Journal of International Business, Innovation and Strategic Management
Vol 1 Issue (2), 142- 162
ISSN: 2617-1805 (Print)

Determinants of Effective Implementation of Procurement Systems for Reproductive Health Supplies: A Case of Kenya Medical Supplies Authority

Wycliffe Peter Osengo

College of Human Resource and Development, Jomo Kenyatta University of Agriculture and Technology

Corresponding Author email: wyclifeosengo@yahoo.com

To cite this article:

Osengo, W. (2018). Determinants of Effective Implementation of Procurement Systems for Reproductive Health Supplies: A Case of Kenya Medical Supplies Authority. *Journal of International Business, Innovation and Strategic Management*, 1(2), 142- 162

Abstract: Health systems strengthening (HSS) is high on the agenda of donors, governments and other stakeholders in the health sector, especially in fragile states, where the government is either not able or not willing to deliver core services to the majority of its people. In these states, the challenge to meet the health MDGs and provide the population with sustainable and equitable health services is far greater than in other developing countries. In these contexts, improving health service delivery not only stands to make significant gains in overall population health indicators, but also has the potential to contribute to reducing state fragility. To have this, an effective procurement system is mandatory. The current study established the factors influencing successful implementation of effective procurement systems for procurement of reproductive health supplies at Kenya Medical Supplies Authority. The study specifically sought to establish the influence of technical capacity, institutional infrastructure, financing and legal and regulatory environments on implementation of effective procurement systems of reproductive health supplies at Kenya Medical Supplies Authority. The target population for this study was employees in lower, middle and top management positions in procurement, warehousing, distribution and operation departments at KEMSA. A total of 116 employees from the lower, middle and top management positions in procurement, warehousing, distribution and operation departments comprising of supervisors, team leaders, managers and assistant managers. The results indicated that all the variables tested, that is, technical capacity of procurement personnel, institutional infrastructure, and financing and legal and regulatory environment affect effective procurement. The study recommends that the government and other policy makers in the Ministry of health, KEMSA and other public institutions should formulate policies that would enhance the procurement of not only reproductive health supplies but also other goods by the government.

Keywords: *Technical capacity, Institutional infrastructure, Financing, Legal and regulatory environments*

Introduction

Shortfalls in the public-sector supply of essential reproductive health (RH) medicines—including contraceptives, medicines for prevention and treatment of sexually transmitted infections, and medicines to ensure healthy pregnancy and delivery—have critical implications for sexual and reproductive health in the developing world. Approximately 215 million women in developing countries face an unmet need for effective contraceptives. Satisfying this unmet need would prevent 53 million unintended pregnancies, resulting in 150,000 fewer maternal deaths and 640,000 fewer newborn deaths each year (World Health Organization, United Nations Population Fund, 2010). Global stakeholders have shown growing commitment to developing sustainable procurement systems, as demonstrated by increased funding and technical support from donors. In addition, developing countries are increasing their demand for functional procurement systems and taking on more responsibility for leading procurement efforts. Efforts to develop procurement capacity, however, have often focused on short-term technical needs with less emphasis on linking these efforts to broader capacity development in public-sector health care systems.

Within this context, many developing countries have faced recurring challenges with procurement of reproductive health supplies (United Nations Population Fund, 2010).Effective procurement systems are critical for ensuring access to reproductive health medicines and other essential health supplies. Many developing countries are insufficiently prepared to manage this increased responsibility. In 2005, the United Nations Population Fund (UNFPA) disbursed more than US$30 million to more than 50 countries to avoid shortfalls in emergency RH supplies, illustrating the magnitude and severity of this problem (Rao, Mellon & Sarley, 2009). Under the Paris Declaration, donors and partner countries jointly committed to provide sufficient resources to support and sustain medium- and long-term procurement reforms and capacity development. They also agreed that countries should lead the reform process, with donors playing a supporting role. These initiatives will require a comprehensive approach to ensure that capacity development efforts result in the desired gains (Alemayehu, Belachew & Tilahun, 2012).

Statement of the Problem

The inability of country programs to procure essential medicines effectively and efficiently is a key barrier to commodity security—the right of every person to obtain and use health commodities when and where they need them. The challenge, as with many public health objectives is, at least in part, financial: inadequate funding to purchase essential medicines for growing populations that do not have the means to access private health care or pay subsidized public sector prices. Often overlooked, however, is the need to build effective procurement systems to enable programs to select, forecast, and quantify needs; identify suppliers; manage the tender and bidding process; maintain transparency and accountability; ensure quality products; and manage and monitor performance (Rao, Mellon & Sarley, 2009). Procurement capacity development efforts have focused on improving procurement techniques (the means of achieving the acquisition of goods and services), with less emphasis on integrating this work into broader development or reform activities in the public sector (Bakker, 2010). This approach however fails to address factors within the public-sector environment that are critical to successful, efficient, and sustainable procurement practices.

These factors include a supportive government with strong policies, legislation, and public financial-management practices (Bakker, 2010).In Kenya, procurement of medical supplies including reproductive health supplies has been a recurring problem. KEMSA is the organization that has been mandated to carry out the procurement function for the Ministry of health. There have been numerous complaints from the public health facilities regarding erratic supplies of the essential drugs and other medical supplies thus putting its performance in question (Kazi, 2012). Ngetich (2014) also argues that the performance of KEMSA has continued to face challenges as the previous assessments have established that KEMSA warehouses do not meet good distribution practices recommended by World Health Organization (WHO). The continued question on the procurement performance of especially reproductive health supplies is a key challenge that needs a quick readdress in Kenya (Kazi, 2012). The repercussions for shortfalls in supply of reproductive health supplies including contraceptives, medicines for prevention and treatment of sexually transmitted infections, and medicines to ensure healthy pregnancy and delivery cannot be under stated as they have critical implications for sexual and reproductive health in the developing world including Kenya. A proper and effective procurement system for procurement of reproductive health supplies at the ministry of health in Kenya needs to be put in place. But this has not been adequately addressed as Kazi (2012) puts it thus raising the question of what factors influence successful implementation of effective procurement systems for procurement of reproductive health supplies at the ministry of health in Kenya? Upon this backdrop, the current study established some of those factors.

Objectives of the Study

i. To establish the influence of technical capacity of procurement personnel on implementation of procurement systems for reproductive health supplies at Kenya Medical Supplies Authority
ii. To determine the influence of institutional infrastructure on implementation of procurement systems for reproductive health supplies at Kenya Medical Supplies Authority
iii. To assess the influence of financing on implementation of procurement systems for reproductive health supplies at Kenya Medical Supplies Authority
iv. To find out the influence of legal and regulatory environments on implementation of procurement systems for reproductive health supplies at Kenya Medical Supplies Authority

Literature Review

Supply Chain Operations Reference (SCOR)

According to Council of Supply Chain Operations Reference (2010), the Supply Chain Operations Reference (SCOR) model provides a unique framework that links performance metrics, processes, best practices, and people into a unified structure. The framework supports communication between supply chain partners and enhances the effectiveness of supply chain management, technology, and related supply chain improvement activities (Agrawal, et al., 2009). SCOR metrics provide the basis for an organization to measure how successful it is in achieving its desired objectives (SCC, 2012). The key success of SCM will rely on the incorporation of

the activities of the supply chain, meaning cooperation, information flow and organization throughout the entire supply chain.

