	Rejected
Objective 3 To evaluate the effect of skill of staff on drugs inventory security management	Hypothesis 3 Skills of staff has no significant influence on drugs inventory security management	Rejected
Objective 4 To explore the effect of internal environmental factors on drugs inventory security management.	Hypothesis 4 Internal environmental factors has no significant influence on drugs security management	Rejected

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the result of this study which evaluated the influence of Organizational breaches on drug inventory security management in health institution. The first part of the chapter describes the summary of major findings as captured from the analyzed data. The following section highlights the major conclusion drawn from the findings and from the analyzed data and at the end, recommendations are drawn based on the study conclusions.

Addressing drugs inventory security management has enable hospitals to improve their service performance, adhere to regulatory requirements and reduce breaches relating to drugs insecurity. By restricting access to inventory, hospitals have reduced risk of theft, ensured only appropriate personals performed inventory transactions and demonstrate compliance with regulatory standards. The proper use of pharmaceuticals has achieved coupled with proper inventory management, hospitals has reduced the risk for regulatory non-compliance and derive further financial benefits from an integral hospital function.

Another contribution to knowledge is that, whilst previous studies have researched on the independent variables individually, this study combines the four independent variables with aim of deriving the strength and impact of their combined effect and the contribution of each variable towards drug inventory security management.

5.2 Summary of the Major Findings

5.2.1 Influence of Organizational Regulations on Drugs inventory Security Management

The factor of Organizational regulations was examined in this study and its impact on the security of the hospital drug regulations privies a reference point or governance issues. In the health sector, a number of regulations exist in form of policies, standards, practices procedures, rules and guidelines on how drugs should be and found that Organizational regulations had significant influence on the drugs inventory security management in hospitals. Corruption was found to be a threat to regulation implementation on drugs inventory security management in the studies hospitals.

On the aspect of communication regulations, the study found that hospital had effective systems on drugs security management. However, the study found that hospitals lacked adequate resources to implement drugs security management's regulations. Lastly, the study found that most of the staff were often sensitized on drug polices to safeguard the hospital drugs

The study found that the p-value for this factor of regulations was 0.0000. This means that this factor was significant because the figure was less than the alpha value of $P= 0.05$ (at 95% level of confidence) it follows that organizational regulations has significant influence on the hospital drugs inventory security management. Prudent and timely operationalization of relevant drug related regulations leads to reduced organizational breaches of drugs in hospitals

5.2.2 Influence of Storage Infrastructure on Drugs Inventory Security Management

In regard to the factor of storage infrastructure, a number of findings were drawn on this aspect. The study found that in most hospitals, the storage was not a major threat to the security of drugs in hospitals. On the factor of lightning where drugs were kept in hospitals, the study found that this was not a challenge or a security concern; adequate lighting was available in all places where drugs were handled. On the aspect of temperature control, the study found that more than half of the hospitals had in place temperature control systems as the health standards requires. The final aspect of storage infrastructure examined the adequacy of ventilations facilities where drugs are held.

The study found the ventilations systems were adequate for all the drug stores in hospitals. On this factor of storage infrastructure, the study found that the p- value was 0.0000 which was compared with the alpha value of 0.05. This implies that this factor was significant in influencing the security of drugs in hospitals because the p- value was less than the alpha value. All the parameters used to measure storage infrastructure factor were found to have some significant impact on the security of drugs held in hospitals. In other words, better storage infrastructure resorted to less security challenges or breaches on drug inventory security management in hospitals.

5.2.3 Influence of Staff Skills on Drugs Inventory Security Management

The study came up with important findings touching on the influence of staff skills on drugs security management in hospitals. The study found that members of staff working in hospitals had adequate technological knowhow. This implied that they were conversant with the work standards in hospitals regarding storage and security of drugs. On the aspect of handling drugs, the study found that the hospital staff had adequate skills required to effectively provide timely,

reliable and quality services. Skills are essential in all aspects of drugs handling, storage and in dispensing them to the patients. The study further found that most members of staff were regularly trained on matters of health care and drugs handling. Regular trainings equip the staff with new and relevant skills for handling all types of drugs.

