

Effects of Skills of the Staff on Drugs Inventory Security Management in Health Institutions Nyeri County, Kenya

Shadrack M. Musyimi¹, Lilian K. M. Mwenda², Anita W. Wachira², David Kiarie²

¹National Police Service, Maua Police Station, Meru County – Kenya.

²Dedan Kimathi University of Technology – Kenya.

Abstract: The study analyzed the effects of employee skills on drug inventory security management for the health institutions in Nyeri County, Kenya. 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. Close-ended questionnaires were used to collect the primary data. SPSS package Version 21 was used to process and analyze the data. Descriptive statistics were presented in the form of frequency distributions, means and standard deviations. A regression model was developed to establish the relationship between the independent and the dependent variable. Skills of staff (X_3) showed a coefficient of 0.210. The regression model generated R^2 value of 0.446 meaning 44.6% of the drugs security management was significantly influenced by skills of staff. The P value was significant at 0% level ($\text{sig.F} < 0.005$), confirming the model's fitness. The study variable had a positive relationship. The study recommends that the management should ensure that staff is continually trained in order to enhance their skill and thus improve drug inventory security in health institutions.

Key words: Drug Inventory, Health Institutions, Security Management, Staff Skills

1. INTRODUCTION

Each organization in the world stores goods, equipment's and other related stock which enable free flow of their activities. According to García-Alcaraz and Maldonado-Macías, (2016), organization must balance benefits and cost of inventory to be 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.

According 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, utilization 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 & Schwartz, 2013).

While the benefits of securing warehousing stocks are many and are known by all the stakeholders, the security of such inventories is 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 aims to reduce the level of uncertainty. 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 reduce breaches. One of the ways of reducing inventory theft by staff is addressing skills of employees (Fathalla, & Maggy, 2013).

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 sack senior officials. In 1994, the Government of Kenya (GOK) approved the Kenya Health Policy Framework (KHPP)

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 utilization 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).

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 & 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.

According to Nyeri County Government Business permit control department (2016), there are three broad categories of health institutions. These include; Public, private and Faith-based health institutions. The largest in each category are; Nyeri public Teaching and referral Hospital (Level-V), Mathari Catholic Church (faith based) hospital, and Outspan private Hospital. 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, (Kenyan republic of Kenya, 2016).

1.1 Statement of the Problem

Medical supplies which include original drugs and equipment are of high financial value and temptations always remain high to divert them for private gains. The security of the medical 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, companies' 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. The objective of Kenya Vision 2030 in the health sector is to provide an equitable and affordable healthcare system of the highest possible quality (Republic of Kenya, 2013). Thus, this study seeks to analyze beaches faced by health institution. Specifically, the research will explore effects of organizational regulations, storage infrastructure, skills of staff

and Internal environmental factors on drug inventory security management in Nyeri County, Kenya

1.2 Research Objective

To evaluate the effects of skills of the staff on drugs inventory security management in health institutions in Nyeri County, Kenya

1.3 Research Hypothesis

H₀₁ : Staff skills have no significant influence on drugs security management.

2. LITERATURE REVIEW

Without adequate pharmacy inventory management practices, hospitals run the risk of not being able to provide patients with the most appropriate medication when 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 & Zheng, 2012). 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 relevant to this research as it explains the effect of drug inventories in the wrong hands possible due to poor rules.

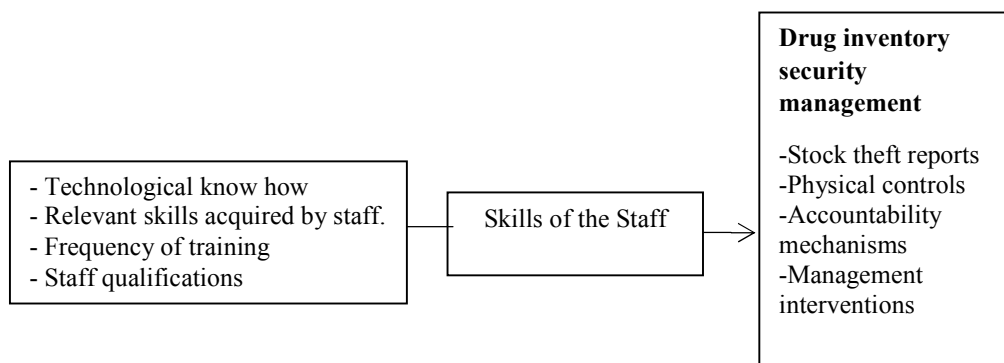
Mbuvi, Mwenda and Wachira (2016), conducted research on effects of drugs and substance abuse on mugging among youths in Kosoro area- Mathare, Nairobi County. It exposed the effects of prescribed drugs dependency on mugging, whereby the hospitals were the main source of the drugs. According to the study, 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.

Godeliver, Kagashe, and Terevail (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.

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

The operational framework (Figure 1) illustrates a link between the dependent variable, independent variables and the parameters used in this study.