Resource Based View Theory

The theory describes how business owners build their business from the resources and capabilities that are currently possessed or can be acquired. Resources have been found to be important antecedents to products and ultimately to performance (Armstrong & Taylor, 2014). Resource may be tangible or intangible and are harnessed into strengths and weaknesses by companies and in so doing lead to competitive advantage. The resource based theory continues to be refined and empirically tested (Bharadwaj, Saxena & Halemane, 2010). The resource based view addresses the resources and capabilities of the firm as underlying factors of performance. Capabilities do not depend only on firm resources: they are more than resource sets, more than a function of prior resource deployment. Capabilities govern how resources are transformed into products through firm specific organizational norms and routines; through the development, management and interchange of information and knowledge via human capital and through the creation of an organizational culture that supports the firm's global activities and derives from a collective learning process (Medcof & Song, 2013).

Theory of Supply Chain Management

The notion of Supply Chain management as used in many research is usually linked with the globalization of producing and the penchant for manufacturers to source their inputs planetary, which necessitates management of profitable ways of regulating worldwide flows of inputs or outputs. As competition in international markets is progressively dependent upon arrival time of goods as well as their quality, coordination between suppliers and distributors has become an important characteristic of the Supply Chain (Mentzer *et al.,* 2011). Effective management of the linking processes in a supply chain is crucial (Mentzer, *et al.*, 2011). Additionally, market uncertainty necessitates Supply Chains to be easily flexible to changes in the situation of trade. Such flexibility in supply requires effective Supply Chain Management. Supply chain can be summed up as a series of interconnected activities which are concerned with planning, coordinating and controlling materials, parts and finished products from supplier to customer Ostrom (2010). The key success of SCM will rely on the incorporation of the activities of the supply chain, meaning cooperation, information sharing and organization throughout the entire supply chain.

Strategic Triangle Theory

The public value theory was previously developed before the development of strategic triangle theory. The public value theory argues that the creation of public value is the ultimate goal of public sector programmes and activities – the value proposition that should guide public organizations (Moore, 1995; Moore, 2000). Moore (1995) formulated the Public Value framework to imbue public sector managers with a greater understanding of the constraints and opportunities within which they work, and the challenge to create publically valuable outcomes. His central proposition was that public resources should be used to increase value not only in an economic sense but also more broadly in terms of what is valued by citizens and communities. Moore (1995) then developed a 'strategic framework' in an attempt to capture the aims and constraints of public sector management and to help align goals, authorization and operational capability (Moore, 1995). The Public Value approach envisages a manager's purpose as going beyond implementation of policy and adherence to institutional norms. It includes seeking out opportunities to make significant improvements to the lives of the

public. The role is envisaged as a strategic decision maker who works at the intersection between three imperatives of value, legitimacy and feasibility.

Conceptual Framework

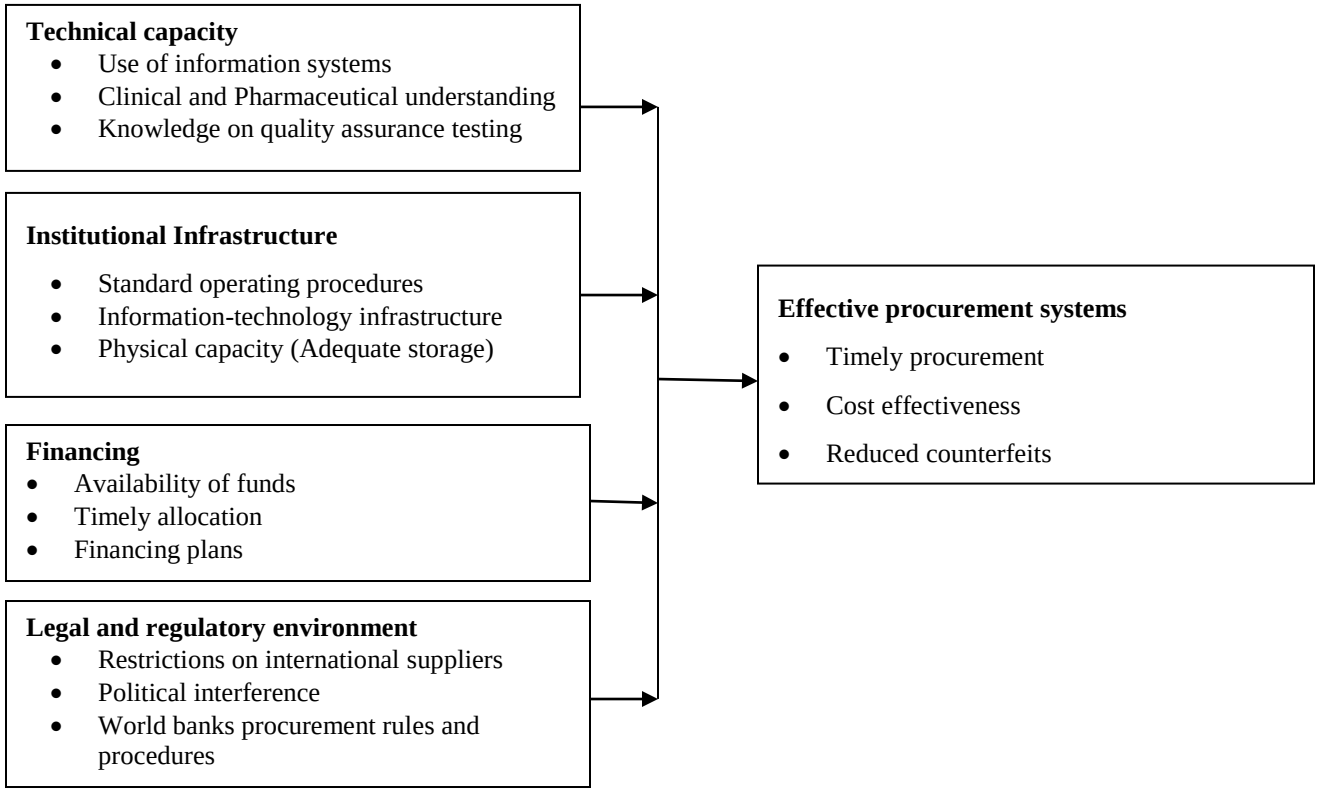

Figure 1: Conceptual Framework

Research Methodology

This study employed descriptive research design. Descriptive research is conducted to describe the present situation, what people currently believe, what people are doing at the moment and so forth (Olusola *et al*, (2013). The target population for this study was employees in lower, middle and top management positions in procurement, warehousing, distribution and operation departments at KEMSA. According to the KEMSA human resource report 2016, there were a total of 116 employees from the lower, middle and top management positions in procurement, warehousing, distribution and operation departments comprising of supervisors, team leaders, managers and assistant managers. The study adopted a census survey since the population of the study was small. Therefore the sample size consisted of 116 employees.