In addition, the study found that most members of staff had relevant qualifications required at their workstation. Relevant qualifications are essential and mandatory in the health sector in order to minimize cases of quacks joining the sector. On this factor of staff skills, the study found that its p-value was 0.0000 where it was compared with the alpha value of $P = 0.05$. This means that the staff skills factor was significant in this study because 0.0000 was less than the alpha value. This finding was captured in the SPSS data output alongside other results.

5.2.4 Influence of internal environment factors on drugs inventory security management

The internal environment determines whether it was easy or hard to access, divert or misuse hospital drugs from where they were held. Internal environment was found to be a major factor which determined how the staff responded to drugs handling and management. Specifically, the study found that hospital drugs were frequently stolen or diverted by some staff. Over half of the respondents indicated that this was a common problem, In the same vein, the study found that culture of drugs misuse in a big way sustained the practice of drugs diversion in most hospitals. On the aspect of staff motivation, the study found that the hospital managers were not active in motivating their staff. Providing incentives, which includes non-financial motivation, is instrumental in enhancing service delivery and strong work spirit among the staff in hospitals. On the factor of accountability practice when handling drugs in hospitals, the study found that most of staff members were held responsible for documentation as measure to enhance security

of drugs. On the factor of internal environment factors, the study found p-value of 0.000 which was less than the alpha value of 0.05

5.3 Conclusion of the study

The study examined the influence of organizational breaches on drugs inventory security Management in health institution and was guided by the four specific objectives.

5.3.1. On Organizational Regulations

According to the findings, organization regulations covering the handling and management of drugs were studied in the research. One of the conclusions drawn was that organizational regulations were a factor which significantly influenced drugs security management in hospitals. The use of policies, guidelines, procedures and application of standards provided crucial reference points for enhancing security of drugs in hospitals.

The study specifically concludes that corruption was a threat to proper implementation of drug regulations. Corruption covers drugs diversion, misuse or denial to dispense drugs to the patients. The study further concludes that most of the hospitals had effective communication regulations which include timely reporting and documentation of drugs handling, storage and management. In regard to implementation of drugs security management regulations, the study concludes that most hospital lacked adequate resource to effectively implement such regulations. Drugs regulations exist in the health sector where they provide a governance framework on issues of drugs storage and management. The study also concludes that most of the hospital staff was often sensitized on the drug policies mainly to safeguard the drugs.

5.3.2 On Storage infrastructure

On the factor of storage infrastructure, the study concludes that it was a significant factor which influenced drugs inventory security management in hospitals. One of the storage infrastructure component studied was adequacy of storage space in hospitals. The study concludes that most hospitals had adequate storage space in form of stores and pharmacy. Proper and adequate storage space contributes to enhanced security of drugs in the health sector. On the aspect of lighting in areas where drugs are held, the study concludes that lighting was adequate in almost all hospitals covered by this study. The issue of temperature control was analyzed where the study concludes that most of the hospitals had systems in place to deal with temperature changes. Most drugs require special storage facilities mainly to address the challenge of temperature control.

5.3.3 On Skills of staff

On the aspect of the skills of staff, the study concludes that, although the staff had adequate technological know-how in terms of operating computers, this did not reduce the drugs inventory security and reduce the drugs security challenges, it was further concluded that staff had adequate skills for handling drugs but in the process, the threat of drug misuse remained. In the same vein, the study concludes that most members of staff had relevant academic and professional qualifications for handling drugs. However, such qualifications did not eliminate drugs inventory security challenges in most hospitals.

5.3.4 On Internal environmental factors

In regard to the factor of internal environment factors, the study concludes that it was a significant factor which influenced drug security management in hospitals. The problem of drug theft was common which was perpetuated by a poor culture of diverting drugs from their intended use i.e. dispensing to the patients. A related component as an internal factor was the issue of low

levels of staff motivation. The study concludes that most of staff felt that management rarely motivates their staff which in turn negatively affected drugs inventory security management. In addition, although accountability for drugs in hospitals was in place, this never guaranteed that drugs were never misused or diverted.