Parameters

Independent Variable

Dependent Variable

Figure 1: Operationalization of Variables

Researcher has considered the variable in relation to staff technological knowhow, skills acquired by staffs, frequency of training and staff qualification on 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 reviled effectiveness of management

3. METHODOLOGY

A descriptive research design was used to analysis the study data. The target population consisted of all the ten (10) Health institutions (Hospitals) in Nyeri County with a bed capacity. There are 10 registered health facilities with a total bed capacity of 1443 (Table 1). 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. Purposive sampling technique was used to pick the institutions with largest number of bed capacity and staff per category. All 130 permanent employees were included as respondents of the research.

Table 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

A semi-structured questionnaire, presented in a Likert scale format, was used to collect data. Drop and pick method was used to administer the questionnaires. 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 & William, 2010). According to Allen (2004) a reliability coefficient of 0.95 or higher is considered acceptable.

Descriptive statistic was used for it determines the frequency with which an event occurs or relationship between variables (Glesne, 2015). The descriptive statistics consisted of frequency tables, diagrams measure of central tendering and measure of dispersion. 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.

The regression model as shown below was applied,

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

Y = Drug inventory security management
 b_0 = Constant factor, rate irrespective of any other.
 b_1 = Coefficient of regression of Skills of staff
 X_1 = Skills of staff
 e = Error term that represents all factors that are not included in the model

4. FINDINGS AND DISCUSSIONS

Out of the one hundred and thirty (130) administered questioners, 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.

4.1 Demographic Results

The demographic 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%. This implied that more male were involved in drug related security challenges compared to females. To understand experience and qualification of workers, department in which respondent's work were examined. Results from respondents indicated that 15% (18 out of 120) were managers, 51% (62 out of 120) were Doctors and Nurses, Pharmacist were 25% (29 out of 120) and Nine 9% (11 out of 120) were support staff as shown on Table 2. This study implies that most of drugs are handler by Doctors, Nurses and Pharmacist hence to enhance accountability on them to mitigate drug inventory security challenges.

Table 2: Department of Work

Departments	Responses	Percentage
Management	18	15%
Doctors and Nurses	62	51%
Pharmacy	29	25%
Support team	11	9%

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 is present in the figure below. According to the study, it implies that minority of those who had issues of drug inventory security management had diplomas and certificates qualifications.

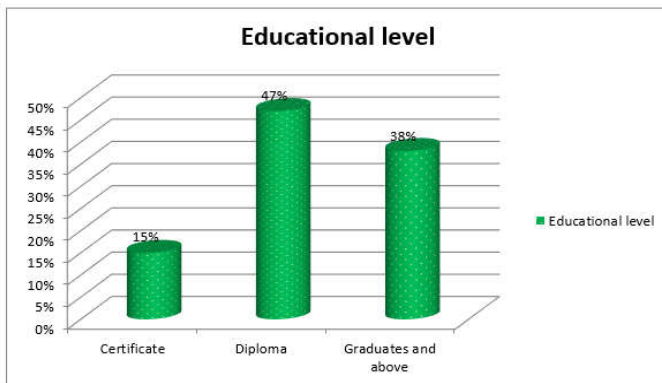


Figure 2: Level of Education

4.2 Descriptive Statistics

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 stage from procurement to disbursement to the patients the study further examined the aspect training on proper drug handling on drugs. 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 are presented in the table below.

Table 3: 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 3, 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 has 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 3 discloses 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 Odhiambo (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.

4.3 Inferential Statistics

Hypothesis Ho₁: 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 0.02 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

$$Y = b_0 + b_1x_1 + e$$

For the hypothesis, it was stated as follows

Ho₁: skills of staff have no significant influence on drugs inventory security management

Table 4: Model Summary

Model	R	R ²	Adjusted R ²	Std Error	Change Statistics				
					R ²	f-change	d.f.1	d.f.2	F
1	0.667	0.446	0.446	0.70434	.446	596.214	1	542	0.00

From the above table, R^2 was 0.446 meaning that 44.6 percent of the variations in drugs security management was explain by the influence of skills of staff. This leaves 55.4 percent of the variation unexplained. This was interpreted to mean the model provides a weak fit.

Table 5: ANOVA 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			
		663.878			

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. 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. The findings on the factor of staff skills were found to be similar to those captures by Keitany, Mwaura and Odhiambo (2015). In their study on drug storage and maintenance in hospitals, their study concluded that although most members of staff had relevant academic qualifications and experience, they required regular short courses to upgrade their knowledge and acquire best practice in their operations. On this factor of staff skills, the study found that is p -value was 0.02 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 0.02 was less than the alpha value. This finding was captured in the SPSS data output alongside other results.

CONCLUSION OF THE STUDY

On the aspect of the skills of staff , the study concludes that this factor significantly influence the drugs decently in hospitals. 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.