Blumberg, Cooper and Schindler (2014) argue that a census approach can be adopted for a population less than 200. Mugenda & Mugenda (2009) defines a sample as the selected respondents who represent the entire population. The study used primary data gathered by use of structured questionnaires and captured through a 5-point Likert scale type. Data gathered from the questionnaires was analyzed quantitatively using statistical package for social sciences (SPSS) computer software version 21. SPSS which generate both descriptive and inferential statistics was employed. Descriptive statistics including the mean and standard deviation was used to capture the characteristics of the variables under study. Inferential statistics; regression coefficient and bivariate correlation was used to analyze the relationship of the dependent variable and the independent variables. The following regression model aided in determination of coefficients of the independent in relation to the dependent variable. The multivariate model is as follows:

$$\mathbf{Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon}$$

Where; Y = Effective procurement of reproductive supplies, X_1 = Technical capacity of procurement personnel, X_2= Institutional infrastructure, X_3= Financing, X_4 = Legal and regulatory framework, ε = Error term. In the model, $\beta 0$ = the constant term while the coefficient β_i i= 1….4 was used to measure the sensitivity of the dependent variable (Y) to unit change in the predictor variables. ε is the error term which captures the unexplained variations in the model. Results were presented in form of tables, charts and figures.

Results

Response Rate

Figure 1 indicates the response rate of the study. A total of 86 filled questionnaires were returned out of the 116 that were distributed, yielding a 74% percent response rate. However, 30 questionnaires were completely not responded to by the targeted respondents (representing 26%). The response rate of 74% was found to be above the acceptable range for such a survey. Saunders, *et al.*, (2007) have argued that in research a response rate of above 50% is adequate, 60% is good and a response rate of over 70% is very good. Based on these assertions, the response rate of 74% was therefore considered representative of the respondents to provide information for analysis and deemed acceptable for making statistical inferences.

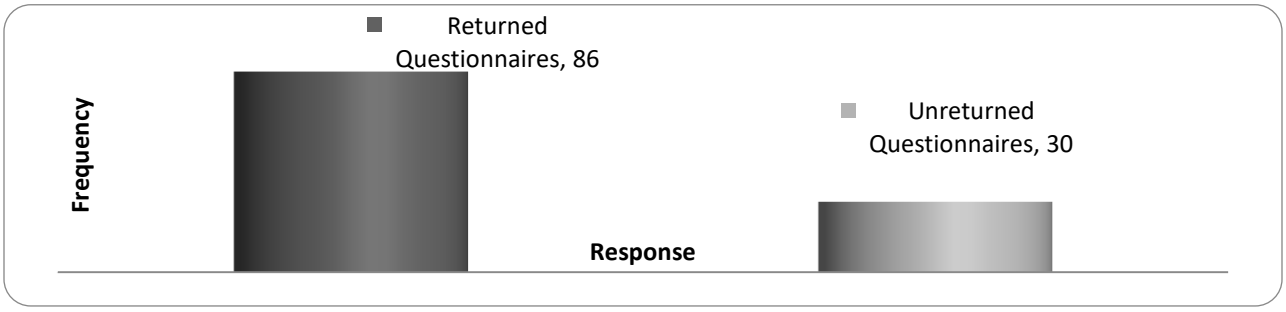

Figure 1 Response Rate

Demographic Results

Respondents' Position

The study sought to establish the respondent's position at work. Employees in diversified management positions were considered for the study. The groups ranged from manages, assistant manager, supervisors and team leaders. The findings indicated in Figure 2 reveal that majority of the employees in management positions at KEMSA are supervisors, then team leaders followed by assistant managers and the least the managers. The findings imply that the management structure at KEMSA prefers fewer top management employees and more low level management employees. The results indicate diversity among the participants in the study hence the information obtained was varied.

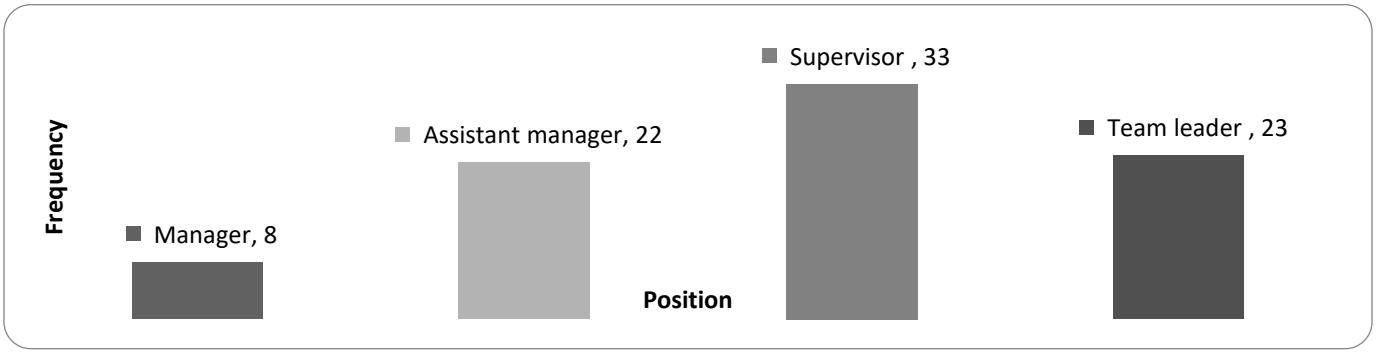

Figure 2 Respondents position

Age of the respondents

The study sought to establish the respondent's age bracket and the findings presented in form of a pie chart. The age was presented in three categories from less than 29 years, between 30-39 years and over 50 years. The results showed that the majority participants had an age bracket of between 30 and 39 years followed by over 40 years and lastly below 29 years. This shows that there is a significant variation in the age bracket among the employees in management position at KEMSA. The results also mean that majority of the employees in management positions are aged between 30 and 39 years. These results also indicate that promotion to management positions at KEMSA is directly linked to employees approaching the older age but above 30 years. This confirms argument by Bowen & Staudinger (2012) that relative to younger adults, older adults tend to be chronically less oriented toward approaching possible gains (promotion orientation).