5.4 Recommendations of the study

From the study output, summary and conclusion, a few recommendations have been generating in line with the specific objectives of the study.

First, it is recommended that hospital management should often be reviewing all the drugs related regulation to ensure that most gaps and shortcomings are resolved since corruption in terms of drugs diversion was common. Resource should be increased to enhance monitoring and reporting of drugs movement in hospitals including proper storage.

On the aspect of storage infrastructure, the study recommends a review of the facilities and systems in place for storing drugs.

The study recommends that only those who meet the minimum academic and professional qualifications should provide service where drugs are handled and regular sensitizations done to ensure that they uphold proper work ethics

The study recommends that the management take full responsibility of all operations involving drug movement and storage. Bad culture of diverting drugs should be addressed by employing changes to the existing practices systems and procedures.

5.5 Areas of further research

The field for organizational breaches on drugs inventory security management is wide and dynamic. It is against such a background that other areas of research should be explored. Based

on the study conclusions and recommendations, it is proposed that the following areas can be studied by other researchers and scholars.

Drugs supply chain risks and mitigation strategies in Nyeri County; Many are times when patients suffer due to drugs mismanagement and need to identify related risks and how to mitigate them before un repairable damages occur. Organizational breaches and drug inventory security management in health institutions in other counties; Although result of research are generalized, there is need to conduct the same research study to a number of other counties in the country to be able to generalize the result for the whole country

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APPENDIX

Appendix i: Introduction Letter



DEDAN KIMATHI UNIVERSITY OF TECHNOLOGY

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6th December, 2017

TO WHOM IT MAY CONCERN

Dear Sir/Madam,

RE: INTRODUCTORY LETTER FOR RESEARCH

The bearer of this letter; **Shadrack Mumo Musyimi** of Registration number B212-02-0022/2014 is a bonafide student in the School of Graduate Studies and Research at Dedan Kimathi University of Technology. In fulfilling part of the requirements for a Master of Science Degree in Supply Chain Management, he intends to collect some data from your esteemed organization.

The university requests for your assistance to the student with the necessary data which forms an integral part of the academic research. The information provided will be used only for this purpose and will be treated with utmost confidentiality.

A final copy of the report will be made available to you upon request.

Thank you in advance.

Prof. Charles N. Mundia,

Dean, SGSR

Copy to Student file: B212-02-0022/2014.

	Questions	5	4	3	2	1
5	Corruptions is a threat to the implementing drug inventory regulations					
6	The organization has effective communication regulations on drug inventory security management					
7	The institution has adequate resources to implement the drug inventory regulations					
8	Members of staff are sensitized on the policies in place to safeguard the hospital drugs					

SECTION C Storage Infrastructure and drug inventory security management

S/no	Question	5	4	3	2	1
9	The storage space for drugs affects drug inventory					
10	The quality/quantity of light in the drug storage facility is adequate to safeguard the drugs:					
11	Temperature control systems are available					
12	The ventilation surfaces available are adequate.					

SECTION D:Skills of Staff and drug inventory security management

	Questions	5	4	3	2	1
13	The members of staff have adequate technological know-how on drug inventory security management					
14	Members of staff involved in drug management have adequate skills for handling and managing drugs?					
15	The members of staff are regularly trained drug inventory management					
16	Members of staff have relevant qualification on drug inventory security management					

SECTION E: Work place Environment and drug inventory security management

S/no	Question	5	4	3	2	1
17	The drugs are frequently stolen through collusion					
18	The culture of the institution encourages drug diversion					
19	The management motivates the staff to encourage professionalism of drug management					
20	There is adequate accountability of drugs in the institution through documentation					

SECTION F: Drug inventory security management of enhancing security of hospital drugs in your organization? Tick as appropriate.

	Security mechanisms on hospital drugs	5	4	3	2	1
21	-Actions are taken on reports of drugs theft					
22	Presence of physical control are in place					
23	Staff are made accountability for the drug used					
24	Rules on drug inventory security management are regularly reviewed.					

Comments:.....