RECOMMENDATIONS OF THE STUDY

Turning to the aspect of staff skills working in hospitals, the study recommends that only those who meet the minimum academic and professional qualifications should provide service where drugs are handled. By so doing drugs diversion problem by non-professional like cleaners, security staff, catering staff, drivers and casual workers may be minimized. However, in case such members of staff work closely as a team with the medical staff, then regular sensitizations should be done to ensure that they uphold proper work ethics.

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.

- i. Drugs supply chain risks and mitigation strategies in organizations
- ii. Information sharing practices among staff and procurement challenge
- iii. Addressing procurement challenge in public hospitals.

REFERENCES

- Allen, K. (2011). *Explaining Cronbach's Alpha. 1st ed.* [eBook] Oklahoma: School of Industrial Engineering - The University of Oklahoma, pp.1-15
- Battini, D., Hassini, E., Manthou, V., & Azzi, A., (2016). Human Resource Management Assessment Tool by Management Sciences for Health. *BMC Public health*, vol 5: 140.
- Fathalla, M., & Maggy F. (2013). A framework for the evaluation of quality of care in maternity services. *University of Southampton*, Highfield.
- García-Alcaraz, J. L., & Maldonado-Macías, A. A. (2016). Concepts of Just-in-Time (JIT). In *Just-in-Time Elements and Benefits* (pp. 3-20). Springer International Publishing.
- Glesne, C. (2015). *Becoming qualitative researchers: An introduction*. Pearson.
- Godeliver, A. B, Kagashe, & Terevael, M (2014). Medicine Stock Out and Inventory Management Problems in Public Hospitals in Tanzania: A Case of Dar Es Salaam Region Hospitals. *International Journal of Pharmacy*, 2(2), 252-259.
- Hair, J.R., William, C.B. & Barr, J.B. (2010). *Multivariate Analysis*, 7th Edition, London, Pearson Prentice Hall.
- Health Act, (2012). *National Council for Law Reporting with the Authority of the Attorney*. Laws of Kenya.
- Holman F. W. (2016). Commodities Regulation Bulletin. *International Journal on Trade and supplies*, Europe.
- Kaloli, M. E., Paczkoski, M., Mburuku, G., Pinho, H.D. & Galea, S. (2015). "In-depth assessment of the medicines supply system in Tanzania, Dar es salaam, Tanzania
- Kausar, S., Afzal, H., Kumar, B., Hasan, R., Prabhat, P., & Kumar, V. Y. (2013) "Storage of pharmaceuticals in products" *World journal of pharmacy and pharmaceutical science*, Vol 2 issue 5:2499-2515

- Keitany, G., Mwaura K., & Odhiambo, M. (2015). Factors Affecting drug storage and maintenance in Nyanza hospitals. *African Journal of Health*, Vol 18 (6) 414-421.
- Mbuvi, D.K, Mwenda, L.M, & Wachira, A. W (2016). Effects of Drug and Substance Abuse on Mugging Among Youth in Koro Area –Mathare, Nairobi County, *Journal of Human and Cultural Studies, Research and Development*.
- Ministry of Health (2014). *National Referral Health Facilities and National Health Policy Bill*. Government Press, Nairobi, 2014.
- Ministry of Planning and National Development. (2008). Republic of Kenya, A globally competitive and prosperous Kenya. First Medium Term Plan 2008-2012, *Ministry of State for Planning, National Development and Vision 2030*.
- Mishra, Dept. of Mathematics, Amity Institute of Applied Sciences, Amity University, Noida, India, Pandey Dept. of Mathematics, JSS Academy of Technical Education, Noida, (2015). India conducted a study on analysis of drugs in hospital pharmacy by inventory management in India. *Journal of young pharmacists*, 2(2), 201-205.
- Mwita, S., Tunzo, N., Jande, M., & Hamasaki, K. (2017). Availability of prescribed medicines for elders at Sekou-Toure Regional Referral Hospital in Mwanza, Tanzania. *Tanzania Journal of Health Research*, 19(4).
- Oliha, J. (2014). Adolescent and drug Abuse, In Tertiary Institution Implication for counseling. *Journal Operations and Production Management*, Vol.13, pp. 23-30.
- Republic of Kenya (2000). *Cap 446 through Kenya Medical Supplies Agency Order (legal No 17 February)* Nairobi, Government Printers.
- Republic of Kenya (2013b). *Kenya Vision 2030: Second Medium Term plan 2013-2017* Nairobi, Ministry of Devolution and; planning, Nairobi
- Republic of Kenya (2016). *Kenya Demographic and Health Survey, KDHS- 2016/2017*, Nairobi, Government printers.
- Shiau, J., Li, X., & Zheng, M. (2012). Drug inventory control for outpatient services. *CIE42 Proceedings. Cape Town: South Africa. July*, 16-18.
- Tajima, M. (2007). Strategic value of RFID in supply chain management. *Journal of purchasing and supply management*, 13(4), 261-273.
- Trans Crime Data (2016). Report on Counterfeiting and Organized Crime. The Italian Case. *United Nations Interregional Crime and Justice Research Institute*, 12(2), 226-241