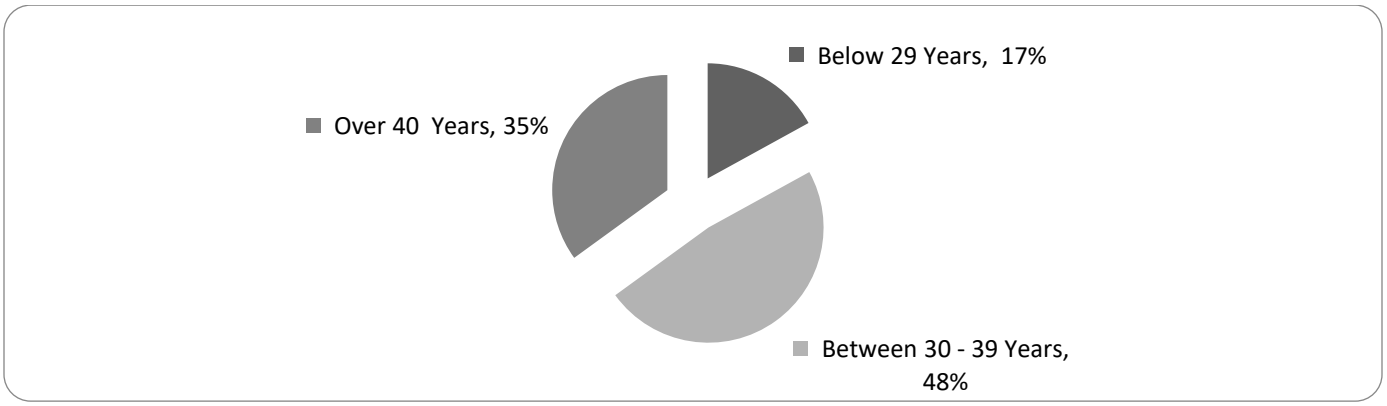

Figure 3 Respondents Age bracket

Respondents Level of Education

The respondent's level of education was also established so as to establish the variation in the level of education in the different management positions at KEMSA. The highest number of the respondents in management positions at KEMSA had a graduate level of education, followed by diploma (32%), postgraduate diploma and lastly a certificate at 3%. This is an indication employees in management positions at KEMSA are literate. The findings are consistent with Harvey (2010) who indicated that high level of education is linked to higher employment positions.

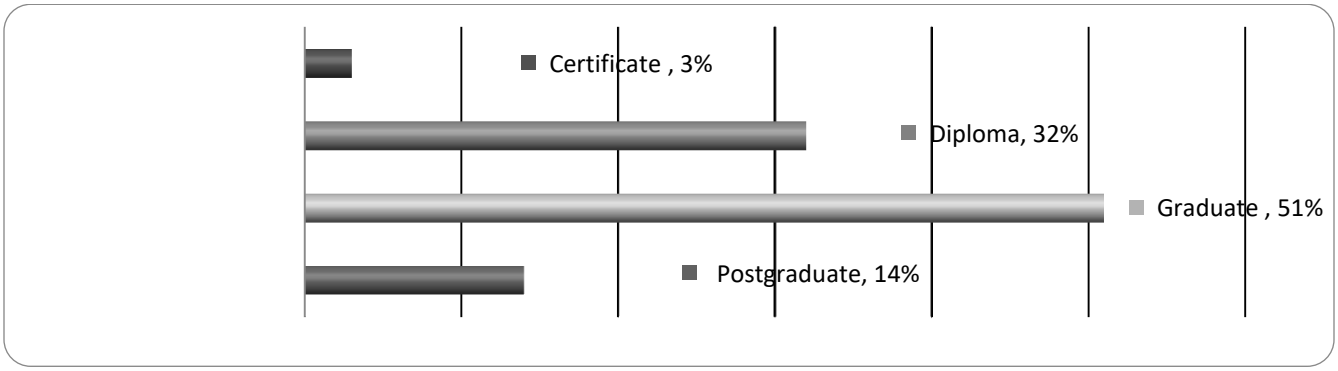

Figure 4 Respondents Level of education

Descriptive Findings and Analysis

Procurement effectiveness

The study asked the respondents to rate the level of effectiveness in the procurement of reproductive health supplies at KEMSA for the last 4 years since 2013.A scale of 3 from not effective, effective and very effective was used. The findings in Table 4.2 indicated that for the last four years, the respondents rated the procurement process as effective as indicated by a rating of 81% in the year 2013, 79% in the year 2014, 70% in the year 2015 and 75% in the year 2016. The rate of effective however seems to be adopting a decreasing trend towards the year 2016. This is an indication that the procurement of reproductive health supplies is facing more challenges as the years go by. These findings agree with Kazi (2012) that the procurement performance of especially reproductive health supplies is a key challenge that needs a quick readdress in Kenya.

Table 1: Effectiveness of the procurement process

Year/ Rate	Not effective	Effective	Very Effective	Total
2013	19%	46%	35%	100%
2014	21%	39%	40%	100%
2015	30%	28%	42%	100%
2016	25%	43%	32%	100%

The respondents were also asked to indicate the trend of the changes in the measures of procurement in terms of lead time, procurement costs and quality captured as number of counterfeits in as far as the procurement of reproductive health supplies is concerned. The findings in Table 4.3 revealed that majority (62%) of the respondents were of the opinion that the number of counterfeit reproductive health supplies had decreased, 53% believed that procurement costs had increased and 60% indicated that lead time in procurement had decreased. The findings also agree with Ngetich (2014) who argues that the performance of KEMSA has continued to face challenges in its procurement performance.

Table 2: Trends in Indicators of effective procurement

Indicator	Increased by over 50%	Increased by less than 50%	Decreased by less than 50%	Decreased by over 50%
Number of counterfeit supplies	0%	38%	32%	30%
Procurement costs	22%	31%	32%	15%
Lead time in procurement	12%	28%	51%	9%

The study then asked the respondents to rate statements on effective procurement on a five point Likert scale ranging from strongly disagree to strongly agree. The findings are indicated in Table 3.

Table 3: Effective procurement

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
There is procurement of quality reproductive supplies	8.6%	14.3%	11.4%	34.3%	31.4%	3.66	1.30
The costs involved in procurement of reproductive supplies is efficient	2.9%	22.9%	5.7%	8.6%	60.0%	4.00	1.37
Procurement of reproductive supplies is normally done in time	5.7%	17.1%	2.9%	40.0%	34.3%	3.80	1.26
The tender and bidding process for reproductive health supplies is effective	14.3%	14.3%	22.9%	14.3%	34.3%	3.40	1.46
There is transparency and accountability in the process of procurement of reproductive health supplies	11.4%	20.0%	25.7%	22.9%	20.0%	3.20	1.30
Average						**3.61**	**1.34**

Results on Table 3 show that majority 65.70% of all the respondents felt that there is procurement of quality reproductive supplies ,68.60% of all the respondents indicated that the costs involved in procurement of reproductive supplies is efficient, 74.30% of all the respondents indicated that procurement of reproductive supplies is normally done in time, 48.60% of all the respondents indicated that the tender and bidding process for reproductive health supplies is effective and 42.90% of all the respondents stated that there is transparency and accountability in the process of procurement of reproductive health supplies. The average mean of the responses indicated from the results was 3.61 which show that the respondents were agreeing on most of the statements while the standard deviation was 1.34 which indicates that the answers received were varied as they were dispersed far from the mean.

Technical Capacity of Procurement Personnel

The respondents were asked to indicate their thought on whether the current compositions of employees have the technical knowhow to procure reproductive health supplies. The results in Figure 5 indicate that 98% of the 86 respondents agreed that the current compositions of employees have the technical knowhow to procure reproductive health supplies.

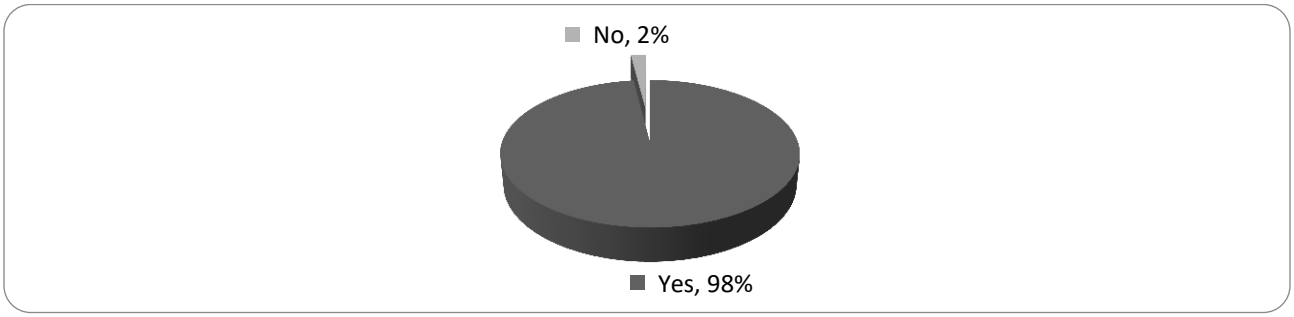

Figure 5 Presence of technical knowhow to procure

The study further sought to find out the level of respondent's opinion on technical capacity of the procurement personnel. The summary of responses is as shown in Table 4.4 showed that majority 77.10% of all the respondents said that the personnel have knowledge on the use of information systems in activities involving procurement, 60% of all the respondents agreed that the personnel in the procurement departments have clinical and pharmaceutical knowledge, 74.30% of all the respondents indicated that the personnel in the procurement departments have knowledge on quality assurance testing, 57.10% of all the respondents indicated that the personnel have knowledge on procurement procedures regarding compliance with world bank procurement rules as well as regarding meeting international bidding standards. 68.60% of the respondents also agreed that the personnel have knowledge on the use of information systems in activities involving procurement.

Table 4 Technical Capacity of the Procurement Personnel

Statement	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
The personnel have knowledge on the use of information systems in activities involving procurement	5.7%	5.7%	11.4%	51.4%	25.7%	3.86	1.06
The personnel in the procurement departments have clinical and pharmaceutical knowledge	8.6%	14.3%	17.1%	31.4%	28.6%	3.57	1.29
The personnel in the procurement departments have knowledge on quality assurance testing	8.6%	5.7%	11.4%	40.0%	34.3%	3.86	1.22
The personnel have knowledge on procurement procedures regarding compliance with world bank procurement rules	8.6%	11.4%	22.9%	17.1%	40.0%	3.69	1.35
The personnel have knowledge on procurement procedures regarding meeting international bidding standards	5.7%	11.4%	25.7%	25.7%	31.4%	3.66	1.21
The personnel have knowledge on the use of information systems in activities involving procurement	5.7%	8.6%	17.1%	8.6%	60.0%	4.09	1.29
Average						**3.79**	**1.24**

Institutional Infrastructure

The respondent's opinion on whether the current institutional framework efficiently supports effective procurement of reproductive health supplies. Majority of the respondents, 53%, indicated that the current institutional framework efficiently supports effective procurement of reproductive health supplies while 47% indicated that it does not. This implies that there is indifference in the opinion on whether the infrastructure efficiently supports effective procurement of reproductive health supplies. The institution may consider improving it as some of its employees in management position have a feeling that it does support effective procurement. The results are shown in Figure 6.

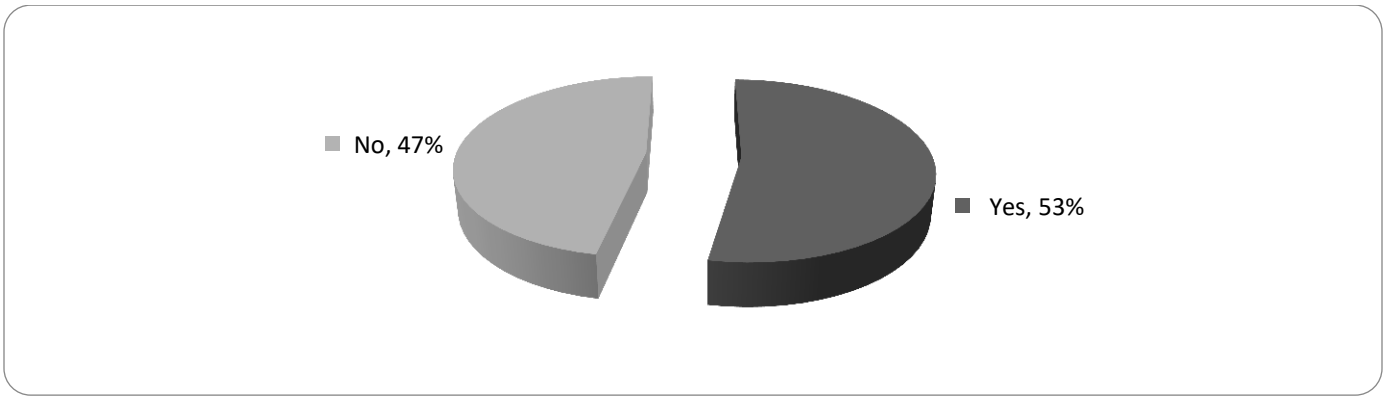

Figure 6 Efficiency of the current institutional Framework

The study then sought to find out the level of respondent's opinion on institutional infrastructure. The summary of responses shown in Table 5 show that 65.7% of the respondents indicated that there are well established standard operation procedures (SOPs) to enhance accountability, 77.1% agreed that there is a functioning IT infrastructure to aide in procurement activities, 60% of all the respondents said that there is adequate physical capacity in terms of warehouses and 62.8% of the respondents agreed that there are well established guidelines and SOPs for compliance with national and international guidelines.

Table 5 Institutional Infrastructure

Indicator	Strongly Disagree	Dis agree	Neutral	Agree	Strongly Agree	Mean	Std Dev
There are well established standard operation procedures (SOPs) to enhance accountability	5.7%	17.1%	11.4%	28.6%	37.1%	3.74	1.29
There is a functioning IT infrastructure to aide in procurement activities	0.0%	5.7%	17.1%	31.4%	45.7%	4.17	0.92
There is adequate physical capacity in terms of warehouses	5.7%	14.3%	20.0%	25.7%	34.3%	3.69	1.25
There are well established guidelines to enhance governance	0.0%	14.3%	22.9%	37.1%	25.7%	3.74	1.01
There are well established guidelines and SOPs for compliance with national and international guidelines	2.4%	17.6%	28.0%	20.2%	31.8%		
Average						**3.84**	**1.12**

Financing

The study asked the respondents to indicate whether the organization receives enough funding to handle and improve the systems involved in procurement of reproductive health supplies. The findings in Figure 7 show that majority, 60% showed that the organization does not receive enough funding to handle and improve the systems involved in procurement. This is probably an appeal to the national government to allocate more funds so that the systems can be improved.

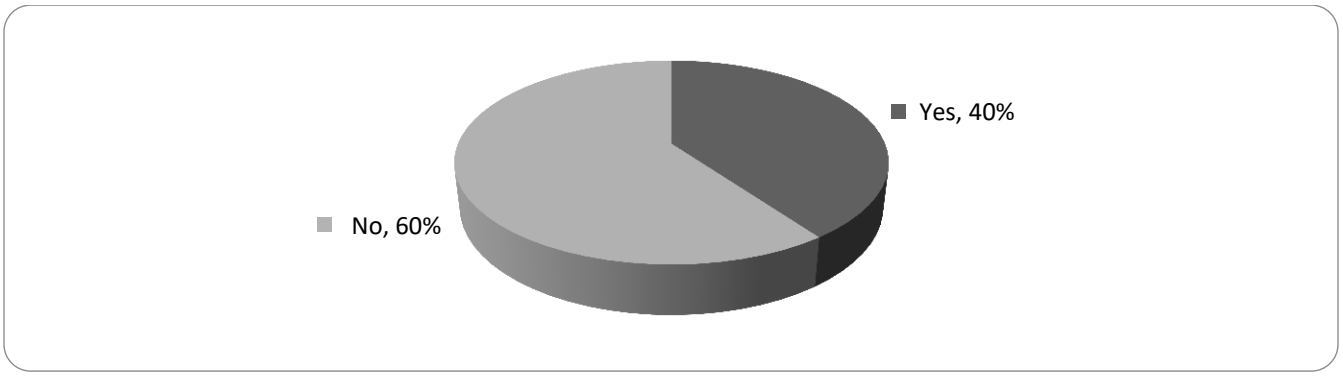

Figure 7 Funding to handle and improve the systems

The study further sought to find out the level of respondent's opinion on financing. The summary of responses is as shown in Table 6 indicated that that majority, 80% of all the respondents agreed that enough finances are always availed for procurement activities, 74.3% of all the respondents stated that there is timely allocation of funds to avoid extra costs, 65.7% indicated that there is a well-established financing plan by the management, 62.9% agreed that proper costing is conducted using previous procurement pricing data and current international reference prices (IRPs) and 80% said that a budget estimate is always developed for the quantities of product required while those who agreed with the statement that enough finances are always availed for procurement activities were 94.3%.

Table 6 Financing

Indicator	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Enough finances are always availed for procurement activities	8.6%	2.9%	8.6%	37.1%	42.9%	4.03	1.20
There is timely allocation of funds to avoid extra costs	5.7%	8.6%	11.4%	31.4%	42.9%	3.97	1.20
There is a well-established financing plan by the management	5.7%	8.6%	20.0%	25.7%	40.0%	3.86	1.22
Proper costing is conducted using previous procurement pricing data and current international reference prices (IRPs)	2.9%	14.3%	20.0%	22.9%	40.0%	3.83	1.20
A budget estimate is always developed for the quantities of product required.	0.0%	8.6%	11.4%	42.9%	37.1%	4.09	0.92
Enough finances are always availed for procurement activities	0.0%	0.0%	5.7%	51.4%	42.9%	4.37	0.60
Average						**3.83**	**1.06**

Legal and Regulatory Environment

The study sought to find out whether the available local, national and international legal and regulatory framework for procurement of reproductive health supplies was flexible. The results showed that majority of the respondents (63%) indicated that the available legal and regulatory environment was not flexible. This is an indication that the government can consider a revision of the existing national regulations on procurement and liaise with other international bodies for instance WHO to find a way of improving the international procurement regulations on reproductive health supplies.

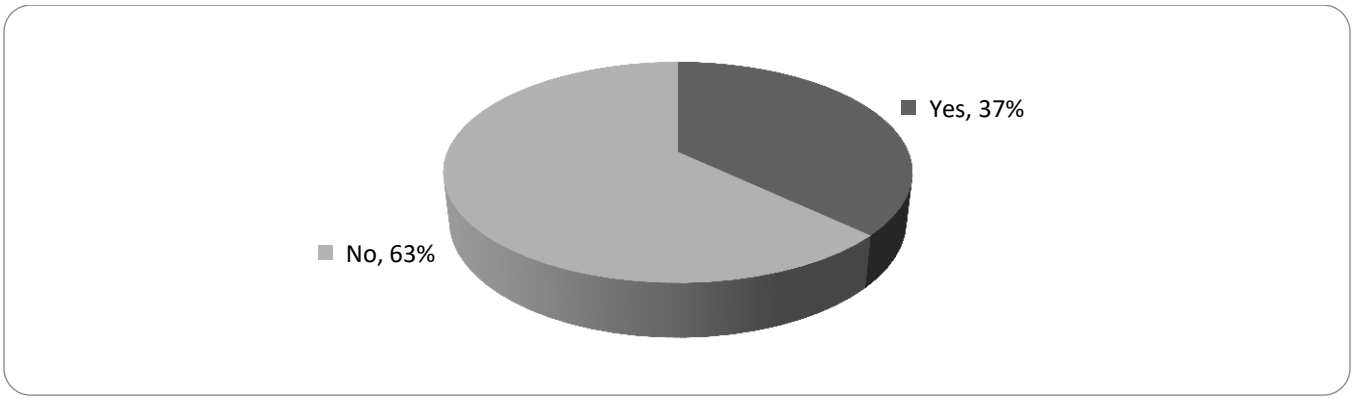

Figure 8 Flexibility of the available Legal and regulatory environment

The study also sought to find out the level of respondent's opinion on legal and regulatory environment. The summary of responses is shown in Table 7 indicated that 65.7% of the respondents indicated that proper mechanisms have been put in place to prevent restrictions on international suppliers, 85.7% agreed that there is minimal political interference in the procurement process while 62.9% of all the respondents said that the World Bank procurement rules and procedures are strictly followed when procuring. The findings are consistent with Arney, Yadav, Miller & Wilkerson (2014) who argued that legal, policy, and regulatory environments has a significant effect on procurement-related challenges.

Table 7 Legal and Regulatory environment

Indicator	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Mean	Std Dev
Proper mechanisms have been put in place to prevent restrictions on international suppliers	0.0%	14.3%	20.0%	34.3%	31.4%	3.83	1.04
There is minimal political interference in the procurement process	0.0%	8.6%	5.7%	42.9%	42.9%	4.20	0.90
The World bank procurement rules and procedures are strictly followed when procuring	2.9%	22.9%	11.4%	28.6%	34.3%	3.69	1.25
Both national and international procuring guidelines are strictly followed when procuring	5.7%	8.6%	22.9%	14.3%	48.6%	3.91	1.27
Regulations involving procurement with public funds allow unrestricted access to international suppliers in order to build competitive bidding	2.9%	14.3%	22.9%	25.7%	34.3%	3.74	1.17
Average						**3.87**	**1.13**

Correlation Analysis

Table 8 Correlation Analysis

		Technical capacity	Institutional Infrastructure	Financing	Legal and regulatory environment
Technical capacity	Pearson Correlation	1			
	Sig. (2-tailed)				
Institutional Infrastructure	Pearson Correlation	.438**	1		
	Sig. (2-tailed)	0.000			
Financing	Pearson Correlation	.566**	.823**	1	
	Sig. (2-tailed)	0.000	0.000		
Legal and regulatory environment	Pearson Correlation	.244*	.448**	.324**	1
	Sig. (2-tailed)	0.014	0.000	0.000	
Effective procurement	Pearson Correlation	.345**	.641**	.421**	.542**
	Sig. (2-tailed)	0.000	0.000	0.000	0.000
	N	86	86	86	86

** Correlation is significant at the 0.01 level (2-tailed).

The findings indicated that technical capacity had a weak but positive and significant association with effective procurement (Pearson coefficient = 0.345, Sig = 0.000). The results showed that an increase in knowledge on the use of information systems in activities involving procurement, clinical and pharmaceutical knowledge, knowledge on quality assurance testing, knowledge on procurement procedures regarding compliance with world bank procurement rules , knowledge regarding meeting international bidding standards and knowledge on the use of information systems in activities involving procurement is significantly associated with effective procurement of reproductive health supplies.

The findings are consistent with the findings of a study by Kiage (2013) which established that the technical capacity has a significant impact on procurement performance in the public sector in Kenya. The findings also indicated that institutional infrastructure had a strong positive and significant association with effective procurement (Pearson coefficient = 0.641, Sig = 0.000). The results imply that an increase in establishment of standard operation procedures (SOPs) to enhance accountability, improvement of the functioning IT infrastructure to aide in procurement activities, adequacy of physical capacity in terms of warehouses and establishment of guidelines and SOPs for compliance with national and international guidelines is positively and significantly associated with effective procurement of reproductive health supplies.

The findings are consistent with the findings of a study by Ngugi and Mugo (2014) which revealed that ICT infrastructure adoption affected procurement process of health care supplies in the public sector to a great extent. The findings further revealed that financing had a weak positive and significant association with effective procurement (Pearson coefficient = 0.421, Sig = 0.000). The results indicate that an increase in favourable financing practices for instance that allocation of enough finances for procurement activities, timely allocation of funds to avoid extra costs, having a well-established financing plan by the management, conducting proper costing using previous procurement pricing data and current international reference prices (IRPs) and developing a budget estimate for the quantities of product is positively and significantly associated with effective procurement of reproductive health supplies. The results are consistent with the findings of a study by Bashuna (2013) which showed that effective financing and the internal control system leads to effective management of the procurement function.

Lastly, legal and regulatory environment also had strong positive and significant association with effective procurement (Pearson coefficient = 0.542, Sig = 0.000). The results showed that an increase in activities involving putting in place proper mechanisms to prevent restrictions on international suppliers, having minimal political interference in the procurement process, strictly following World Bank as well as the national and international WHO procurement rules and procedures when procuring and allowing unrestricted access to international suppliers in order to build competitive bidding is positively and significantly associated with effective procurement of reproductive health supplies. The findings are consistent with the findings of a study on building effective sustainable systems for procuring essential reproductive health supplies by Cohen, Reeh & Neroutsos (2011) and established that there is a need for development of other areas of the public-sector health care system that enable and support good procurement practices for instance human resources and management; institutional infrastructure; the legal, policy, and regulatory environment; government leadership; financing; and transparency so as to have an effective procurement.

Regression Model Estimation

To establish the determinants of effective implementation of procurement systems for reproductive health supplies at Kenya Medical Supplies Authority, the study used a multivariate ordinary least square regression model. The regression results show that R was 0.778 which shows that the correlation between the joint predictor variables (technical capacity of procurement personnel, institutional infrastructure, financing and legal and regulatory environment) and dependent variable (effective procurement) is positive. The coefficient of determination explains the percentage of variation in the dependent variable (effective procurement) that is explained by all the four independent variables (Technical capacity of procurement personnel, institutional infrastructure, financing and legal and regulatory environment).The coefficient of determination also called the R^2 was 0.605. This means that the combined effect of the predictor variables (Technical capacity of procurement personnel, institutional infrastructure, financing and legal and regulatory environment) explains 60.50% of the effectiveness of procurement at KEMSA. This therefore means that other factors not studied in this research contribute 39.50% of the effectiveness of procurement at KEMSA. Therefore, further research should be conducted to investigate the other factors that explain 39.50% effectiveness of procurement at KEMSA.

Table 9 Model Summary

Model summary

R	R Square	Adjusted R Square	Std. Error of the Estimate
0.778	0.605	0.552	0.254

The F value of 11.489 is significant at a significance value of 0.000 which is less than 0.05 at 5% level of significance. This shows that the overall model was significant. This shows that the combined effect of Technical capacity of procurement personnel, institutional infrastructure, financing and legal and regulatory environment were statistically significant in explaining the effectiveness of procurement at KEMSA. To further compare the results, a comparison of the F critical value using 4 degrees of freedom and 81 degrees of freedom established as 2.484 from the normal distribution table was compared with the 11.489 and since F calculated (11.489) was greater than F critical (2.484), similar conclusions were made that the overall model was significant and that the combined effect of Technical capacity of procurement personnel, institutional infrastructure, financing and legal and regulatory environment were statistically significant in explaining the effectiveness of procurement at KEMSA.

Table 10 Analysis of Variance (Overall Model Significance)

	Sum of Squares	df	Mean Square	F	Sig.
Regression	10.653	4	2.663	11.489	0.000
Residual	6.954	81	0.232		
Total	17.607	85			

Table 11 Regression coefficients

Predictor variables	Beta	Std. Error	t	Sig.
Constant	1.443	0.509	2.833	0.008
Technical capacity of procurement personnel	1.146	0.399	2.873	0.007
Institutional infrastructure	0.527	0.211	2.496	0.018
Financing	1.688	0.338	4.995	0.000
Legal and regulatory environment	0.594	0.263	2.254	0.032

Dependent variable : Effective implementation of procurement systems

The data findings analyzed also shows that taking all other independent variables at zero, a unit increase in technical capacity of the personnel leads to a 1.146 unit increase in effective procurement. The results showed that an increase in knowledge on the use of information systems in activities involving procurement, clinical and pharmaceutical knowledge, knowledge on quality assurance testing, knowledge on procurement procedures regarding compliance with world bank procurement rules , knowledge regarding meeting international bidding standards and knowledge on the use of information systems in activities involving procurement significantly affects effective procurement of reproductive health supplies. The results are consistent with Njeru (2015) who found out lack of the required technical skill affect procurement systems in the firms in the private sector. Furthermore, taking all other independent variables at zero, a unit increase in institutional infrastructure leads to a 0.527 unit increase in effective procurement. The results imply that an increase in establishment of standard operation procedures (SOPs) to enhance accountability, improvement of the functioning IT infrastructure to aide in procurement activities, adequacy of physical capacity in terms of warehouses and establishment of guidelines and SOPs for compliance with national and international guidelines positively and significantly affects effective procurement of reproductive health supplies.

The results agree with the findings of a study by Kingori and Ngugi (2014) sought to establish the determinants of procurement performance in the public sector in Kenya and established that top management support and the institutional frameworks established by the top management positively affected procurement performance in the public sector. The results further reveal that taking all other independent variables at zero, a unit increase in financing leads to a 1.688 increase in effective procurement. The results indicate that an increase in favourable financing practices for instance that allocation of enough finances for procurement activities, timely allocation of funds to avoid extra costs, having a well-established financing plan by the management, conducting proper costing using previous procurement pricing data and current international reference prices (IRPs) and developing a budget estimate for the quantities of product positively and significantly affect effective procurement of reproductive health supplies.

The results are supported by the findings of Wanyonyi (2014) who concluded that procurement strategy implementation is performing poorly due to Poor leadership, lack of adequate resources, frequent management changes and lack of strategy communication contributed to the challenges. The results further reveal that taking all other independent variables at zero, a unit improvement in legal and regulatory environment leads to a 0.594 unit increase in effective procurement. The results showed that an increase in activities involving putting in place proper mechanisms to prevent restrictions on international suppliers, having minimal political interference in the procurement process, strictly following World Bank as well as the national and international WHO procurement rules and procedures when procuring and allowing unrestricted access to international suppliers in order to build competitive bidding positively and significantly affect effective procurement of reproductive health supplies.

Conclusions

The study concluded that an increase in knowledge on the use of information systems in activities involving procurement, clinical and pharmaceutical knowledge, knowledge on quality assurance testing, knowledge on procurement procedures regarding compliance with world bank procurement rules , knowledge regarding meeting international bidding standards and knowledge on the use of information systems in activities involving procurement significantly affects effective procurement of reproductive health supplies.

The study also concluded that an increase in establishment of standard operation procedures (SOPs) to enhance accountability, improvement of the functioning IT infrastructure to aide in procurement activities, adequacy of physical capacity in terms of warehouses and establishment of guidelines and SOPs for compliance with national and international guidelines positively and significantly affects effective procurement of reproductive health supplies. The study also concluded that an increase in activities involving putting in place proper mechanisms to prevent restrictions on international suppliers, having minimal political interference in the procurement process, strictly following World Bank as well as the national and international WHO procurement rules and procedures when procuring and allowing unrestricted access to international suppliers in order to build competitive bidding positively and significantly affect effective procurement of reproductive health supplies.

Recommendations of the Study

The study recommends that the government and other policy makers in the Ministry of health, KEMSA and other public institutions should formulate policies that would enhance the procurement of not only reproductive health supplies but also other goods by the government. This is because legal and regulatory environments concerning national and international procurement rules affect effective procurement. The study also recommends that the Ministry of Health as well as Kenya Medical Supplies Agency should focus on building effective procurement systems of reproductive health supplies through strengthening their technical capacity, improving on financing and institutional infrastructure.

Conflict of Interest

No potential conflict of interest was reported by the authors.

References

Agrawal, S., R. N. Sengupta, et al. (2009). "Impact of information sharing and lead time on bullwhip effect and on-hand inventory." *European Journal of Operational Research* 192(2): 576-593.

Babbie, E., & Mouton, J. (2001). The practice of social science research. Belmont, CA: Wadsworth.

Bakker G. (2010). *A Weak Link in the Chain: Opportunities for Improving Global Fund Grant Performance by Strengthening Procurement and Supply Management*. Washington, DC: Global AIDS Alliance.

Birdsall, N., De La Torre, A., & Menezes, R. (2010). *Fair growth: economic policies for Latin America's poor and middle-income majority*. Ctr for Global Development.

Buckley, G. J., & Gostin, L. O. (2013). Causes of Falsified and Substandard Drugs.

Cohen, J., Reeh, C., & Neroutsos, K. (2011). Building effective sustainable systems for procuring essential reproductive health supplies.

Drew R. (2007). *Strategic Options for Greater European Investment in Reproductive Health Supplies. London: Interact Worldwide*

Eurodad. (2008). *Turning the Tables: Aid and Accountability Under the Paris Framework*. Brussels: European Network on Debt and Development.

Gall, M.D., Gall, J.P., & Borg, W.R. (8th Ed.). (2007). Educational Research: An Introduction. Boston, MA: Pearson.

Kazi, S. K. (2012). *Supply chain management practices and performance at Kenya Medical Supplies Agency* (Doctoral dissertation, The University of Nairobi).

Lu, C., Schneider, M. T., Gubbins, P., Leach-Kemon, K., Jamison, D., & Murray, C. J. (2010). Public financing of health in developing countries: a cross-national systematic analysis. *The Lancet*, *375*(9723), 1375-1387.

Mahoney, R. T., Krattiger, A., Clemens, J. D., & Curtiss, R. (2012). The introduction of new vaccines into developing countries: IV: global access strategies. *Vaccine*, *25*(20), 4003-4011.

Mugenda, O. M. &Mugenda, A. G. (2011). *Research Methods*: Quantitative and Qualitative Approaches, Acts Press, Nairobi, Kenya

Ngetich, D. T. (2014). *Outsourcing and supply chain performance of Kenya medical supplies agency* (Doctoral dissertation, University of Nairobi).

Ostrom, E. (2010). "Beyond Markets and States: Polycentric Governance of Complex Economic Systems." *American Economic Review* 100 (June 2010):): 32.

Sarley D, Dayaratna V, Abramson, W. *et al*. (2006). Options for Contraceptive Procurement: Lessons Learned from Latin America and the Caribbean. Arlington, Virginia: DELIVER.

SCC. (2012). *Supply Chain Operations Reference (SCOR) Model Version 11.*

Shamoo, A. E., & Resnik, D. B. (2003). Responsible conduct of research. Oxford University Press.

Travis, P., Bennett, S., Haines, A., Pang, T., Bhutta, Z., Hyder, A. A., ... & Evans, T. (2014). Overcoming health-systems constraints to achieve the Millennium Development Goals. *The Lancet*, *364*(9437), 900-906.

Tsui, A. O., McDonald-Mosley, R., & Burke, A. E. (2010). Family planning and the burden of unintended pregnancies. *Epidemiologic reviews*, *32*(1), 152-174.

Woodle D. (2000). Vaccine procurement and self-sufficiency in developing countries. *Health Policy and Planning* 15:121–129.

World Health Organization (2012). Operational Principles for Good Pharmaceutical Procurement. Geneva: WHO.